

# Pattern of corneal blindness in Goro district, Gurage zone, southern Ethiopia

Dereje Negussie, Yonas Tilahun

## Abstract

There are about 37 million blind people in the world. In Ethiopia there are 1.15 million blind people, corneal blindness accounted for 19% of cases. The objective is to identify determinants and pattern of corneal blindness in Goro district, Gurage Zone in Southern Ethiopia. A cross sectional descriptive study and multistage sampling technique were used to identify the study units and subjects. The prevalence of blindness in the study area was 1.5% and out of which corneal blindness accounted for 20.8% of the blindness. Trachoma had caused 80% of the corneal blindness. Determinants like application of herbal medicine, recurrent painful red eye or ocular trauma was not reported to cause bilateral corneal blindness. The prevalence of monocular blindness was 1.89%. Corneal blindness accounted for 36.7% of the cases. Trauma and trachoma were found in 31.6% and 15.8% of unilateral corneal blindness respectively. Trachoma is the leading cause of bilateral corneal blindness. Non trachomatous corneal opacity is the major cause of unilateral corneal blindness. Health education and training mid level health workers on the management of treatable and preventable cause of corneal blindness is highly recommended. [*Ethiop.J.Health Dev.* 2008;22(3):298-301]

## Introduction

The World Health Organization (WHO) defines blindness as a visual acuity of less than 3/60 in the better eye. *Corneal blindness* defined if the visual acuity in that eye was less than 3/60 as a result of a corneal disease. Currently there are about 37 million bilaterally blind people in the world. (1). In Africa blindness prevalence rates vary widely but evidence suggests that approximately 1% Africans are blind (2). In Ethiopia, the prevalence of blindness is 1.6% and corneal blindness accounts over 19% of the blindness (3). Low vision and blindness in adults in Gurage zone showed the prevalence of blindness to be 7.9 % (4).

The structural and functional integrity of the cornea is of paramount importance for normal visual function. Its external location makes it vulnerable to a variety of insults, each of which can lead to sight-threatening sequelae. Infections, injuries, malnutrition, congenital or hereditary problems and iatrogenic diseases constitute the gamut of etiologic factors leading to corneal blindness.

As to the best of our knowledge, a community based study on pattern of corneal blindness was not done in the country. This study will help to give base line information about the determinants and pattern of corneal blindness in community.

## Methods

A cross-sectional descriptive study was carried out to identify the determinants and pattern of corneal blindness, in Goro district, Gurage zone in Southern Ethiopia from Sep 30–Oct 30, 2006. The Woreda was selected with direct allocation purposively taking into consideration time, cost and manpower.

The study was undertaken in all age groups who reside in the study area for greater than two months. All people in a household were eligible for the study.

## SAMPLE SIZE AND SAMPLING PROCEDURE SAMPLE SIZE DETERMINATION

$$N = (1.96)^2 p (1-p) / w^2 \text{ where } P = 19\% (2). \\ N = (1478)$$

Multistage sampling technique was employed to identify the study units and subjects. Goro district had 30 peasant associations (PAs) with homogenous subjects. Using simple random sampling, 11 PAs were selected from 30 PAs. In each PA, there were 2-5 villages. One village was selected with simple random sampling from each PA.

Each village had an average of 100-150 households. The household was used as sampling unit. The first household was selected by rotating a pen at center of the village, thereafter; using systematic random sampling, every 5<sup>th</sup> household was selected to get 27 households per village. We moved from house to house to get a total number of 296 households. This produced the sample size of 1585 individuals which exceeded the calculated sample size of 1478. This was due to large variation in household size.

For this study, WHO classification of visual acuity (V/A) interpretation was used and blindness was defined as a visual acuity of less than 3/60 in the better eye. Corneal opacity is a whitish scar of the cornea with different degree of density. Determinants are factors that are considered to cause corneal opacity.

Data were collected using structured pre-tested questionnaire. Two trained interviewers who completed grade 12 and residents of the area conducted the interview. The head of the house hold was informed of the study aim and asked for verbal consent before interview. The interview and examination applied at the convenience of the individual study subject. Ophthalmic examination of the study subjects were done with 2x magnifying loupe, torch and ophthalmoscope. Examination was done by the investigator who was a third year ophthalmic resident that could diagnose and manage most ophthalmic problems. But examination was limited by the lack of a slit lamp or tonometer as a result, for example, glaucoma was not diagnosed. Each questionnaire was checked for completeness and consistency by the investigator at scene of the data collection. Any incomplete questionnaire was revised and data made complete.

Cases with treatable conditions like trichiasis and cataract were referred to the nearest health unit. Health education and early intervention on eye diseases were given at the time of examination.

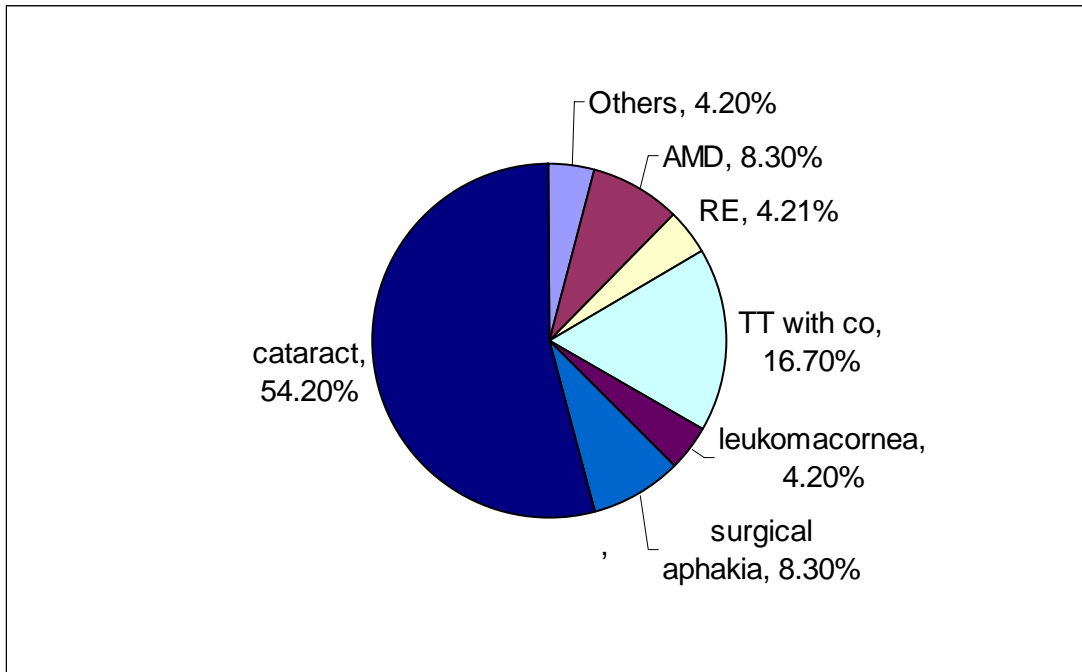
This study was approved by the Research and publication committee of the Department of

Ophthalmology, Faculty of Medicine of Addis Ababa University. Permission was obtained from Goro health desk and Woreda administrative.

Collected data were entered a computer and processed using SPSS software Version 11 statistical soft ware. After organizing and cleaning the data, frequencies and percentage were calculated on all variables that are related to the objectives of the study. Cross tabulation and 95% confidence intervals were calculated.

**Results**

A total of 1585 subjects were included in the study with response rate of 100%. Females were 54.4% of the study subjects. The mean age of individuals involved in the study was 20 years, with a SD of ±19.18. Under five children and those greater than 15 years accounted 23.3% and 41.4% of the study subjects respectively. The average household size was 5.37 with SD of ±1.79. Out of the total study subjects, there were 24 (1.5%) blind people from different causes. This was found in the age group 35-80 years with the mean age of 61.7 and SD of ±11.38. About fifty four percent of the cases were cataract and it was the leading cause of blindness followed by corneal blindness which was 20.8% of the blindness (See Fig-1).



Key: - AMD - age related macular degeneration, RE-Refractive error, TT-Trachomatous Trichiasis, CO-corneal opacities

Figure 1: Causes of bilateral blindness, Goro district, 2006

There were 5(20.8%) cases of bilateral corneal blindness. Trachoma caused 4(80%) of corneal blindness and 16.7 % (4/24) of total blindness cases (see fig -1). It was seen in patients above 40 years. It was higher in females than males making a male to female ratio of 1:4. This finding was statistically significant [OR = 1.684, 95% CI (0.610-4.646)], p-value = 0.014. Mean duration of corneal blindness was 6.75 years and with a SD of  $\pm$  2.98. In one case, the cause was not defined (Non-Trachomatous). Determinants like trauma, application of herbal medication, ocular surgeries or inflammatory condition were not detected in five cases of corneal blind individuals. The types of cornea opacities were diffuse and dense with vascularization.

The prevalence of monocular blindness was 1.89%. Corneal opacities accounted 11(36.7%) of unilateral blindness followed by cataract 6(20 %). (See Fig.2) Mono ocular blindness was still more common in female than in males making male to female ratio of unilateral blindness to be 1: 1.3.

Non trachomatous corneal opacities were seen in 8(72.2 %) of unilateral corneal blindness and the rest were caused by trachoma. Still unilateral corneal blindness was more prevalent in female than male with male to female ratio of 1:1.25. Trauma was found as a cause of unilateral corneal opacities in 6(54.5 %) of the cases. Corneal opacities were in left eyes and in right eye 57.9 % and 42.1% of the cases respectively. Other determinants were not reported in monocular corneal blind individuals.

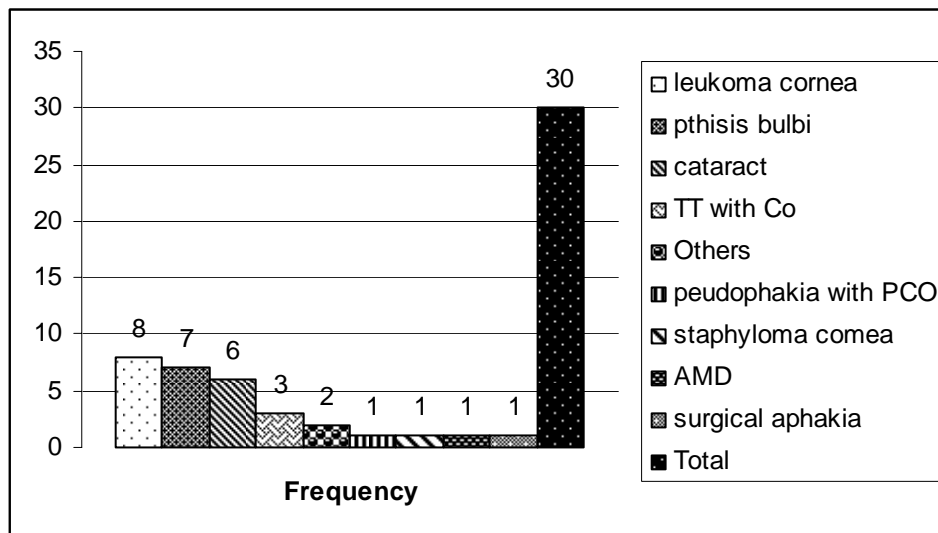


Figure 2: Distributions of causes of monocular blindness. Pattern of corneal blindness in Goro, District, Gurage Zone, 2006

### Discussion

So far there is no community based study on the pattern of corneal blindness in the country and most studies are hospital based. This study will give preliminary information on the problem. Children under 15 years accounted 58.6% of the study subject but no cases of bilateral blindness were seen in children. There were more blind women than men both in case of unilateral and bilateral blindness. This is probably due to economic dependence of females and poor medical seeking behavior. The finding goes with most studies in Africa (2)

Prevalence of corneal blindness in this study was 20.8% of the total blindness which is closer to the findings of the recent Ethiopia national blindness survey which was 19% of cases (3). But It was lower than the study done in Jima that accounted for 25.4% of the cases (9). The leading causes of blindness in study area were cataract, followed by corneal blindness especially trachomal

causes. Population-based studies in Africa have also shown that corneal disease is usually the second leading cause of blindness, second to cataract which is similar with our finding. (5) But corneal blindness is greater than cataract blindness in Central African Republic (10). This may be explained by the fact that Central African Republic is onchocerciasis endemic area that causes most corneal blindness.

Trachoma caused 80% of the bilateral corneal blindness and 16.7% of total blindness. This figure is higher than the national blindness of Ethiopia which was 11%. This might be due to endemicity of trachoma in study area. The use of traditional eye medicines (TEM) is a major risk factor in the current epidemic of corneal ulceration in developing countries. The study in Africa showed a relation between peripheral corneal ulceration and use of TEM which was not seen in this study. This might be due to unreliability in the response of the study population on the use of TEM. (8).

Corneal opacities were the leading causes of unilateral blindness and accounted for 36.7% of unilateral blindness. Trauma was the major cause of the unilateral corneal blindness. In Malawi, Tanzania, and Bangladesh; corneal scarring was found to be responsible for 39-55% of all cases of unilateral blindness and comparable to our study.

Trachoma is the leading cause of bilateral corneal blindness. Non trachomatous corneal opacities are the leading cause of unilateral corneal blindness. Other determinants were not reported. As much as 95% of all bilateral blindness in the study population is either curable or could have been prevented through health education or early intervention. So health education and training of IECWs are highly recommended.

#### Acknowledgment

The research was made possible by the full support of ORBIS International-Ethiopia. I thank Goro health desk for facilitating this study and I am grateful to all people in the study area for giving their time and assistance for the study. Lastly, I would like to thank the Department of Ophthalmology, for providing me with the necessary equipments to do ophthalmic examination.

#### References

1. Resnikoff S, Pascolini D, Etya'ale D, et al Global data on visual impairment blindness in the year 2002: Bull World Health Organ. 2004;82(11):844-51.
2. Lewallen S, Courtright P. Blindness in Africa: present situation and future needs. Br J Ophthalmol 2001;85:897-903.
3. Berhane Y, Worku A, Bejiga A et al. prevalence and causes of blindness and low vision in Ethiopia. Ethiop J Health Dev. 2007;21(3):204-210.
4. M. Melese, W. Alemayehu, S Bayou, Low vision and blindness in adults in Gurage Zone, central Ethiopia, British Journal of Ophthalmology 2003;87:677-680.
5. Taylor KI, Taylor HR. Distribution of azithromycin for the treatment of trachoma [commentary]. British Journal of Ophthalmology, 1999;83:134-135.
6. Kocak-Midillioglu I I. Penetrating keratoplasty in patients with corneal scarring due to trachoma. Ophthalmic Surgery and Lasers, 1999;30:734-741.
7. Jackson H, Foster A. Causes of blindness in northwest Cambodia. Ophthalmic Epidemiology, 1997;4:27-32.
8. Lewallen S, Courtright P. Peripheral corneal ulcers associated with use of African traditional eye medicines. British Journal of Ophthalmology, 1995;79:343-346.
9. Zerihun N, Mabey D. Blindness and low vision in Jima Zone, Ethiopia: results of a population-based survey. Ophthalmic Epidemiology, 1997;4:19-26.
10. Schwartz EC. Blindness and visual impairment in a region epidemic for onchocerciasis in the Central African Republic. British Journal of Ophthalmology, 1997;81:443-447.