

## ORIGINAL ARTICLE

# Corneal Ulcer Profile in Saiful Anwar Hospital Malang 2013-2014

**Nuke Erlina Mayasari**

Department of Ophthalmology, Faculty of Medicine, Brawijaya University  
E-mail: nuke.kecil@gmail.com

## ABSTRACT

**Background :** The study aims to describe clinical profile of corneal ulcer patients in Saiful Anwar Hospital Malang.

**Method :** Retrospective study was used to evaluate the medical record of corneal ulcer patients that were diagnosed by Infection and Immunology subdivision in Saiful Anwar Hospital, Malang, from January 2013 to December 2014. Data included patient's gender, age, occupation, chief complaint, predisposing factors, visual acuity, corneal ulcer grading, microbiology examination, pharmacological therapy, surgical intervention and the clinical evaluation of treatment with slitlamp.

**Result :** As many as 81 males and 26 females with corneal ulcer which showed the highest frequency was at the age of 41 to 50 years old (33.64%) and 69.16% cases had severe ulcers. Farmers were the most affected (46.73%). Trauma was the leading predisposing factors (78.50%) and plant material as the most cause (42.85%). Red eye was the most chief complaint in 40.19% patients. Visual acuity was 2/60-LP+ in 73.83% patients. Gram positive cocci were obtained in 72.90% patients, whereas fungi was obtained in 29.97% patients from Gram and KOH staining. Coagulase-negative staphylococcus was the most frequently detected organism in 22.43% patients amongst positive isolates. Quinolones are given in 39.25% patients, aminoglycosides in 32.71% patients, and itraconazole in 28.04% patients. As 21.50% patients needed amnion membrane transplantation. We found improvements upon the condition in 47.66% patient after the treatment evaluation.

**Conclusion :** corneal ulcer diagnosis relies upon the complaint, predisposing factor, clinical and laboratory findings. Early and adequate treatment provides clinical improvement.

**Keywords :** corneal ulcer, clinical profile, microbiology examination, therapy, improvement

Corneal ulcer is a pathological state characterized by infiltrates in cornea with corneal epithelial defect that result in a hollow. World Health Organization (WHO) states corneal muddiness, including corneal ulcer as the 4<sup>th</sup> leading cause of blindness in the world. However according to Basic Health Research (*Riset Kesehatan Dasar*) in 2007, blindness is

caused by corneal cicatrix at approximately 18.1% of Indonesian people.

A study in South of India claims that the incidence of corneal ulcers is 113 cases per 100,000 people per year. The study in Ciptomangunkusumo Hospital in 1995 recorded 109 cases of corneal ulcer from 550 new cases of outer eye infection. 67 cases (62%) clinically is bacterial corneal ulcus.<sup>1-3</sup>

In order to find out the cause of corneal ulcer, we evaluated the corneal scraping for Gram staining, KOH, culture and sensitivity test. The objective of corneal ulcer management is the eradication of corneal ulcer cause (fungi, bacteria or viruses), the suppression of inflammatory reaction thus no further aggravation should destruct the cornea, the acceleration of healing upon epithelial defects, and the complication or improvement on visual acuity.<sup>2</sup>

Corneal ulcer requires a proper treatment to prevent further ulceration and the onset of complications such as descemetocoele, perforation, endophthalmitis and blindness. This study aimed to evaluate the profile of corneal ulcers in Malang RSSA 2013-2014. We hope this research can be the foundation for future research and it can demonstrate the importance of proper management for corneal ulcers corresponding to causative organisms.<sup>3</sup>

## METHODS

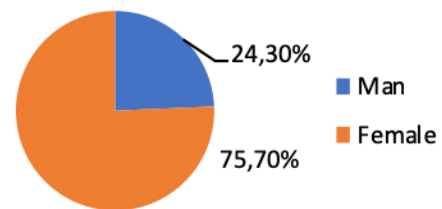
The study design is retrospective observational. The research was conducted at Saiful Anwar Hospital (RSSA) in Malang. Data was retrieved from the medical records of patients who came to the Infection and Immunology Division of Eye Clinic over 2 years (January 2013 to December 2014). All new patients with the diagnosis of corneal ulcers revisits the Infection and Immunology Division of Eye Clinic in RSSA Malang from January 2013 to December 2014.

Data collection includes the age, gender, occupation, major complaint, vision, predisposing factors, the degree of ulcers, results of microbiological examination, prescribed treatment, the results of the evaluation after treatment and operative procedure. The inclusion criteria of this study is the entire collected data from the medical records of new patients who came to the Infection and Immunology Division of Eye Clinic in

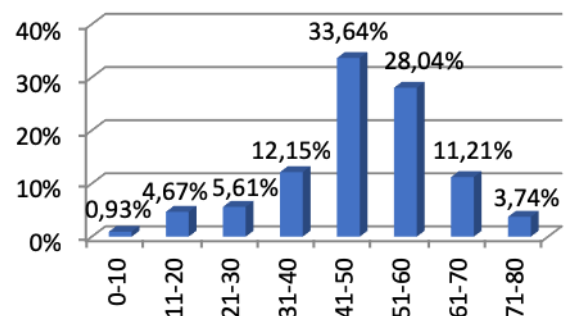
RSSA Malang from January 2013 to December 2014 with corneal ulcer and then made a repeat visit to the microbiological examination. Exclusion criteria applied to the patients with autoimmune diseases associated with corneal ulcers and other eye diseases that cause decrease in visual acuity, as well as incomplete data of the medical records.

## RESULT

Based on the data from the medical records from January 2013 to December 2014, we obtained 107 new patients (107 eyes) with diagnosis of corneal ulcers that come to The Infection and Immunology Division of Eye Clinic in RSSA Malang. There are 81 (75.70%) male and 26 (24.30%) female.



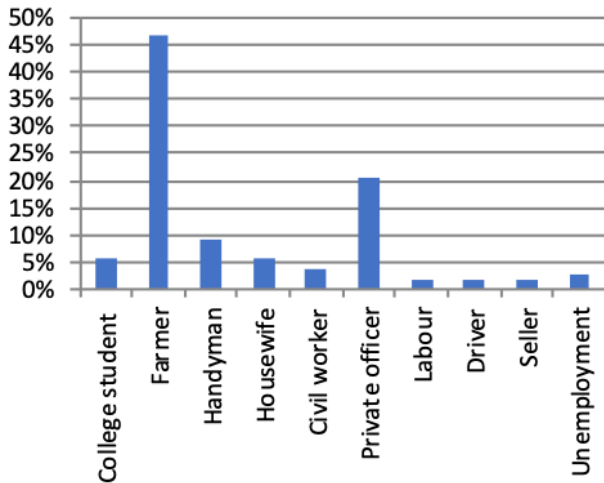
**Fig 1.** Distribution of corneal ulcer according to sex



**Fig 2.** Distribution of corneal ulcer according to age

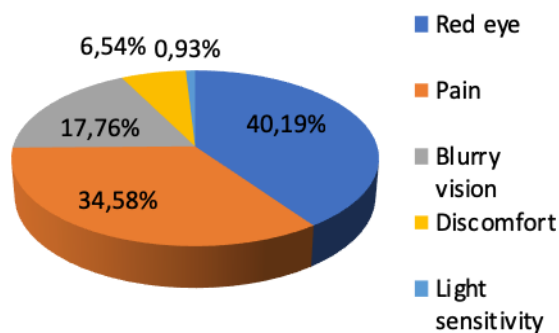
We evaluated patients with corneal ulcer from 6 to 78 years old. Among 107 patients, we obtained 1 patient (0.93%) from the age group of 0-10 years old, 5 patients (4.67%) in the age group 21-30 years old, 13 patients (12.15%) in the age group of 31-40 years old, 36 patients (33.64%) in the age group of 41-50 years

old, 30 patients (28.04%) in the age group of 51-60 years old, 12 patients (11.21%) in the age group of 61-70 years old, and 4 patients (3.74%) in the age group of 71-80 years old.



**Fig 3.** Distribution of corneal ulcer according to occupation

We obtained 50 (46.73%) corneal ulcer patients who were farmers, 22 (20.56%) patients who were private officers, 6 (5.61%) patients who were college students, 6 (5.61%) patients who were housewives, 4 (3.76%) patients who were civil workers, 2 (1.87%) patients each who were labour workers, and 3 (2.80%) patients who were unemployed.



**Fig 4.** Distribution of corneal ulcer according to chief complaint

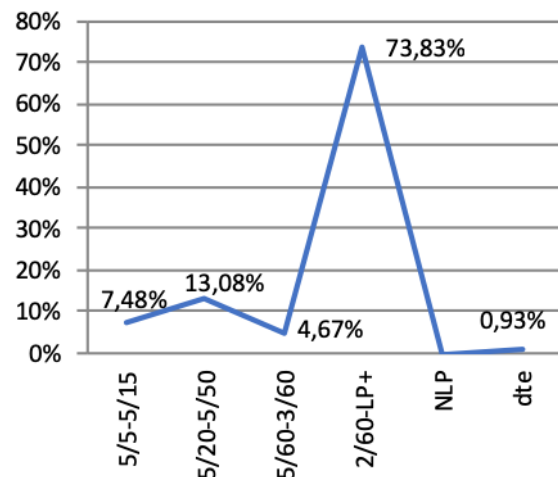
Among 107 patients, 43 patients (40.19%) complained of red eye as the cause of the visit to the eye clinic; 37 patients complained of eye pain (34.58%), 19 patients complained of blurry vision (17.76%), 7 patients complained of eye

discomfort (6.54%), and 1 patient complained of light sensitivity (0.93%).

Risk factors of corneal ulcer development, based on the data samples, are shown in the Table 1.

**Table 1.** Distribution of corneal ulcer according to predisposing factor

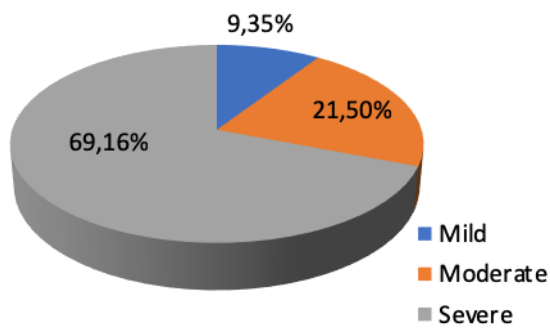
| Predisposition | Number of patients | Percentage |
|----------------|--------------------|------------|
| Trauma         | 84                 | 78.50%     |
| Steroid        | 5                  | 4.67%      |
| DM             | 3                  | 2.80%      |
| Lagophthalmos  | 4                  | 3.74%      |
| Unknown        | 8                  | 7.48%      |
| Contact lens   | 1                  | 0.93%      |
| Herpes history | 2                  | 1.87%      |



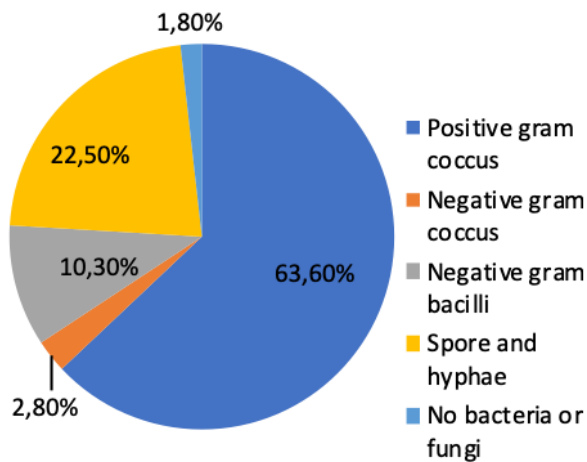
**Fig 5.** Distribution of corneal ulcer according to its degree of severity

According to the graph above, we can see 8 patients (7.48%) had visual acuity 5/5-5/15, 14 patients (13.08%) with visual acuity of 5/20-5/50, 5 patients (4.67%) had 5/60-3/60, 79 patients (73.83%) had 2/60-LP+, 1 patient (0.93%) had visual acuity that was hard to be evaluated. There was no patient who had no-light perception (NLP) (0%).

About 74 (69.16%) patients came with severe ulcer, 23 (21.50%) patients came with moderate ulcer and 10 (9.35%) patients came with mild ulcer. The distribution of corneal ulcer according to its degree of severity is shown in the Fig 6.



**Fig 6.** Distribution of corneal ulcer according to its degree of severity



**Fig 7.** Distribution of corneal ulcer according to Gram staining and KOH

The result of microbiology examination for Gram and KOH staining from 107 patients were positive gram coccus (63.60%), negative gram coccus (2.80%), negative gram bacilli (10.30%), spore and hyphae (22.50%) and those of no bacteria or fungi (1.8%).

We obtained negative *Staphylococcus coagulase* in 24 (22.43%) patients and *Staphylococcus aureus* in 5 patients (4.67%). There was no culture explanation on 61 patients.

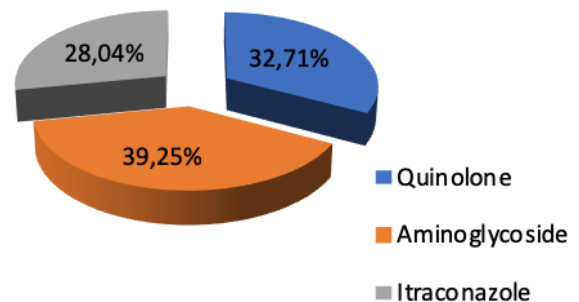
The distribution of corneal ulcer is based on antimicrobes prescribed to the patients. Quinolone was given to 39.25% patients, aminoglycosides was given to 32.71% and itraconazole to 28.04% patients.

We can see the graph above that among 107 patients, 23 (21.50%) patients received AMT procedure. 1 (0.93%)

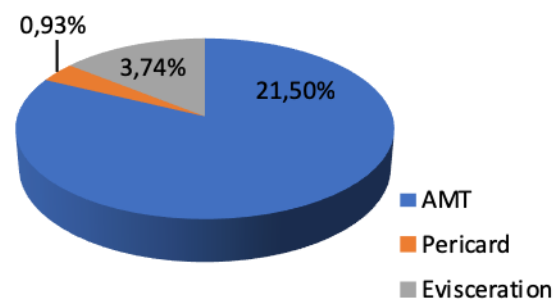
patient received pericard procedure and 4 (0.93%) patient received evisceration.

**Table 2.** Distribution of corneal ulcer according to the culture test

| Culture test                     | Number of patients | Percent age |
|----------------------------------|--------------------|-------------|
| <i>S. coagulase</i> negative     | 24                 | 22.43%      |
| <i>S. aureus</i>                 | 5                  | 4.67%       |
| <i>Ps. Stutzeri</i>              | 3                  | 2.80%       |
| <i>Ps. Aeruginosa</i>            | 1                  | 0.93%       |
| <i>Acinetobacter Huafii</i>      | 2                  | 1.87%       |
| <i>Acinetobacter baumanii</i>    | 1                  | 0.93%       |
| <i>E. coli</i>                   | 2                  | 1.87%       |
| <i>Salmonella arizonal</i>       | 1                  | 0.93%       |
| <i>Acinobacter hydrophilia</i>   | 1                  | 0.93%       |
| <i>Enterobacter gergovia</i>     | 1                  | 0.93%       |
| <i>S. epidermidis</i>            | 1                  | 0.93%       |
| <i>Burkholdenia pseudomallei</i> | 1                  | 0.93%       |
| No growth of microbe or fungi    | 3                  | 2.80%       |
| No culture explanation           | 61                 | 57.01%      |

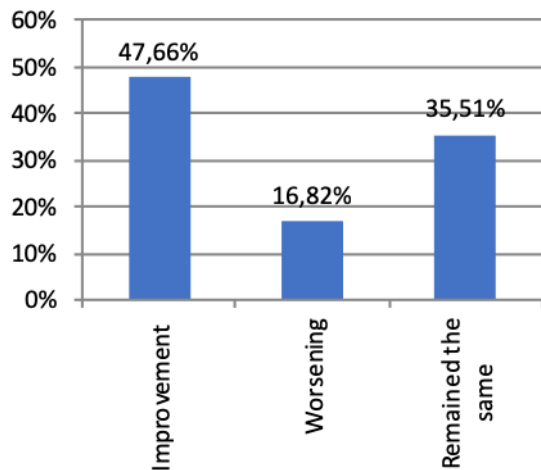


**Fig 8.** Distribution of corneal ulcer according to prescribed antimicrobes



**Fig 9.** Distribution of operative procedure in patient of corneal ulcer

Meanwhile the result of evaluation form 107 patients of corneal ulcer were 51 (47.66%) patients achieved improvement of visual acuity, 18 (16.82%) patients worsening and 38 (35.51%) patients remained the same.



**Figure 10.** Distribution of corneal ulcer according to the patient evaluation

## DISCUSSION

According to the medical record from January 2013 to December 2014, there were new patients with corneal ulcer around 107 patients, of which 8 were male (75.70%) and 26 female (24.30%). It corresponds to the research conducted by Katara et al. in 2013 which shows 60 male (60%) and 40 female (40%) from 100 people. Sameen et al. shows similar results, from which 170 patients of corneal ulcer, around 68.8% is male and 31.2% is female.<sup>5,6</sup>

In this research, most corneal ulcer was found in the age group of 41-50 years old where there were 36 people (33.64%). Shoja et al. obtained similar results in his research where most patients of corneal ulcer were in the age group of 40-50 years old (17.5%). This could potentially be explained since this age group is more active physically and go out to work more often, thus exposing themselves more to the trauma, especially in male.<sup>7,8</sup>

Most of the patients' livelihood in this research, as many as 50 patients (46.73%), comes from farming. Similarly, Srinivasav et al. found most of the patients of corneal ulcer, 245 (56.4%) patients, were farmers.<sup>23</sup> On the same note, Rohatagi et al. showed the highest number patients, 135 (54%) patients out of 250 patients, were farmers as well. These similarities could be explained by the similar geographic location and climate.<sup>8,9</sup>

The corneal ulcer patients who visited The Immunology and Infection Division of Eye Clinic in RSSA Malang complained mostly of red eye (40.19%) and eye pain (34.58%). On the other hand, Kartikha et al. conducted a study in 2014 which showed eye pain (30.96%) as the first, most common chief complaint, and red eye as the second most common (26.96%).<sup>2,10</sup>

Similar results were obtained in studies conducted by Kartikha et al. in 2014, 41 of the 100 corneal ulcers patient had trauma history and it became the highest risk factor in her study. In this study, among 84 patients, 36 people (42.85%) with a history of trauma of foreign bodies in the eye especially from plant, 33 people (39.28%) due to trauma of dust. Similar results were obtained by Gopinathan et al. where by the most common cause of corneal ulcer is trauma, specifically plants (13.9%) and dust (11.4%). The most traumatic cause of the plants is in accordance with the most common livelihood of being farmers who are often exposed to plants.<sup>10-12</sup>

Based on the results of visual acuity in the first visit, we obtained the most visual acuity 79 patients (73.83%) were 2/60-LP+. This is supported by research conducted by Keshav et al. in 2008, in which 188 patients with corneal ulcers were 120 patients (64.86%) of patients with visual acuity 2/60-LP+. Poor visual acuity is caused by the severity of the degree of ulcers in the first visit.<sup>13</sup>

The severity of corneal ulcers found in most of the patients upon the first visit is that of severe degree with 74

patients (69.16%). This is similarly found by Keshav et al. with as many as 68 patients (36.17%) came with severe corneal ulcer. The high number of patients who come to the ophthalmologists with severe ulcer degree is presumably due to the majority of low socio-economic level and low knowledge level that have led to the carelessness upon the treatment of the condition. Besides that, the distant location of the health center also constraints the patients from seeking immediate treatment.<sup>13,14</sup>

Based on the data from microbiological examination (Gram staining and KOH), there were 7 patients (72.90%) infected by Gram-positive cocci. Meanwhile for the KOH staining, we obtained spores and hyphae in 31 patients (28.97%). Similarly, Titiyal et al. stated that 50% patients were infected with bacteria and 17% patients by fungi. Likewise, Keshav et al. found 88.26% of the patients were infected with bacteria and 11.84% infected with fungi.<sup>11,13</sup>

There were patients who were given solely antibiotics or antifungi, or combination of them. The consideration of prescribing the drug is the result if microbiologic examination (i.e. staining or culture), and the severity of ulcer from clinical condition.

Antifungal treatment is given to the patient who had no fungi in the microbiology but relevant to the patient's clinical condition since no positive response was elicited upon antimicrobial only.<sup>9</sup>

Among the total of 107 patients, 23 patients (21.50%) were given AMT procedure, 1 patient (0.94%) was on pericard procedure, 4 patients (0.93%) were given evisceration. This finding is similarly discovered along the study conducted by Rohatagi et al. where by 25% patients were given AMT, conjunctival flap and pericard, and few received evisceration.<sup>2,8,14,15</sup>

Our finding shows 51 patients (47.66%) undergoes improvements based on the evaluation results. According to

Agarwal et al. factors that are evaluated include the inflammation degree, height of hypopion, ulcer healing, and the visual acuity. In addition, Sandhya et al. also added subjective complaint as one of the indicators of successful treatment.<sup>7,16,17</sup>

## CONCLUSION

Corneal ulcer diagnosis relies on the complaint, predisposing factor, clinical and laboratory findings. Early and adequate treatment provides clinical improvement.

## REFERENCES

1. Srinivasan M, Mascarenhas J, Rajaraman R, Ravindran M, Lalitha P. The Steroids for Corneal Ulcers Trial. *Arch Ophthalmol*. 2012;130(2):151-7.
2. Sitompul R, Marsetio M, Asyari F, Sjamsoe S. Arah Penatalaksanaan Ulkus Kornea Bakteri. *Continuing Medical Education "Understanding Ocular Infection and Inflammation"*. 1999:33-41.
3. Erry M. Disiribusi dan Karakteristik Sikatrik Kornea di Indonesia, RISKESDAS 2007. In: Pusat Humaniora KKdPM, editor: Media Litbang Kesehatan; 2012. P.30-74.
4. Weiner G. Confronting Corneal Ulcer. *EyeNet Magazine*. 2012. Epub July 2012.
5. Katara RS, Patel ND, Sinha M. A Clinical Microbiological Study of Corneal Ulcer Patients at Western Gujarat, India. *Acta Medica Iranica*. 2013;51 (6):399-403. Epub 4 Jan 2013.
6. Sameen AJ, Arshad AL, Ahmed M, Kumar M, Kamal M. Efficacy of Gatifloxacin in Acute Bacterial Corneal Ulcer. *Pak J Med Sci*. 2013;29(6):1375-80. Epub 20 September 2013.
7. Shoja MR, Manaviat M. Epidemiology and Outcome of Corneal Ulcer in Yazd Shahid Sadough Hospital. *Acta Medica Iranica*. 2004;42(2):136-41. Epub 17 September 2003.
8. Rohatagi S, Shalini R. Microbial Keratitis in Kannauj District: An Epidemiological And Microbiological Evaluation. *Journal of Evolution of Medical and Dental Sciences*. 2014;3(13):3440-5. Epub 31 March 20 1 4.
9. Srinivasan M, Gonzales CA, George C, Cevallos V, Mascarenhas JM, Asokan B, et al. Epidemiology and Aetiological Diagnosis of Corneal Ulceration in Madurai, South India. *British Journal of Ophthalmology*. 1997; 81:965-71.
10. Karthika HN, Neelima A, Ramchandran S. Microbiological Profile of Corneal Ulcers from a Tertiary Care Hospital in R.R District, AP *International Journal of Health Sciences and Research*. 2014,4(1):112-6. Epub January 2014.
11. Titiyal JS, Smita SN, Anand A, Tandon R, Sharma N, Vajpayee RB. Risk Factors for Perforation in Microbial Corneal Ulcers in North India. *British Journal of Ophthalmology*. 2006;90(6):686-9. Epub 10 March 2006.
12. Gopinathan U, Garg P, Fernandes M, Sharma S, Athmanathan S. The Epidemiological Features and

- Laboratory Results of Fungal Keratitis. *Cornea*. 2002;21(6):555-9. Epub 1 May 2002.
13. Keshav B, Zacheria G, T I, Bhat V, Joseph M. Epidemiological Characteristics of Corneal Ulcers in South Sharqiya Region. *Oman Medical Journal*. 2008;23(1). Epub January 2008.
  14. Limbu B, Saiju R, Ruit S. A Retrospective Study on The Causes For Evisceration at Tilganga Eye Centre. *Kathmandu University Medical Journal*. 2009;7 (2): 115-9.
  15. Khanna RK, Mokhtar E. Bovine Pericardium in Treating Large Corneal Perforation Secondary to Alkali Injury: A Case Report. *Indian Journal of Ophthalmology*. 2008;56(5):429-30.
  16. Sandhya R, Niharika S, Sanjay N. Conjunctivo-limbal Autograft for Climatic Droplet Keratopathy with Ulcerative Keratitis; A Case Report. *International Journal of Scientific Study*. 2014;1(6):11-5. Epub November 2014.
  17. Agarwal P, Roy P, Das A, Banerjee A, Maity PK, Banerjee AR. Efficacy of Topical and Systemic Itraconazole as A Broad-spectrum Antifungal Agent in Mycotic Corneal Ulcer. *Indian Journal of Ophthalmology*. 2001; 49(3):173-6.