

Prevalence and causes of blindness in Merhabete, North Shoa, Ethiopia

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Abstract

Background: Baseline data on the prevalence and causes of blindness which are important pre-requisites for prevention of blindness strategies are scarce in Ethiopia.

Objectives: To determine the prevalence and causes of blindness in Merhabete Woreda (district) of North Shoa Zone, Ethiopia.

Methods: In the year 2000, a cross-sectional, community based survey was conducted in 6 kebeles of Merhabete Woreda which have a total population of 23,000.

Results: Among the 23,000 people screened 21,350 were available for visual acuity test and 225 blind people were identified giving a prevalence ratio of 1%. It is estimated that there are 1000 blind people in the Woreda. The leading cause of blindness is corneal opacity accounting for 50% of cases while glaucoma and cataract accounted for 27.7% and 11.4% of cases respectively. Ninety percent of the blindness is either preventable or curable.

Conclusion: As in many parts of the country, blindness is a serious public health problem in this area, requiring concerted efforts to tackle the problem. Since 90% of the blindness is due to either preventable or curable causes, the burden of blindness can be minimized by employing strategies directed against the major causes of blindness. [*Ethiop. J. Health Dev.* 2002;16(1):71-76]

Introduction

Most of the world's blind people live in developing countries with blindness rates 10-20 times higher than that in developed countries. Blindness rates in developing countries are often in the range of 1-3% or higher, while figures for the developed countries are in the order of 0.1-2% (1-8). The majority of the blindness in developing countries is due to either preventable or curable causes (1). The leading causes of blindness in developing countries are generally associated with poverty, illiteracy and deprivation, most commonly found in rural often remote and undeveloped areas. The problem of blindness in these countries is compounded by the lack of adequate baseline data on the prevalence and causes of blindness. A community based prevalence study was conducted in Merhabete Woreda of North Shoa Zone in September 2000. It is hoped that data obtained from this survey will contribute to the national database on blindness prevalence and its causes.

Subjects and Methods

Merhabete Woreda (District) is found in the Northern Shoa Zone of the Amahara Regional Administration, 180 kms north of Addis Ababa. It has a population of just over 100,000. The Woreda consists of 19 peasant associations and 2 urban settlements. Except for the very few urban settlements, the majority of the population lives in a rural setup with agriculture as their main form of subsistence. The Woreda is a mountainous one with difficult terrain. Most of the people live in areas, which are not easily accessible. Consequently, infrastructures like roads, health facilities, schools, etc. are poorly developed. Regarding health facilities in the Woreda, there is one health

center, seven health stations and nine health posts that are serving the community. There is some primary eye care activity in the Woreda supported by NGO's which includes lid surgery for trachoma and Vitamin A distribution. Small-scale cataract campaigns were also conducted repeatedly. There are few health assistants who are trained to perform lid surgery. There is neither an ophthalmologist nor another category of ophthalmic health worker in the District or the Zone.

A 25% cluster sample of the Woreda population (100,000) was randomly selected resulting in the inclusion of the whole population of 6 randomly selected kebeles out of the 21 kebeles and peasant associations. In this study, the national blindness prevalence estimate of 1.5% was used to calculate the necessary sample size (11), though according to WHO guidelines a sample size of 2500 persons is said to be sufficient to estimate causes of blindness to a level of public health importance (7). The sample size calculation estimated that about 20,000 people should be surveyed to maintain the validity of the survey. The total population in the 6 Kebeles, which were included in the survey, was 23,000 while the number of people available for visual acuity testing was 21,350.

In the next phase of the study 12 enumerators, who are health workers, were trained in the technique of visual acuity testing. A pretest was done to evaluate the agreement level between the enumerators and the ophthalmologist, which was found to be greater than 90%. The enumerators made house - to - house visits to all of the households in the 6 kebeles. Visual acuity testing was done using the illiterate Snellen E chart at 6 meters in adequate daylight, outdoors. After performing the initial visual acuity testing, they gave appointments for those people who fulfil the WHO criteria of blindness (i.e visual acuity of $\leq 3/60$ in the better eye with available correction) (1). One ophthalmologist did the second round of evaluation for all the blind people at nearby clinics and peasant association offices. The ophthalmologist confirmed the presence of blindness using testing procedures described above, and performed ocular examinations to establish the cause of blindness. A hand held torch, magnifying loupe, Schoitz tonometer and direct ophthalmoscope were used to establish diagnosis on all the blind people. A WHO adopted, simplified methodology for the assessment of blindness and its main causes was used as a protocol (11). Open ended questionnaires were used to interview the blind people, which included information on socio-demographic data, past and present ocular history, use of modern or traditional medicine and the perception of patients about their illness and were filled by the ophthalmologist. After completing the ocular examination and establishing the most likely cause of blindness, subjects who required medical treatment or surgical intervention were duly identified and were either managed on the spot or were referred.

Data obtained by interview and examination was entered into EPI-INFO 6 software pro-program for data analysis.

Results

The total number of people living in the 6 surveyed kebeles and covered by the survey was 23,000. Of these 21, 350 (93.7%) were available for visual acuity testing. The house-to house visit and visual acuity test identified 225 blind people who fulfil the WHO definition of blindness. This gives a blindness prevalence of 1.0%. Of the 225 blind people, 166 (73.8%) presented for the detailed examination and interview by the ophthalmologist. The age of the patients ranged from 7 to 88 years with a mean of 55 years and median of 59 years (Table 1). Of the 166 blind people 100 (60%) were females and 66 (39.9%) males with a F:M ratio of 1:0.6.

Questions about the marital status of the 166 blind people revealed that the majority of the patients (75%) are divorced, never married or widowed. Concerning their educational level, 155 (93.4%) are illiterate. One hundred thirty (78.3%) blind people reported that they have no source of income and that they are totally dependent on siblings or relatives for their livelihood while 24 (14.5%) people claimed to have some income (Table 1).

Table 1: **Socio -demographic characteristics of blind people in Merhabete Woreda, 2000 (n=166)**

Characteristics	Frequency	Percent (%)
Age group (in years)		
≤14	5	3.0
15-24	5	3.0
25-34	9	5.4
35-44	15	9.0
45-54	38	22.7
55-65	40	24.5
65-74	38	22.7
75-84	15	9.0
≥85	1	0.6
Marital Status		
Divorced	70	41.7
Married	40	24.4
Never married	21	13.1
Widowed	35	20.8
Educational Level		
Illiterate	155	93.4
Read/Write	10	6.0
1-6 th grade	1	0.6
Occupation		
Jobless (no source of income)	130	78.3
Farming	24	14.5
Others	12	7.2

Regarding the causes of blindness, this survey found the leading cause of blindness to be corneal opacity, accounting for 50% of the blindness. Glaucoma accounted for 27.7% of the blindness while cataract was the cause of blindness only in 11.4% of cases. The rest of the blindness is accounted for by miscellaneous causes like retinal pathologies (1.8%) optic atrophy (1.2%), uncorrected aphakia (3.0%) (Table 2 and 3). Corneal opacities, cataract and glaucoma together accounted for almost 90% of the blindness.

Of the 115 blind people who responded to questions about the circumstances related to their blindness, the majority (47.8%) didn't know the circumstances related to their blindness, while others attributed their blindness to causes like inturning of eyelashes (17.4%), eye infection (23.5%), trachoma (5.2%), systemic illnesses (3.5%) and other causes (1.7%).

Table 2: Causes of blindness in Merhabete Woreda, 2000

Diagnosis	Frequency n=166	Percent (%)
Corneal opacity	83	50.0
Glaucoma	46	27.7
Cataract	19	11.4
Uncorrected aphakia	5	3.9
Retinal lesions	3	1.8
Optic atrophy	2	1.2
In determinate	3	1.8
Others	5	3.0

Table 3: Frequency of findings related with blindness in Merhabete Woreda 2000

Clinical	Frequency n=166	Percent (%)
Corneal opacity	106	63.9
Entropion-trichiasis	49	29.5
Corneal opacity with previous lid surgery	29	17.5
High intra-ocular pressure and glaucomatous optic atrophy	43	26.4
Cataract	29	17.5
Phthisis bulbi	18	10.8
Corneal ulcer/decematocele	6	3.6
Uncorrected aphakia	5	3.8
Retinal pathologies	3	1.8
Optic atrophy	2	1.2

NB Total exceeds 166 because of multiple pathologies

Questions regarding what patients did about their blindness revealed that 49.7% of the blind people didn't do anything about their illness while 36.5% visited a health institution, traditional healer or Holy water (13.5%).

Discussion

Understanding the magnitude, geographical distribution and causes of blindness within a region or a country are essential for the design of an effective intervention program. Hospital and clinic based data cannot be relied upon to give the real picture prevailing in a community. Prevalence

surveys are therefore, the only means of developing reliable data on the prevalence and causes of blindness in a community.

This survey found a blindness prevalence of 1.0% among the community in Merhabete Woreda. Though the available data on pre-valence and causes of blindness in Ethiopia are incomplete, the prevalence of blindness in Ethiopia is estimated at 1.5%, ranging from 0.55% to 2.98% in different parts of the country (9,11). A similar survey in Butajira, in the Southern Region, found the prevalence of blindness to be 1.1% which is similar to our finding. According to WHO guidelines, blindness prevalence rates of $\geq 1.0\%$ are considered as significant public health problem (14). Using this prevalence rate, the estimated number of blind people in the Woreda, which has a population 100,000, will be 1,000. In this survey we haven't included the prevalence of visual impairment which is visual acuity of $\leq 6/18$ and $> 3/60$ in the better eye, according to WHO definitions (1). But from the point of view of visual disability, these are an important group of people and it is estimated that for every one blind person there will be three visually impaired people (1). Using this relationship it is estimated that there are 3, 000 visually impaired people in Merhabete Woreda making the total number of people with visual disability 4,000.

Blind people are known to suffer from social and economic deprivation, as was found in this survey. Other studies have also demonstrated that these people suffer an increased mortality compared to their age matched compatriots. (13).

The male to female ratio in this study is 0.6:1.0. This is in accordance with the findings of other surveys, which have revealed more blindness burden among females (2-8). The age distribution among the blind people found in this study is similar to the findings of previous surveys both in Ethiopia and globally (1-8,13). The toll of blindness increases with increasing age as is clearly shown in this survey (Table 1).

With regard to the causes of blindness, cataract is said to be the leading cause of blindness in the world (9,13). According to a WHO survey in Ethiopia in 1981, trachoma accounted for 42% of the blindness (9). A similar study in Butajira by Wondu et. al found trachoma to be the leading cause of blindness accounting for 35% of causes (13). In this survey, we found 50% of the blindness to be due to corneal opacities. Though all corneal opacities may not be secondary to trachoma, the high prevalence of entropion-trichiasis among these patients suggests that trachoma may well be the leading cause of blindness among these patients. School health surveys conducted in the Woreda by the NGO Menchen fur Menchen have found active trachoma rates as high as 60% (unpublished report). Besides, most of the blind cases with phthisis may well also be secondary to complications of trachoma. The high prevalence of trachomatous blindness found in the Woreda is typical of poor, neglected and undreserved populations in developing countries with poor economic. Besides lid surgery and antibiotic treatments, the trachoma control strategy includes personal and environmental hygiene. According to the Water supply and Sewerage Authority (WASSA), clean water supply for domestic and municipal use is provided to only about 21% of the population in the country (15), while the situation is improved in Merhabete to 87% through the activity of NGOs. In spite of the relatively good water supply, this high prevalence of trachoma infection indicates the need for strong health education, especially on face washing which is known to have a strong impact on the prevalence of trachoma (16).

In Merhabete, cataract was the cause of blindness only in 11.4% of cases. This may well be due to the repeated cataract campaigns carried out in the Woreda by organizations like ALERT. In spite of these campaigns, there are still people who are blind from cataract indicating the need for a more community based approach to identify cases, since many people blind from cataract do not

know that their blindness is curable. Five patients (3%) were found to be still blind even after cataract surgery because they don't have aphakic glasses. This raises the issue of introducing intra-ocular lens implantation surgery which now is a low-cost surgery with far superior outcome than the older intra-capsular cataract extraction, with less post-operative blind patients either from complications or loss of aphakic glasses (17).

Glaucoma is amongst the leading causes of blindness. It is said to account for 10-15% of blindness (1,9,13,18). In this survey, glaucoma, which may be primary or secondary, accounted for 27.7% of the blind cases. With differing definitions of glaucoma by different people it is difficult to compare data on the prevalence of glaucomatous blindness from different parts of the world. Generally, it can be stated that the proportion of blind people from glaucoma in Merhabete is high. This may be due to genetic and social factors, which are known to influence the prevalence of primary glaucomas. It may also be a reflection of the lack of facilities for the diagnosis and management of this disease. A community based approach to evaluate the real prevalence of the disease and the detection and management of the disease at earlier stages will require highly skilled professionals and relatively sophisticated equipments, which makes it a difficult task even in the most advanced of societies. Nevertheless, it is important to increase awareness among health workers on the detection of glaucoma and its management. It is also important to improve facilities at health institutions for the detection and management of this disease.

In conclusion, this survey has found that 90% of the blindness in the Woreda is due to either

preventable or curable causes. If proper emphasis is given to the leading causes of blindness like trachoma and cataract it will be possible to reduce the burden of blindness and its economic and social sequelae.

This survey has its own drawbacks in that adequate data was not collected on the socio-demographic profile of the Woreda population so that reliable comparison could be made between the blind and the rest of the population. Another drawback was that it was not possible to trace the 59 defaulters in order to make sure that they do not constitute a certain characteristic or diagnosis that may have influence on the result. Nevertheless, it is hoped that the information obtained from this survey will contribute to the national database on blindness and its causes. More elaborate surveys should be conducted at regional and national levels to obtain a clearer picture of the prevalence and causes of blindness.

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References

1. Thyelfros B, Negrel AD, Pararajasegaram R, Dadzie KY. Global data on Blindness, *bull WHO*, 1995;73:115-27.
2. Potter AR. Causes of blindness and visual impairment in the Central African Republic. *Br J Ophthalmol*. 1991;75:326-8.
3. Rapoza PA, West SK, Katala SJ, Taylor HR. Prevalence and causes of vision loss in Central Tanzania. *Int Ophthalmol*. 1991;15: 123-9.
4. Whitfield R, Schwab L, Rose Degnan E, et al. Blindness and eye diseases in Kenya. *Br J Ophthalmol*. 1990;74:333-30.

5. Negrel AD, Massembo Yako B, Bataka E, et al. Prevalence and causes of blindness in the Congo. *Bull WHO* 1990;68:237-47.
6. Kabo AM. Prevalence of blindness in Niger. *Int Ophthalmol*. 1990;14:227-30.
7. Sukawa TY, Muwandu DH, Negalande TC et al. Prevalence of blindness and visual impairment in the Luapahla valley, Zambia. *Trop Geog Med* 1988;40:237-40.
8. Tizazu T, Mburu FM.. Prevalence and causes of visual loss in Southern Sudan. *Social Sci Med*. 1983;17:1785-8.
9. Budden FH. Blindness in Ethiopia. A report Geneva, WHO, STC, 1981.
10. Cerulli L, Cedune, Chernet A, Scudari GL. Assessment of visual status of the population in seven regions of Ethiopia. *Rev Int Trach*. 1984;24:127-135.
11. Guidelines for the prevention of blindness programmes in Ethiopia. Prevention of blindness Team, Ministry of Health, Addis Ababa, 1996.
12. Thylefros B. A simplified methodology for the assessment of blindness and its main causes. *World Health Statistics quarterly*. 1987;40(2):129-41.
13. Alemayehu W, Teklehaimanot R, Forsgren L, et al. Causes of visual impairment in Central Ethiopia. *Eth Med J*. 1995;33:163-73.
14. WHO report on the 11th meeting of the WHO programme advisory group on the prevention of blindness. WHO/PBL 95:51.
15. National programme on capacity building for sustained Human Resources Development and utilization. 1993 (MOH), Addis Ababa, Ethiopia.
16. West S, Murioz B, Lynch M, et al. Impact of face washing in Konagawa, Tanzania. *Lancet* 1995;345:155-58.
17. Use of intra-ocular lenses in cataract surgery in developing countries. Memo-random from a WHO Meeting. *Bull. WHO*. 1991;69:657-666.
18. Thylefros B, Negrel AD, The global impact of glaucoma. *Bull WHO*. 1994;72:323-6.