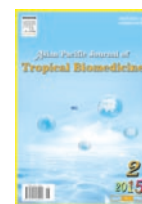




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## Blinding trachoma among refugees: complicating social disaster

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## ABSTRACT

**Objective:** To determine the prevalence of blinding trachoma among refugees in South Western Ethiopia.**Methods:** A cross-sectional outreach clinic based descriptive study was conducted on 1054 refugees in Southwest Ethiopia. A basic eyelid and cornea examination for signs of trachoma was done by using 2.5× binocular magnifying loupe. The findings were classified by using the World Health Organization simplified trachoma grading system and data were analyzed by using SPSS version 16.0.**Results:** A total of 1054 refugee patients were examined for trachoma, 179 (16.98%) of them had clinical signs of trachoma. About 6 (3.35%) patients had active trachoma with trachomatous trichiasis (TT), 47 (26.26%) patients had TT only and the rest 126 (70.39%) patients had TT with trachomatous corneal opacity. All of the trachoma patients had blinding trachoma (TT with or without trachomatous corneal opacity), and about 60.89% of them had visual impairment. Blinding trachoma was significantly more common among females, patients in age group of 16-59 years, married patients, illiterates and Fugnido camp settlers ( $P < 0.05$ ).**Conclusions:** There is a very high burden of blinding trachoma among refugees. Urgent surgical intervention is needed to prevent blindness and low vision in the study subjects, and targeted regular outreach-based eye care service should be commenced.

## 1. Introduction

Trachoma, one of the neglected tropical diseases, is the leading infectious cause of blindness[1,2]. Globally about 40.6 million people are suffering from active trachoma and 8.2 million have trichiasis. Trachoma is responsible for 2.2 million visually impaired and 1.2 million blind people[1]. Africa is the most affected continent where 68.5% of active trachoma and 46.6% of trichiasis are found[1].

The highest prevalence of active trachoma is reported from Ethiopia and Sudan. Population-based surveys revealed that the

prevalence of active trachoma in children under 10 years of age is 40.14% in Ethiopia[3], 63.3% in Southern Sudan[4], 70.5% in Unity State of South Sudan[5], 70.9% in Darfur[6], 35% in Mali[7], and 13.6%-21.7% in Central and Southern Malawi[8]. Similarly, the prevalence of trichiasis in developing countries is variable, and it is higher in Eastern African countries: 3.1% in Ethiopia[3], 15.2%-19.2% in South Sudan[4,5], 19.1% in Darfur[6] and 0.17%-12.6% in Tanzania[9]. Moreover, the prevalence of trachomatous corneal opacity (TCO) in Unity State of South Sudan (7.6%)[5], Darfur (14.5%)[6], and Tanzania (27%) is among the highest in reported area[9].

Trachoma affects the disadvantaged segment of the population including females, children and refugees. Thirty percent of the refugees in the world are found in the Sub-Saharan Africa region, and Ethiopia hosts 370 000 refugees, which come from different neighboring countries of Africa[10]. Benishangul-Gumuz and Gambella regions of South Western Ethiopia host

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refugee settlement camps. These refugees are the most risk population undergoing health disparities for various reasons such as relocation, poverty and demographics of refugees that 80% of these refugees are women and children<sup>[10]</sup>. Furthermore, there are very few (or no) mid-level eye workers in these regions and most of the residents of these regions and the refugees do not have direct access to eye care services (Regional Health Bureau reports).

Though refugees had been living in trachoma endemic areas in their original country, and there are multiple factors that predispose the refugees to trachoma, the sequelae and data concerning blinding trachoma in this disadvantaged segment of the population is lacking. However, prevalence estimate is vital to design intervention strategies for prevention and control of trachoma-related blindness and curtail vision loss-related psychosocial and economic impacts that further complicate the humanitarian/social disaster which refugees are facing. Thus, the objective of this study is to determine the prevalence of blinding trachoma among refugees in South Western Ethiopia.

## 2. Materials and methods

The study was conducted based on the Declaration of Helsinki, and verbal informed consent was obtained from each trachoma patient and/or guardian or care taker after explaining the purpose of the study. All patients with active trachoma received the appropriate treatment and those patients with trichiasis were subjected to surgical management. Authors assured the study participants that all the sociodemographic and clinical data were entirely anonymous, and authors did not record any personal identifiers.

A cross-sectional descriptive outreach clinic based study was conducted from November to December 2012 among refugees in Gambella and Benishangul-Gumuz regional government refugee settlement camps in Southwest Ethiopia. The Fugnido refugee camp of Gambella, and the Sherkole, Tongo and Bambassi refugee camps of Benishangul-Gumuz were all included.

We screened all refugees who came to the Mobile Outreach Eye Clinic in the settlement camps for trachoma as part of the general ocular morbidity survey and provided comprehensive primary eye care service. The responsible refugee camp officials, coordinators, camp leaders, social workers and school teachers had performed announcement and mobilization preceding the mobile outreach program and informed all the refugees. Besides, they communicated to all pre-registered refugees with visual impairment and/or blindness.

All refugees who came to the Mobile Eye Clinic for eye problem were registered; their ophthalmic history and the examination findings were recorded by using semi-structured

questionnaire. The distance visual acuity was measured by using the Snellen acuity chart for literates, E-chart for illiterates and Lea acuity chart for preschool children, and then the visual acuity was categorized by using the World Health Organization definitions of visual impairment and blindness<sup>[11]</sup>.

Ophthalmic examination was performed by using disposable glove, torch and 2.5× binocular magnifying loupe (Heine HR, Germany). The eyelids was first observed for inward turning lashes [trichomatous trichiasis (TT)] or evidence of previously removed lashes and the corneas for corneal opacity (CO), and then the upper eyelids were everted to check the tarsal conjunctiva of each eye for inflammation [trichomatous inflammation-follicular (TF) and trichomatous inflammation-intense (TI)] and trichomatous scarring (TS). The following case definitions of the World Health Organization simplified trachoma grading system was used to classify the clinical findings<sup>[12]</sup>: TF, defined as presence of five or more follicles in the upper tarsal conjunctiva of at least 0.5 mm diameter; TI, defined as pronounced inflammatory thickening of the upper tarsal conjunctiva that obscures more than half of the normal deep tarsal vessels; TS, defined as presence of easily visible scarring in the tarsal conjunctiva; TT, defined as evidence of at least one eyelash touching the globe or evidence of recent removal of inturned eyelashes; and TCO, defined as presence of easily visible CO which obscures at least part of the papillary margin.

In this study, active trachoma was defined as a case of trachoma with TF and/or TI and blinding trachoma as a case of trachoma with trichiasis and/or CO. We categorized a person as having a particular grade of trachoma when trachoma signs were present in one eye or both eyes.

Individuals with active trachoma were treated with antibiotics according to the national guidelines and also provided with information on the importance of face washing and good hygiene practices. Patients with TT and other significant eye conditions who needed surgical treatment were referred to health facilities with available service.

The data were checked for completeness and consistency, and analyzed by using SPSS version 16.0 for Windows (SPSS Inc., Chicago, IL, USA). We used descriptive statistics to analyze statistical values and examine the participants' characteristics and we set the level of statistical significance at 0.05.

## 3. Result

A total of 1054 patients were examined for trachoma, and 179 (16.98%) of them had clinical signs of trachoma. Trachoma was significantly more common among females ( $P=0.000$ ), patients in age group of 16-59 years ( $P=0.009$ ), married patients ( $P=0.000$ ), illiterates ( $P=0.000$ ) and Fugnido camp settlers ( $P=0.000$ ) (Table 1).

**Table 1**  
Sociodemographic characteristics of the study population (n=1054).

Variable	Trachoma [n (%)]		$\chi^2$	P value	
	Yes	No			
Age in years	<10	4 (0.40)	46 (4.40)	11.629	0.009
	10-15	10 (0.90)	25 (2.38)		
	16-59	95 (9.12)	539 (51.10)		
	≥60	70 (6.60)	265 (25.09)		
Sex	Male	48 (4.60)	469 (44.50)	42.658	0.000
	Female	131 (12.40)	406 (38.50)		
Marital status	Never married	13 (1.23)	118 (11.20)	41.090	0.000
	Married	87 (8.30)	540 (51.20)		
	Divorced	2 (0.19)	33 (3.13)		
	Widowed	77 (7.30)	184 (17.50)		
Religion	Protestant	84 (7.95)	426 (40.39)	3.545	0.170
	Muslim	83 (7.87)	356 (33.78)		
	Others	12 (1.10)	93 (8.80)		
	Illiterate	160 (15.20)	569 (54.00)		
Primary school	15 (1.40)	186 (17.63)			
High school	3 (0.30)	80 (7.60)			
Higher education	1 (0.10)	40 (3.80)			
Family size	<5	52 (4.89)	283 (26.90)	2.445	0.294
	5-9	117 (11.09)	522 (49.48)		
	≥10	10 (0.91)	70 (6.58)		
Camp site	Fugnido	99 (9.40)	416 (39.48)	70.538	0.000
	Sherkole	3 (0.28)	199 (18.88)		
	Bambassi	60 (5.69)	126 (11.95)		
	Tongo	17 (1.61)	134 (12.71)		
Total	179 (16.98)	875 (83.02)			

The prevalence of active trachoma among refugee children aged 1-9 years was 2% (1/50) and the overall prevalence of TT was 16.98% (179/1054). Similarly, the prevalence of TT and TCO in the adult population was 17.03% (165/969) and 12.28% (119/969) respectively. Among the refugee patients with trachoma, 6 (3.35%) patients had active trachoma with TT, 47 (26.26%) had TT only and the rest 126 (70.39%) had TT with TCO. About 38 (21.23%) patients had unilateral trachoma while 141 (78.77%) patients had bilateral trachoma. All of the trachoma patients had blinding trachoma (TT with or without TCO).

As regards active trachoma, its prevalence was more higher in adults, and it equally involved both sexes. The entire patients with active trachoma had TT. TT only was more common in females (20.11%) than males (6.15%), and adults (23.46%) than children (2.79%). Similarly, TCO with TT was more common in females (51.39%) and adults (66.48%) (Table 2).

**Table 2**  
Clinical findings of trachoma by age and sex among refugee patients (n=179).

Variable	Active trachoma+TT [n (%)]	TT only [n (%)]	TT+TCO [n (%)]	Total [n (%)]
Age in years	<10	1 (0.56)	2 (1.12)	4 (2.23)
	10-15	1 (0.56)	4 (2.23)	5 (5.58)
	≥16-59	4 (2.23)	42 (23.46)	119 (66.48)
Sex	Male	3 (1.68)	11 (6.15)	34 (18.99)
	Female	3 (1.68)	36 (20.11)	92 (51.39)
Total	6 (3.35)	47 (26.26)	126 (70.39)	179 (100.00)

When we analyzed the trachoma cases, TT only was found in

320 eyes, and of these trachoma affected eyes, 233 (72.8%) were in females and 295 (92.2%) were in age group of older than 16 years. Similarly, TT with TCO was found in 237 eyes, and it was more common in females (72.6%) and age group of older than 16 years (93.7%) as compared to that in males and other age groups (Table 3).

**Table 3**  
Clinical findings of trachoma cases by age and sex per eye among refugees.

Variable	Grades of trachoma cases (n=569)			
	Active trachoma+TT [n (%)]	TT Only [n (%)]	TT+TCO [n (%)]	
Age in years	<10	2 (16.67)	7 (2.20)	5 (2.11)
	10-15	2 (16.67)	18 (5.60)	10 (4.20)
	≥16	8 (66.67)	295 (92.20)	222 (93.70)
Sex	Male	6 (50.00)	87 (27.20)	65 (27.40)
	Female	6 (50.00)	233 (72.80)	172 (72.60)
Total	12 (100.00)	320 (100.00)	237 (100.00)	

A significant number of patients with trachoma had poor vision. Among 179 patients with trachoma, 109 (60.89%) patients had visual impairment; 55 (50.46%) of them had trachoma-related low vision while 54 (49.54%) of them were blind from trachoma.

#### 4. Discussion

The overall prevalence of blinding trachoma among refugees in South Western Ethiopia was 16.98% and this prevalence estimate is higher than that in a study in medical camps of Darfur with an overall prevalence of trachoma and cicatricial trachoma of 8.73% and 2.54% respectively[6]. The difference in the sample size in these studies might have contributed to this variation in blinding trachoma prevalence. Our study showed that blinding trachoma is a public health problem among refugees in South Western Ethiopia. The prevalence of trachoma was higher in Fugnido refugee camp [99 (9.4%)] and lower in Sherkole refugee camp [3 (0.28%)]. This could be due to the influx of South Sudanese refugees with trachoma to Fugnido camp in Gambella Region, while the old Sherkole settlement camp in Benishangul-Gumuz Region does not accept new refugees. Moreover, we also observed that there is a better housing condition, water supply and health infrastructure in Sherkole camps, and this might have contributed to the low prevalence of blinding trachoma in this camp.

In this study, the prevalence of active trachoma in refugee children aged 1-9 years was 2%, which is very much lower than that in studies[3-8]. This was partly explained by the low prevalence of trachoma in the regions where the refugees were residing[3]. Moreover, the comprehensive health care given to refugees by different health institutions/organizations might have contributed to the prevention and control of new infection of trachoma in these settlement areas.

In this study, the prevalence of TT was 16.98% and our finding is comparable to the report from South Sudan (15.2%-19.1%) [4,5], but higher than the report from Tanzania (0.17%-12.60%) [9], Ethiopia (3.1%)[3], Central and Southern Malawi (0.3%-

0.6%)[8], Upper Sindh Pakistan (3.4%)[13], and Desert area of Sindh (6.79%)[14]. This might be due to the variation in trachoma prevalence and its determinants and intervention were taken by the government/stakeholders in these countries.

In our study, the prevalence of TCO in the adult population was 12.28% and this figure is comparable to a report from Darfur (14.5%)[6], but higher than the findings in Unity State of South Sudan (7.6%)[5], and Desert area of Sindh (1.16%)[14], and lower than a report from Tanzania (27%)[9]. Our study also showed that nearly two-third (60.89%) of trachoma cases had trachoma-related visual impairment, which heavily influences quality of life of refugee patients, and the intervention should be taken to prevent further reduction of vision and improve or, at least, maintain their mobility and /or survival ability in the face of humanitarian crisis/ social disaster from displacement.

This study shows the neglected health issue among refugees; it, however, has its own weakness. As this study is a clinic based cross-sectional study, the prevalence estimate could be higher. Nevertheless, the evidence is vital to different stakeholders for planning and designing trachoma service for the prevention and control of trachoma-related blindness and low vision among refugees in the study settings as well as in the region.

Our study highlights that the burden of blinding trachoma is high among refugees in South Western Ethiopia. There is, thus, an urgent need of TT surgical intervention to address the already existing TT cases in the refugee camps to prevent further loss of vision and improve quality of life of these disadvantaged and vulnerable groups of the society. There is also a need to establish sustainable TT surgical services besides treating active trachoma at health facilities in the refugee camps.

### Conflict of interest statement

We declare that we have no conflict of interest.

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### References

- [1] Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. *Br J Ophthalmol* 2012; **96**(5): 614-618.
- [2] Ejigu M, Kariuki MM, Ilako DR, Gelaw Y. Rapid trachoma assessment in Kersa District, Southwest Ethiopia. *Ethiop J Health Sci* 2013; **23**(1): 1-9.
- [3] Berhane Y, Worku A, Bejiga A, Adamu L, Alemayehu W, Bedri A, et al. Prevalence of trachoma in Ethiopia. *Ethiop J Health Dev* 2007; **21**(3): 211-215.
- [4] Ngondi J, Ole-Sempele F, Onsarigo A, Matende I, Baba S, Reacher M, et al. Blinding trachoma in postconflict Southern Sudan. *PLoS Med* 2006; doi: 10.1371/journal.pmed.0030478.
- [5] Edwards T, Smith J, Sturrock HJW, Kur LW, Sabasio A, Finn TP, et al. Prevalence of trachoma in Unity State, South Sudan: results from a large-scale population-based survey and potential implications for further surveys. *PLoS Negl Trop Dis* 2012; **6**(4): e1585.
- [6] Islam QU, Khan AA, Noor M, Malik SM. Magnitude of trachoma in medical camps at Darfur, Sudan. *Pak Armed Forces Med J* [Internet]. 2012 Jun [cited 2014 Oct 2]; (2): [about 1 p.]. Available from: <http://www.pafmj.org/showdetails.php?id=578&t=o>
- [7] Hägi M, Schémann JF, Mauny F, Momo G, Sacko D, Traoré L, et al. Active trachoma among children in Mali: clustering and environmental risk factors. *PLoS Negl Trop Dis* 2010; **4**(1): e583.
- [8] Kalua K, Chirwa T, Kalilani L, Abbenyi S, Mukaka M, Bailey R. Prevalence and risk factors for trachoma in Central and Southern Malawi. *PLoS One* 2010; doi: 10.1371/journal.pone.0009067.
- [9] Moshiro C, Masesa DE, Masanja H, Mkocha M, Ngirwamungu E, Kilima P, et al. Prevalence of potentially blinding trachoma in Tanzania. *East Afr J Ophthalmol* 2008; **14**: 42-48.
- [10] Seicean A. Refugee health: making a difference in Sub-Saharan Africa: a literature review. Cleveland: Case Western Reserve University; 2008. [Online] Available from: [http://www.cwru.edu/med/epidbio/mph439/refugee\\_health.pdf](http://www.cwru.edu/med/epidbio/mph439/refugee_health.pdf) [Accessed on July 2013]
- [11] World Health Organization. Diseases of the eye and adnexa. In: *International statistical classification of diseases and related health problems (ICD-10) in occupational health*. Geneva: World Health Organization; 2004, p. 19.
- [12] West SK, Bailey R. Trachoma. In: Johnson GJ, Minnassian DC, Weale RA, editors. *Epidemiology of eye disease*. 2nd ed. London: Hodder Arnold; 2003.
- [13] Qureshi MH, Siddiqui SJ, Pechuho MA, Shaikh D, Shaikh AQ. Prevalence of trachoma in upper Sindh. *Pak J Ophthalmol* 2010; **26**(3): 118-121.
- [14] Junejo SA, Laghari NA, Ibrahim F. Prevalence of trachoma in Thar desert area of Sindh. *J Liaquat Univ Med Health Sci* 2005; **4**(3): 109-112.