

**ORIGINAL ARTICLE****OCULAR MORBIDITY AMONG REFUGEES IN SOUTHWEST ETHIOPIA****Yeshigeta Gelaw, Aemero Abateneh****ABSTRACT**

**Background:** Low vision and blindness are recognized as one of the major public health problems worldwide, especially in developing countries. The prevalence and cause of blindness and low vision vary from region to region, among different age and population groups in a country or geographical region. The objective of this study is thus to determine the causes of blindness and ocular morbidity among refugees in Southwest Ethiopia.

**Methods:** A cross-sectional clinic based study was conducted on 1,054 refugees in Southwest Ethiopia. A basic anterior and posterior segment examination was done by ophthalmologists with Magnifying Loupe 2.5X and Direct Ophthalmoscope. Data were analyzed using SPSS version 16.0.

**Results:** The most common causes of ocular morbidity identified were trachoma 547(21.2%), cataract 501(19.4%), refractive error 353(13.7%), conjunctivitis 240(9.3%), glaucoma 130(5.1%) and climatic droplet keratopathy 112(4.4%). The overall prevalence of blindness was 26.2% and the prevalence of childhood blindness was 0.7%. The prevalence was higher among females (16.9%) than males (9.3%) and age groups 60 years and above (15.9%) than other age groups (10.3%) ( $P<0.05$ ). The overall prevalence of low vision was 25.8% and the prevalence of low vision in pediatric age group was 0.9%. The leading causes of blindness were cataract 112(40.6%), trachomatous corneal opacity 58(21.0%) and glaucoma 49(17.8%). The commonest cause of low vision was cataract 102(37.6%) followed by trachomatous corneal opacity 49(18.1%) and refractive error 35(12.9%).

**Conclusions:** There is a very high burden of blinding eye diseases among refugees. Integrated multidisciplinary intervention strategies for the prevention and control of blindness and low vision in the study settings should be initiated.

**Key words:** Blindness, low vision, ocular morbidity, refugees, Ethiopia

**DOI:** <http://dx.doi.org/10.4314/ejhs.v24i3.6>

**INTRODUCTION**

Low vision and blindness are recognized as one of the major public health problems worldwide, especially in developing countries. According to WHO 2010 estimates, there are 285 million visually impaired people worldwide, and of these 39 million are blind. South East Asia and Western Pacific accounted for 73% of moderate to severe visual impairment (VI) and 58% of blindness while Africa has about 6 million blind people (1). Overall, about 90% of the blind live in developing countries. About 75% of all blindness worldwide

is believed to be avoidable and is mainly caused by cataract and trachoma (1).

The prevalence of low vision and blindness in sub-Saharan Africa is one of the highest worldwide. The prevalence of blindness is 4.1% in Southern Sudan (2), and 1.6% in Ethiopia (3). Cataract is believed to be responsible for 41.2% of the blindness in southern Sudan (2), 49.9% of the blindness in Ethiopia (3) and 60% of the blindness in Sudan (2), and other causes include trachoma, refractive error, onchocerciasis, and glaucoma (2-4).

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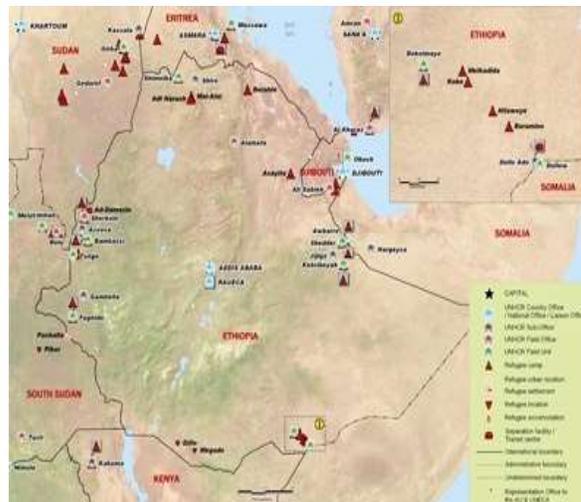
The prevalence and cause of blindness and low vision vary from region to region, among different age and population groups in a country or geographical region. The prevalence of blindness and low vision in the Southwest Ethiopia ranges from 0.8%-1.7% and 0.7%-3.4% respectively (3).

The displacement of people in the horn of Africa also affects the pattern and burden of blinding eye diseases which in turn affects the eye care service in the region. Currently, Ethiopia hosts about 370,000 refugees: the largest groups being Somalis (56%) followed by Sudanese and South Sudanese (23%), and Eritreans (17%) (5). The majority of the refugees are women and children. The recent disputes in the border areas, especially those contiguous to Sudan's Blue Nile and South Kordofan states, have resulted in large numbers of refugees entering western Ethiopia, and living in camps in the area of Gambella and Benishangul-Gumuz Region (5).

Despite this influx of displaced people in Ethiopia and the region, blindness and low vision and ocular morbidity data in this underserved and disadvantaged segment of the population is lacking. The objective of this study is thus to determine the prevalence and causes of blindness and ocular morbidity among refugees in Southwest Ethiopia and generate evidence for devising intervention strategies for prevention and control of avoidable blindness and low vision through the concerted efforts of responsible stakeholders.

## PATIENTS AND METHODS

A cross-sectional outreach clinic based descriptive study was conducted from November to December 2012 among refugees in Gambella and Benishangul-Gumuz refugee settlement camps in Southwest Ethiopia. The Fugnido Refugee camp of Gambella, and the Sherkole, Tongo and Bambasi refugee camps of Benishangul-Gumuz were all included. These two regions of Southwest Ethiopia are bordered by South Sudan and Sudan (Fig.1). Moreover, there is no single ophthalmologist and most of the residents of these regional states and the refugees do not have direct access to eye care services.



**Fig. 1:** Map of the Study Area

This mobile outreach eye campaign was conducted in the settlement camps over a period of two months to screen for eye diseases and provide comprehensive eye care service to the refugees. Prescreening announcement was carried out through their respective and responsible refugee camp officials, coordinators, camp leaders and social workers; and all the refugees were aware of the mobile outreach program and those who required eye care services assembled in areas where clinics were held. Preregistered refugees with visual impairment and/or disability were also informed on house to house basis. The overall patient turnout was very high.

All the refugees who came to the local health center for eye problem were registered, and their ophthalmic history and examination findings were recorded using semi-structured questionnaire. The presenting distance visual acuity was measured using the Snellen or E-chart for literates and illiterates respectively and Lea acuity chart for preschool children. The presenting visual acuity was then categorized as normal ( $\geq 6/18$ ), moderate visual impairment ( $<6/18 - \geq 6/60$ ), severe visual impairment ( $<6/60 - \geq 3/60$ ) and blindness ( $<3/60$ -NLP) according to the World Health Organization's definitions of visual impairment and blindness (6). The anterior segment examination was done with a torch and magnifying loupe 2.5X (Heine HR, Germany). For those patients with low vision or blindness, the posterior segment was examined by Heine Direct Ophthalmoscope and pupil was dilated when

necessary. Intraocular pressures were measured using Schoitz tonometer for selected or suspected cases.

Visual acuity measurement and subjective and objective refractions were done by optometrist, while ocular examinations were done by ophthalmologists. All patients with eye problems received medical treatment and corrective eye glasses, but patients who were in need of surgical management were referred to appropriate centers. Health education on eye health and preventable blinding eye diseases were also given. The study was conducted in compliance with the principles enunciated in Helsinki Declaration, and individual patient data were kept confidential.

Data were checked for completeness and consistency, and analyzed using SPSS version

16.0 for windows (SPSS Inc., Chicago, IL, USA). Descriptive statistics was used to analyze values, and the level of significance was set at 0.05.

## RESULT

A total of 1,054 individuals with eye diseases were identified from the four refugee camps. Of these, 517(49.1%) were males and 537(50.9%) females. The majority, 634(60.2%), were in the age group of 16-59 years, while 335(31.8%) of them were older than 60 years. The majority of the patients were protestant, 510(48.4%), married, 627(59.5%), and illiterate, 729(69.2%); and 639 (60.6%) of them had a family size of 5-9 (Table 1).

Table 1: Socio-demographic characteristics of refugees in Southwest Ethiopia

Variables	Male No (%)	Female No (%)	Total No (%)
<b>Age in years</b>			
≤15	50(4.7)	35(3.3)	85(8.1)
16-59	328(31.1)	306(29.0)	634(60.2)
≥60	139(13.2)	196(18.6)	335(31.8)
<b>Refugee camp</b>			
Fugnido	198(18.8)	317(30.1)	515(48.9)
Sherkole	123(11.7)	79(7.5)	202(19.2)
Bambasi	102(9.7)	84(8.0)	186(17.6)
Tongo	94(8.9)	57(5.4)	151(14.3)
<b>Marital status</b>			
Never married	96(9.1)	35(3.3)	131(12.4)
Married	378(35.9)	249(23.6)	627(59.5)
Divorced	24(1.8)	11(1.0)	35(3.3)
Widowed	19(1.8)	242(23.0)	261(24.8)
<b>Religion</b>			
Protestant	209(19.8)	301(28.6)	510(48.4)
Muslim	262(24.9)	177(16.8)	439(41.7)
Catholic	20(1.3)	17(1.6)	37(3.5)
Others	26(2.5)	42(4.0)	68(6.5)
<b>Level of education</b>			
Illiterate	261(24.8)	468(44.8)	729(69.2)
Primary school	145(13.8)	56(5.3)	201(19.1)
High school	73(6.9)	10(0.9)	83(7.8)
Higher education	38(3.6)	3(0.3)	41(3.9)
<b>Family size</b>			
<5	162(15.4)	173(16.4)	335(31.8)
5-9	305(28.9)	334(31.7)	639(60.6)
≥10	50(4.7)	30(2.8)	80(7.6)
<b>Total</b>	517(49.1)	537(50.3)	1054(100.0)

The most common causes of ocular morbidity identified were trachoma 547(21.2%), cataract 501(19.4%), refractive error 353(13.7%), conjunctivitis 240(9.3%), glaucoma 130(5.1%) and climatic droplet keratopathy (CDK) 112(4.36%) (Table 2). Other less common but

clinically important cases like optic atrophy (6 cases), congenital glaucoma (6 cases), amblyopia (6 cases), Xerophthalmia (5 cases), bullous keratopathy (5 cases), keratoconus (4 cases) and Stargardt diseases (4 cases) were also seen.

Table 2: Causes of ocular morbidity among refugees in Southwest Ethiopia

Ocular and orbital disorders	No	%
Trachoma	547	21.28
Cataract	501	19.49
Refractive error	353	13.73
Conjunctivitis/blepharoconjunctivitis	300	11.67
Glaucoma	132	5.13
Climatic droplet keratopathy	112	4.36
Pseudophakia/aphakia/after-cataract	101	3.92
Pterygium	88	3.42
Non-trachomatous corneal opacity	83	3.23
Phthisis bulbi	71	2.76
Blepharitis/meibomian gland dysfunction	59	2.29
Other lid disorders	38	1.48
Dry eye syndrome	32	1.24
Retinitis pigmentosa	17	0.66
Retinal detachment	17	0.66
Pseudo exfoliation syndrome	15	0.58
Age-related macular degeneration	15	0.58
Strabismus	12	0.47
Nystagmus and microphthalmia	16	0.62
Other ocular and orbital disorders	77	2.99
<b>Total</b>	<b>2,571</b>	<b>100</b>

The overall prevalence of blindness (presenting visual acuity less than 3/60) was 26.2% and the prevalence of childhood blindness was 0.7%. The prevalence was higher among females (16.9%) than males (9.3%). Similarly, the prevalence was higher among age group 60 years and above (15.9%) than other age groups (10.3%) (Table 3).

These differences were statistically significant ( $P<0.05$ ). The overall prevalence of low vision (presenting visual acuity less than 6/18 but greater than 3/60) was 25.8%, and the prevalence of low vision in pediatric age group was 0.9% (Table 3). Overall, more females (15.0%) were visually impaired than males (10.7%), and there was a statistically significant association among sex, age and low vision ( $P<0.05$ ).

Table 3: Presenting visual acuity by age and sex among refugees in Southwest Ethiopia

Variable	Presenting visual acuity				Total No (%)
	≥6/18 No (%)	<6/18-≥3/60 No (%)	<3/60-NLP* No (%)	Undetermined No (%)	
<b>Age in years</b>					
≤15	46(4.4)	9(0.9)	7(0.7)	23(2.2)	85(8.1)
16-59	388(36.8)	414(13.6)	101(9.6)	1(0.1)	634(60.2)
≥60	49(4.6)	118(11.2)	168(15.9)	0(0.0)	335(31.8)
<b>Sex</b>					
Male	291(27.6)	113(10.7)	98(9.3)	15(1.4)	517(49.1)
Female	192(18.2)	158(15.0)	178(16.9)	9(0.9)	537(50.9)
<b>Total</b>	483(45.8)	271(25.8)	276(26.2)	24(2.3)	1054(100.0)

\*NLP-No light perception

Among 276 eye patients with blindness, 99(35.9%) were males and 177(64.1%) were females, and 170(61.6%) of them were above 60

years of age followed by age group of 16-59 years, 99(35.9%) (Table 4).

Table 4: Blindness by age and sex among refugees in Southwest Ethiopia

Age in years	Blindness		Total No (%)
	Male No (%)	Female No (%)	
≤15	4(1.4)	3(1.1)	7(2.5)
16-59	37(13.4)	63(22.8)	100(36.2)
≥60	58(21.0)	111(40.2)	169(61.3)
<b>Total</b>	99(35.9)	177(64.1)	276(100)

The leading causes of blindness included cataract 112(40.6%), trachomatous corneal opacity 58(21.0%) and glaucoma 49(17.8%) (Fig.2). Similarly, the causes of childhood blindness were developmental cataract 2(0.7%), trachomatous corneal opacity 2(0.7%), congenital glaucoma

2(0.7%) and retinitis pigmentosa 1(0.4%). The commonest cause of low vision was cataract 102(37.6%) followed by trachomatous corneal opacity 49(18.1%), and refractive error 35(12.9%) (Fig. 3).

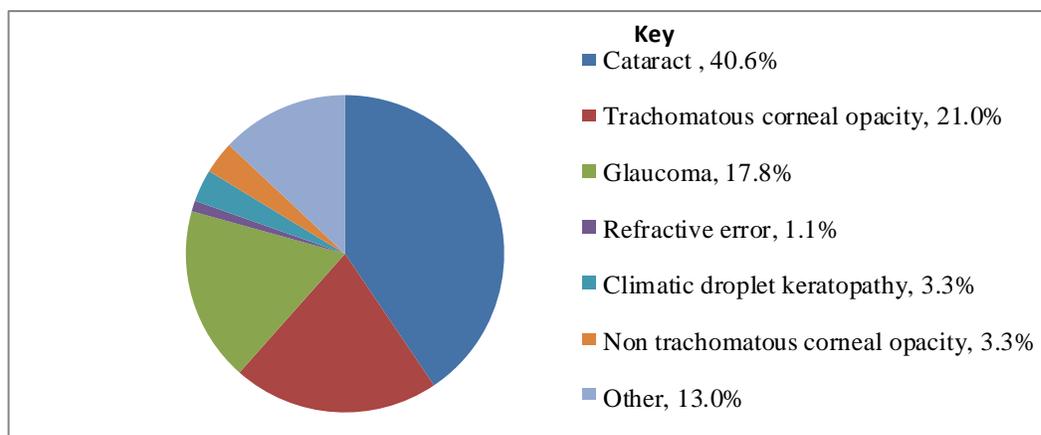
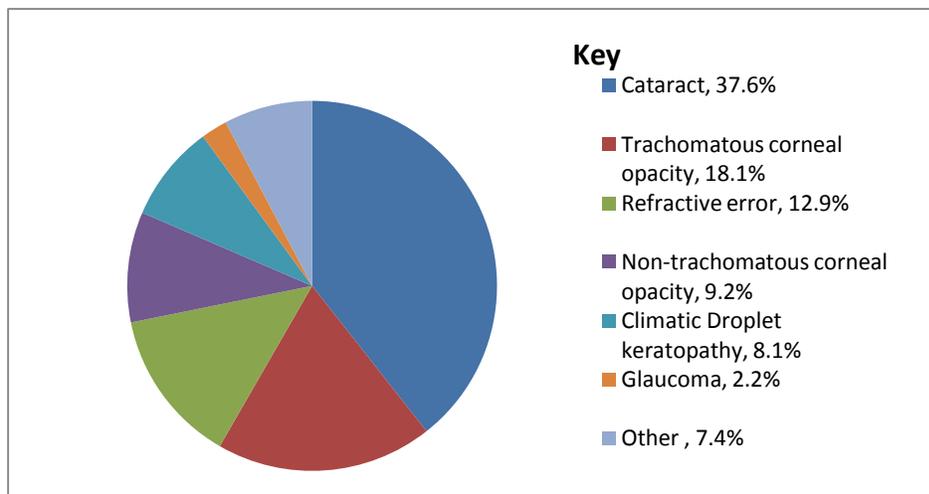


Fig. 2: Causes of blindness among refugees in Southwest Ethiopia



*Fig. 3: Causes of low vision among refugees in Southwest Ethiopia*

## DISCUSSION

Results from outreach clinic based study provide high prevalence estimates of eye diseases in the community under study. However, the evidence generated is of great significance in the planning of eye care services and designing integrated multidisciplinary intervention strategies for prevention and control of blindness and low vision in the study settings and in the region where displacement of people is a common social disaster.

The overall prevalence of blindness among the studied refugees in Southwest Ethiopia was 26.2% which is higher than the reports of a community based survey in Mankien District of southern Sudan (11.0%)(2) and Southwest Ethiopia (0.8% in Gambella, 1.7% in Benishangul-Gumuz)(3). This variation could be due to the differences in the study population since our study involved only those who presented to mobile eye outreach centers with perceived eye problem(s). Similarly, the prevalence of blindness in our study was also higher than the finding of a similar study done in Adjumani settlement camps for Sudanese refugees in Uganda which reported a prevalence of 21% (8). This could possibly be due to differences in the accessibility of eye health care professionals and infrastructures in the regions hosting the refugees and/or their original residential areas/regions as there was significant variation in their duration of stay in their

respective camps ranging from two years to several decades.

In our study, more females than males and age group 60 years and above than other age groups were blind. This finding is similar with the reports in several published studies (2, 3, 10, 11, 14).

The major cause of blindness reported in this study is cataract (40.6%) which is in agreement with the global data (9) and a report by similar study in Adjumani settlement camps for Sudanese refugees in Uganda (8), Southern Sudan (2), Ethiopia (3) and Gambia (10). The second most common cause of blindness is trachoma (21%), which is in agreement with studies from Ethiopia and South Sudan (2, 3). In our study setting, glaucoma (17.8%) is the third most common cause of blindness as reported by other studies (9, 11). Cataract, trachoma and glaucoma combined accounted for about 80% of the blindness. However, the blindness caused by these eye diseases is either treatable or preventable (9), hence providing cataract surgical service, SAFE (Surgery for trichiasis, Antibiotics, Facial cleanliness and Environmental change) strategy of trachoma and glaucoma care to the refugees would restore and/or maintain their sight.

The major causes of ocular morbidity identified were trachoma (21.2%), cataract (19.4%), refractive error (13.7%) and conjunctivitis/blepharconjunctivitis (11.67%). This was contrary to the findings of other studies

(12-14), which found refractive error as the major cause followed by cataract and conjunctivitis. This difference could be explained by the variation in geography, socioeconomic status, population dynamics, access and utilization of eye health care services, and public health challenge priorities or basic need concerns of people in line with resource limitation.

In this study, climatic droplet keratopathy (CDK) was one of the main causes of ocular morbidity, accounting for 4.36%. This might indicate a significant number of the study subjects had corneal exposure to environmental irritants, such as evaporation and microtrauma from windblown dust and UV radiation and thus predisposed to CDK (15-17). This finding is, however, not surprising as CDK is prevalent in high temperature and arid areas that are characterized by high solar radiation and exposure to atmospheric irritants (15-17). This is the case in the study setting.

Though this study is the first of its kind in Ethiopia to provide ocular morbidity among refugees, it has its own limitations. The study instruments allowed basic anterior and posterior segment examination only. Use of slit lamp biomicroscope, indirect ophthalmoscopy and visual field tests could have identified more ocular problems/diseases. Moreover, the clinic based cross-sectional study design limits the generalization of the result to the overall refugee population.

In conclusion, there is a high burden of blinding eye diseases among refugees and about 80% of the blindness is avoidable. More females and elderly people were blind and visually impaired. The three leading causes of blindness are cataract, trachomatous corneal opacity and glaucoma. Similarly, the top three causes of low vision are cataract, trachomatous corneal opacity and refractive error. Regular medical and surgical ophthalmic outreach programs and rehabilitation services should be implemented at refugee settlement camps through concerted efforts of responsible national and international stakeholders. Training of primary or midlevel eye care workers who can provide eye health education and trachoma surgery is also recommended. Wearing Ultraviolet (UV) blocking sunglasses may help prevent climatic droplet keratopathy in the studied population.

## ACKNOWLEDGEMENTS

We acknowledge the Administration for Refugee and Returnees Affairs (ARRA) and the United Nations High Commissioner for Refugees (UNCHR) local offices for their cooperation, and the Rehabilitation and Development Organization (RADO) for supporting the mobile eye outreach.

## REFERENCES

1. Pascolini D, Mariotti SP. Global Data on Visual Impairments 2010. World Health Organization. Switzerland: Geneva, 2012. Available at: <http://www.who.int/blindness/GLOBALDATAFINALforweb.pdf> (Accessed on Jan 2013).
2. Ngondi J, Ole-Sempele F, Onsarigo A, Matende I, Baba S, *et al.* Prevalence and causes of blindness and low vision in southern Sudan. *PLoS Med* 2006; 3(12): e477. doi:10.1371/journal.pmed.0030477.
3. Berhane Y, Worku A, Bejiga A, Adamu L, Alemayehu W, *et al.* Prevalence and causes of blindness and Low Vision in Ethiopia. *Ethiop.J.Health Dev.* 2007; 21(3): 204-210.
4. Ali AM, Elsheikh EA, Elawad MEA. Causes of low vision in Sudan: a study among the attendees of blind centres in Khartoum. *Sud J Ophthalmol.* 2009; 1(1): 13-15.
5. UNHCR. Global Appeal 2013 Update: Ethiopia. United Nations High Commissioner for Refugees. USA: New York, 2013. Available at: <http://www.unhcr.org/ga13/index.xml> (Accessed on June 2013).
6. World Health Organization (Diseases of the eye and adnexa. International statistical classification of diseases and related health problems: ICD-10. Tenth Revision. Geneva: *World Health Organization.* 2004; report number 1: 426-428.
7. Ngondi J, Reacher M, Matthews F, Ole-Sempele F, Onsarigo A, *et al.* The epidemiology of low vision and blindness associated with trichiasis in southern Sudan. *BMC Ophthalmol.* 2007; 7:12 doi: 10.1186/1471-2415-7-12.
8. Kawuma M. Eye diseases and blindness in Adjumani refugee settlement camps, Uganda. *East Afr Med J.* 2000; 77(11): 580-582.

9. World Health Organization. Vision 2020 the right to sight: Global initiative for the elimination of Avoidable blindness action plan 2006-2011. WHO. Switzerland: Geneva, 2007. Available at: [http://www.who.int/blindness/Vision2020\\_report.pdf](http://www.who.int/blindness/Vision2020_report.pdf) (Accessed on May 2013).
10. Faal H, Minassian D, Sowa S, Foster A. National survey of blindness and low vision in The Gambia: results. *Br J Ophthalmol*. 1989; 73(2): 82-87.
11. Loewenthal R, Pe'er J. Prevalence survey of ophthalmic diseases among the Turkana tribe in north-west Kenya. *Br J Ophthalmol*, 1990; 74: 84-88.
12. Sonia P, Munish A, Sandeep SS, Tarundeep K, Akshay K. Pattern and Distribution of Ocular Morbidity in Patients Visiting the Field Practice Area of Tertiary Care Hospital of North India. *Journal of Biomedical and Pharmaceutical Research* 2013; 2(2): 42-46.
13. Rizyal A, Shakya S, Shrestha RK, Shrestha S. A study of ocular morbidity of patients attending a satellite clinic in Bhaktapur. *Nepal Med Coll J* 2010; 12(2): 87-89.
14. Singh A, Dwivedi S, Dabral SB, Bihari V, Rastogi AK, Kumar D. Ocular morbidity in rural areas of Allahabad, India. *Nepal J Ophthalmol* 2012; 4 (7): 49-53.
15. Gray RH, Johnson GJ, Freedman A. Climatic droplet keratopathy. *Surv Ophthalmol*. 1992; 36(4): 241-253.
16. Tabbara KF. Climatic droplet keratopathy. *Int Ophthalmol Clin*. 1986; 26(4): 63-68.
17. Urrets-Zavalía JA, Knoll EG, Maccio JP, Urrets-Zavalía EA, Saad JA, et al. Climatic droplet keratopathy in the Argentine Patagonia. *Am J Ophthalmol*. 2006; 41(4): 744-746.