



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## Prevalence of Dry Eye in post cataract surgery in North Karnataka Population

Abhishek Kulkarni<sup>1</sup>, Sayed Nooruddin (Corresponding Author)<sup>2</sup>

1. Assistant Professor, Department of Ophthalmology Khaja Banda Nawaz

Institute of Medical Sciences Kalaburgi-585102, Karnataka

2. Junior Resident, Department of Ophthalmology Khaja Banda Nawaz Institute of Medical Sciences Kalaburgi-585102, Karnataka.

### Abstract

**Background:** Incidence of dry Eye in patients following manual small Incision cataract surgery which may cause ocular discomfort, grittiness foreign Body sensation and visual disturbance.

**Method:** 110 senile cataract patients without dry Eye had undergone Manual small incision cataract surgery. To measure schimmers test, Tear film Break-up Time, ocular staining on post-operative days 7, 30 and 60<sup>th</sup> day.

**Results:** Pre-operative ocular staining pattern value  $6.43 \pm 1.04$ , schirmers value  $4.54 \pm 0.67$  and TBUT value  $6.08 \pm 0.96$  which changes to  $7.44 \pm 0$  ( $p < 0.001$ )  $3.5$  to  $0.7$  ( $p < 0.001$ )  $4.86 \pm 0.1$  ( $p < 0.001$ ) at the first post operative day 7,  $6.76 \pm 0.9$  ( $p < 0.001$ )  $3.80 \pm 0.69$  ( $p < 0.01$ )  $5.24 \pm 0.91$  ( $p < 0.001$ ) at the post operative 30<sup>th</sup> and  $6.14 \pm 0.92$  ( $p < 0.001$ )  $4.24 \pm 0.62$  ( $p < 0.007$ ),  $5.48 \pm 0.99$  ( $p < 0.001$ ) at the post operative day respectively.

**Conclusion:** Significant proportion of patients without sign and symptoms of dry eye prior to SICS, developed dry eye following cataract surgery immediately post-operative period with improvement in successive period. Patients should be put on preservative free lubricants for better visual outcome and patient's satisfaction.

**Keywords:** SCIS, TBUT, Schirmers test, Dry Eye, Ocular staining

## Introduction

Dry eye disease is a multi-factorial ocular surface disorder responsible for different symptoms like ocular discomfort grittiness, foreign body sensation and visual disturbances characterised by decreased tear production and/or increased tear evaporation. It is the main factor affecting the quality of life especially in elderly population <sup>(1)</sup>. As per the International Dry Eye Work Shop (DEWS) 2007. Dry eye disease is defined as a multi factorial disease of tears and ocular surface that results in symptoms of discomfort <sup>(2)</sup> visual disturbance and tear film instability <sup>(3)</sup> with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface. A smooth ocular surface and lacrimal tear film are essential for the formation of clear image, as they constitute the first refractive medium <sup>(4)</sup>. Dry eye is one of the most common disorders of the ocular surface. About 4.3 million cases of dry eye reported in India and globally, the severity is more with advancement of age, could be due to ductal pathology leads to lacrimal gland dysfunction by its obstructive effect surgical innervations caused dry eye operated in normal ocular tissue certainly makes to review about pre-surgical preparation, surgical procedure and post-surgical medication hence attempt is made to evaluate the different causes of dry Eye.

## Material and Method

110 (One hundred and ten) patients aged between 50 to 90 years regularly visiting to ophthalmology department of Khaja Banda Nawaz Institute of Medical Science Kalaburgi-585101 were studied.

**Inclusion Criteria:** Patients with Bilateral senile cataract admitted for cataract surgery having schirmer's test  $1 > 10$  patients with Tear film Break time  $> 10$  seconds

**Exclusion Criteria:** Patients having schirmer's test  $1 < 5$  mm, TBU  $< 10$  seconds, patients having pseudophakia, pre-existing disorders of cornea conjunctive, sclera, glaucoma, chemical burns, and radiation. Cataract induced by trauma uveitis,

drug induced, already undergone cataract surgery. Patients having type-II DM, Thyroid disorders, Allergic disorders were excluded from study.

**Method:** History of each patient, visual Acuity recorded anterior segment evaluated by slit lamp Bio microscopy, lens power calculation, dry Eye evaluation grading scheme was done posterior segment was evaluated by ophthalmoscope. The patients fit for surgery prophylactic antibiotic drops was put, A small incision cataract surgery (sclera-corneal tunnel supero-temporal) with posterior chamber intra ocular lens implantation under peribulbar anaesthesia

Dye Eye evaluation and grading was done on the basis of (1) discomfort severity and frequency, (2) visual symptoms (c) Conjunctival staining (d) corneal staining (severity / Location) (e) corneal Tear Sign (f) lid/Meibomian glands (g) TBUT (sec) (h) schirmer's score (mm/5 min)

The diagnostic included corneal and conjunctival staining Assessment of ocular surface staining. A single drop of antibiotic is installed into a commercially available Fluorescein impregnated strip. When the drop has sutured the impregnated tip, the excess is shaken into a waste bin with a sharp flick. The right lower lid is then pulled down and the strip is tapped into the lower tarsal conjunctiva. A similar procedure was carried out on the left. The patient is asked to blink several times and the cornea and conjunctival staining is observed under cobalt blue filter of slot lamp using sodium Fluorescein Dye strips using van Bijsterveld scheme.

Tear Film Break up Time (TBUT) was observed by using cobalt blue filter watching for an area of tear film rupture manifested by a black island within green sea of fluoresce in The time is recorded using a stop watch in seconds. This procedure is repeated for three times and the mean of values taken.

**Schemer's Test** – Patients is made to sit in a dark room with fans and air conditioners switched off. The terminal end of a what man No-41 filter paper is folded in pre marked area and is placed at the junction of medial two third and lateral one third of lower lid margin into lower conjunctival cut de sec. Precautions are taken not to touch the cornea with the paper to avoid reflex lacrimation.

The patients are asked to keep the eyes closed for the period of 5 minutes after which the strip is removed and the length of filter paper moistened is measured. Procedure of SICS (small Incision of cataract surgery) peribulbur block (4ml of inj. Lingnocaine 2% plus 4ml of inj. Bupivacin 0.5% plus inj. Hyaluronidase (10 turbidity unit per ml) was given. Massage with gauze piece and finger over closed eye lid was applied for five minutes. Eye and surrounding area was wetted with povidine iodine (5% in aqueous solution) then eye was draped. After applying speculum and holding superior rectus fornix based conjunctival flap was fashioned. Bipolar cautery used carefully to prepare a blood less field to operate. A straight or frown incision of 6.5 – 7mm was made 1.5mm behind the limbus. Using crescent knife sclera tunnel was made in such a way that, it was 10 to 11 mm internally (by extending scleral pocket towards corneal stroma). The corneal tunnel was made 1.5 mm from the limbus, in case of harder nucleus the incision was extended. Anterior capsule stained by Trypan blue, visco elastic substance (hydroxyl propyl methyl cellulose) was introduced into the anterior chamber. A side port was made at the temporal side, capsulorhexis was done then after hydro dissection, breaking all the adhesion of nucleus within the bag, two relaxing incision at the edge of the capsulorhexis at 11<sup>o</sup> clock and 2<sup>o</sup> Clock position were given to facilitate the prolapse of the nucleus into anterior chamber from the capsular bag. Entry into the anterior chamber is made with 3.2 mm angled keratome. The tunnel was enlarged 7-8 mm externally and 11-12 mm internally viscoelastic substance was introduced above and below the nucleus. The Nucleus was taken out by irrigating vectis, the cortical matter was washed through the main wound and side port by simcoe two way irrigation aspiration cannula, then viscoelastic substance is introduced into anterior chamber and 5.5 mm optic PMMA, PCIOL was implanted in capsular bag, the visco elastic substance was washed out by the same cannula. Side port hydrated conjunctival was repositioned back by holding the conjunctiva with forceps, cautery was applied at two ends. Then gentamycin and Dexamethasone sub conjunctival injection was given. Ocular pad was applied, all patients followed 1<sup>st</sup> post operative day.

The duration of study was Dec-2018 to June-2020.

**Statistical analysis:** Various findings of preoperative and post-operative days by applying t test to obtain p value. The statistical analysis was carried out in SPSS software, the ratio of male and female was 1:2.

### Observation and Results

**Table-1:** Study of ocular staining pattern pre-operatively staining was 110 (100%). In post-operative 7<sup>th</sup> days -34 (30.9%), 65 (59.1%), 11 (10%) respectively. In POD-30<sup>th</sup> 75 (65.5%) 30 (27.3%) 8 (7.3%), In POD 60<sup>th</sup> 106 (96.4%) 4 (3.6%) and p value is highly significant.

**Table-2:** Study of conjunctival injection grades of patients, pre and post operatively. Grade-I pre- operatively 110 (100%) POD 7<sup>th</sup> day, 2<sup>nd</sup> grade 97 (88.2%) Grade-3 was 13 (11.8%) In POD 30<sup>th</sup> day grade-I 99 (90%), 2<sup>nd</sup> grade-I 11 (10%) POD on 60<sup>th</sup> days grade-I 110 (100%) and p value was highly significant ( $p < 0.001$ )

**Table-3:** Schirmers value of patients studio pre and post-operatively from pre-op POD 7<sup>th</sup> day Mean difference was 11.05 (SC=0.35) CI lower bound 10.09 upper bound 12.01 p value was highly significant From pre- operatively POD 30<sup>th</sup> day – Mean difference was 7.46 (SC-0.42) CI Lower bound 6.32 and upper bound was 8.60  $p < 0.001$  (highly significant). From pre- operatively to POD 60<sup>th</sup> day Mean difference was 4.72 (SC=0.39) CI Lower Bound (LB) was 3.67, Upper bound (UL) 5.78 p value was highly significant ( $p < 0.001$ ). From POD 7 to POD 30<sup>th</sup> day Mean difference was -3.59 (SC – 0.34) CI -4.50 LB, -2.67 UL P value was highly significant ( $p < 0.001$ ). From POD 7 to 60<sup>th</sup> day Mean difference was -6.32 (SC 0.344) – 7.25 LB, -5.40 UB P value was highly significant ( $p < 0.01$ ). From POD 30 to POD 60<sup>th</sup> day Mean difference was -2.73 (SC -0.228) -3.34 LB, -2.12 UB P value was highly significant ( $P < 0.001$ ).

**Table-4:** Comparison of TBUT pre-operatively and post-operatively at certain intervals of 7<sup>th</sup>, 30<sup>th</sup> and 60<sup>th</sup> day pre-operatively to POD 7<sup>th</sup> day Mean difference was 4.30 (SC=0.162) 3.86 LB, 4.73 UB) and P value is highly significant ( $P < 0.001$ )



pre- operatively to POD 30<sup>th</sup> Mean difference was 2.61 (SC=0.132) 2.26 LB, 2.97 UB,  $P<0.001$ , (P value was highly significant)

Pre- operatively to POD 60<sup>th</sup> day Mean difference was 1.50 (SE -0.124) 1.17 LB, 1.84 UB  $P<0.001$  (P value was highly significant)

POD to POD 30<sup>th</sup> day – Mean difference was -6.82 (SE 0.144) -2.06 LB, -1.295 UB,  $P<0.01$  P value was highly significant

POD 7 to POD 60<sup>th</sup> day – Mean difference was -2.79 (SC 0.173) – 3.25 LB, -2.32 UB, ( $P<0.001$ ) P value was highly significant

POD 30 to POD 60<sup>th</sup> day – 1.10 (SE 0.096) 1.36 LB, -0.85 UB ( $P<0.001$ ) P value was highly significant.

### Discussion

Prevalence of dry Eye in Post cataract surgery in North Karnataka Population ocular staining pattern in grade-0, grade-I,II,III pre-operatively and Pod 7<sup>th</sup>, 30<sup>th</sup> and 60<sup>th</sup> day the grading values were quite significant ( $P<0.001$ ) (Table-1). Conjunctival injection was done pre-operatively and POD at 7<sup>th</sup>, 30<sup>th</sup> 60<sup>th</sup> day of post- operatively the grading values were compared and observed highly significant ( $P<0.001$ ) (Table-2). Comparison values on pre-operative to POD 7<sup>th</sup> (post-operative Days) POD 30<sup>th</sup> and 6<sup>th</sup> the differences were significant P Value was highly significant ( $P<0.001$ ) (Table-3). TBUT values were compared pre-operatively and POD at 7<sup>th</sup>, 30<sup>th</sup>, 60<sup>th</sup> day. Differences were quite significant ( $P<0.001$ ) P Value was highly significant (Table-4). These findings are more or less in agreement with previous studies <sup>(5)(6)(7)</sup>.

It is also reported that, dry eye changes also observed in many patients in Korean country<sup>(8)</sup>. It could be due to post-operative inflammation, toxicity from the use of benzalkonium chloride containing eye drops and also damage to the corneal nerves from incisions at the limbus. Moreover patients receiving presbyopic lenses cause disturbances in the tear film that can significantly impact the visual quality and patients satisfaction post-operatively due to dryness of eye. Delayed visual recovery after cataract surgery, patients with moderate to severe ocular surface disease are also at higher risk of post-operative complication like infections and corneal melts followed by dryness of Eye <sup>(9)</sup>.

It is also experimented in lower mammals like rabbits and observed that, phototoxic effects of an operating microscope on the ocular surface and tear film caused decreased aqueous tear production, devitalized conjunctival and corneal epithelial cells, squamous type of conjunctival epithelial cells, decrease in conjunctival goblet cells density, decreased expression of mucin SAC, ultra structural damage to conjunctival and corneal tissues and increased inter leukin 1-beta expression in tears. These changes were seen to intensify as the intensity of light was increased. Hence excessive exposure of light during ophthalmic procedure could be a possible pathogenic factor in dry eye syndrome after surgery<sup>(10)</sup>. These are a possibility of denervation of corneal nerves by cataract surgery leading to dry eye syndrome. It is difficult to rejuvenate due to old age.

### **Summary and Conclusion**

Present study of Dry eye in post cataract surgery in North Karnataka Population. These patients underwent manual small incision cataract surgery (supero-temporal incision) and follow up was done post-operatively on 7<sup>th</sup>, 30<sup>th</sup> and 60<sup>th</sup> day using the parameters of Dry eye severity and grading scheme included schirmers. The parameters TBUT, ocular staining was compared with previous follow up, and pre-operative status. Apart from normal base line study, prevalence of dry eye syndrome needs to be considered and reviewed seriously during pre-operative preparation, surgical procedure and post-surgical follow up with medication. This study demands further histo-pathological, genetic, nutritional, pharmacological, geriatric studies because exact pathogenesis of dry-eye is still unclear.

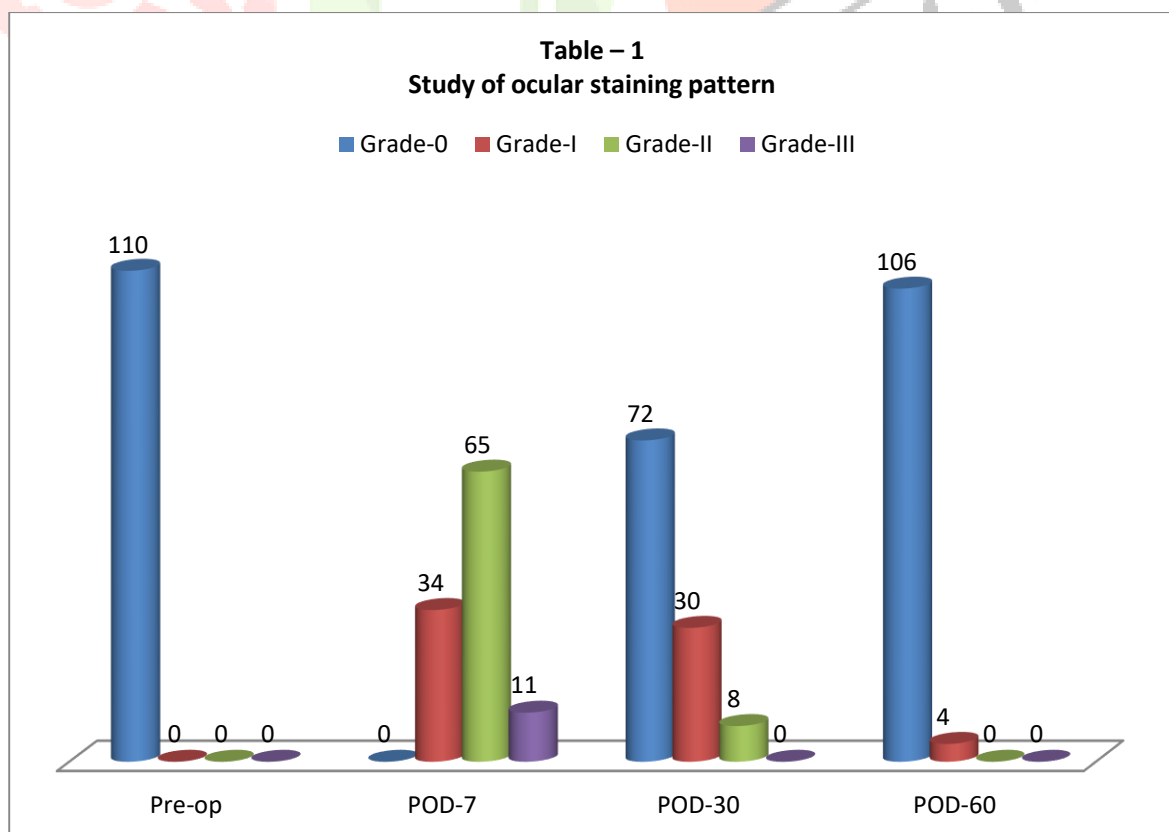
**Table – 1**  
**Study of ocular staining pattern**

Staining	Pre-op	POD-7	POD-30	POD-60	P Value
Grade-0	110 (100%)	0	72 (65.5%)	106 (96.4%)	P<0.001
Grade-I	0	34 (30.9%)	30 (27.3%)	4 (3.6%)	
Grade-II	0	65 (59.1%)	8 (7.3%)	0	
Grade-III	0	11 (10%)	0	0	
Total	110 (100%)	110 (100%)	110 (100%)	110 (100%)	

P value is highly significant ( $p < 0.001$ )

Grade-I deteriorated (0) pre- operatively but POD 30 was 72 (65.5%), POD 60<sup>th</sup> day was 100 (96.4%) I<sup>st</sup> grade on 7<sup>th</sup> POD 34 (30.9%), 30<sup>th</sup> POD 30 (27.3%) and 60<sup>th</sup> POD 4 (3.6%)

II<sup>nd</sup> grade was quite significant than III<sup>rd</sup> grade ( $p < 0.001$ )





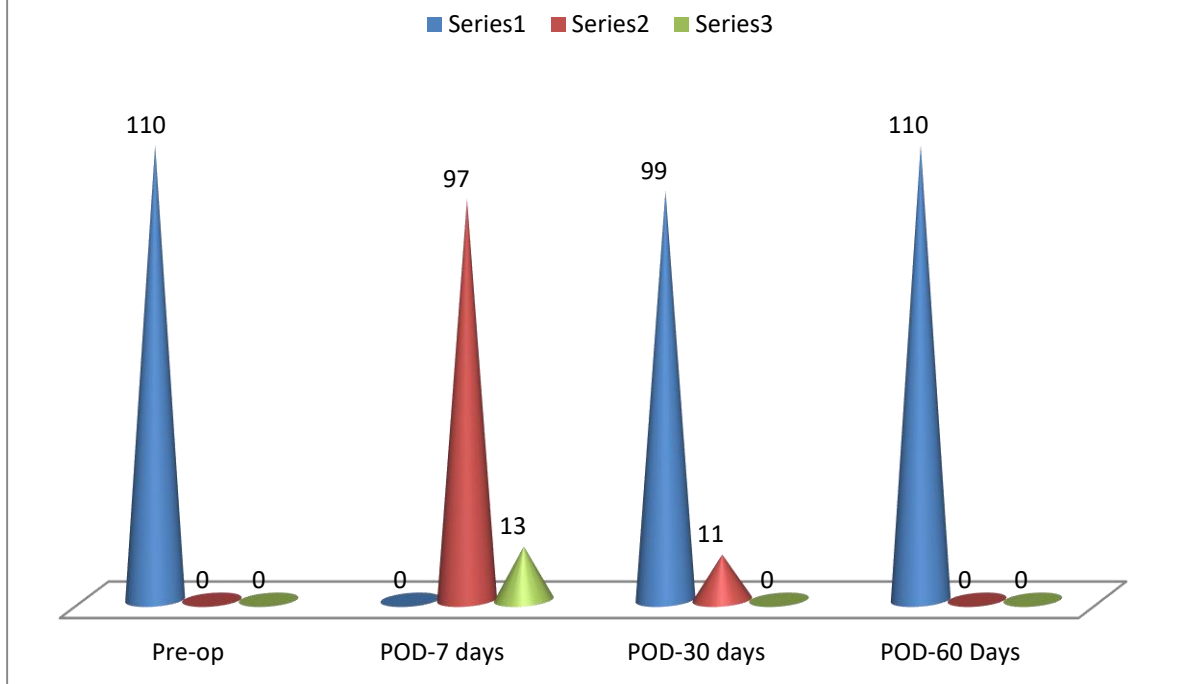
**Table – 2**

**Study of conjunctival injection grading of patients studied pre-operatively and post-operative**

Conjunctival injection	Pre-op	POD-7 days	POD-30 days	POD-60 Days	O Value P<0.001 (highly significant)
1	110 (100%)	0	99 (90%)	110 (100%)	
2	0	97 (88.2%)	11 (10%)	0	
3	0	13 (11.8%)	0	0	
Total	110 (100%)	110 (100%)	110 (100%)	110 (100%)	

Pre-operative grade-I and post-operative 60<sup>th</sup> day was 100%. Least 3<sup>rd</sup> grade was on post operative 7<sup>th</sup> day 11.8% and followed by 10% 2<sup>nd</sup> grade on 30<sup>th</sup> day. P value was highly significant (P<0.001).

**Table – 2**  
**Study of conjunctival injection grading of patients studied pre-operatively and post-operative**



**Table – 3**

**Compression of schirmers value of patients studied pre-operatively and posts operatively 7<sup>th</sup>, 30<sup>th</sup> and 60<sup>th</sup> days**

Schirmers-1		Mean Diff	Std Error	P Value	95 % confidence Internal differences	
					Lower Bound	Upper Bound
Pre-op	POD 7 <sup>th</sup> day	11.05	0.35	0.00	10.09	12.01
	POD 30 <sup>th</sup> day	7.46	0.42	0.001	6.32	8.60
	POD 30 <sup>th</sup> day	4.72	0.392	0.00	3.67	5.78
POD-7	POD 30 <sup>th</sup> day	-3.59	0.341	0.001	-4.50	-2.67
	POD 60 <sup>th</sup> day	-6.32	0.344	0.001	-7.25	-5.40
POD 30	POD 60 <sup>th</sup> day	-2.72/ 0.228	0.001	-3.34	-2.12	

Pre-op = pre-operation, POD = Post-operation

This POD days between 7 and 30 mean Difference -3.59 ( $p<001$ ) and 7 and 60 Mean Difference -6.32 ( $p<001$ ) shows schirmers test-I score

**Table – 4**

**Comparative study of Tear Film Break up Time (TBUT) (post HOC-Bonferroni) pre-and post operatively 7, 30 and 60 days**

TBUT		Mean Difference	Std. Error	P Value	Confidence Internal	
					Lower Bound	Upper Bound
Pre-op	POD-7	4.30	0.16	0.001	3.86	4.73
	POD-30	2.61	0.13	0.001	2.26	2.97
	POD-60	1.50	0.12	0.001	1.17	1.84
POD-7	POD-30	-1.68	0.14	0.001	-2.068	-1.295
	POD-60	-2.79	0.17	0.001	-3.257	-2.325
POD-30	POD-60	-1.10	0.09	0.001	-1.367	-0.851

The present of TBUT comparison between 7 and 30<sup>th</sup> day mean difference was -1.68 ( $p < 0.001$ ) and POD between 7 and 60<sup>th</sup> day. Mean difference was -2.79 ( $p < 0.001$ ), It shows significant improvement in TBUT score.

## References

1. Lemp MA, Baudowin C, Baum J – The definition and classification of Dry eye disease ocul. surf. J. 2007, 5 (2), 75-92.
2. Begley CG, Chalmers RL – The relationship between habitual patients – reported symptoms and clinical signs among patients ophthalmol. Vis. Sci. 2003, 44 (11), 4753-61.
3. Holly FJ – Formation and rapture of the tear film, Exp. Eye Res. 1973, 15 (5) 515-25.
4. Yusuf Rizvi, Sneha Singh – Comparative assessment of tear function and ocular surface following cataract surgery employing manual SICS and phaco-emulsification technique. Ind. J. of Basic and applied Med. research 2014, 4 (1), 544-533.
5. Aditia FA, Michaeli Chhen A – Correlation between corneal sensitivity, subjective dry eye symptoms and corneal staining is sjogren syndrome J. Can. Ophthalmol 2004, 39 (7) 767-71.
6. Rigger G – Importance of the pre-corneal tear film for the quality of optical imaging Br. J. Ophthalmol. 1992, 76 (3), 157-8.
7. Schein OD, Munoz B – Prevalence of dry eye among elderly Am J. Ophthalmol, 1997, 124, 723-8.
8. Cho YK, Kim MS – Dry eye after cataract surgery and associated Intro-operative risk factors Korean J. Ophthalmol. 2009, 23 (2), 65-73.
9. Mobvhedeen, Asadolah – Cataract surgery in the face ocular surface disease curr. Opinion in ophthalmol. 2012, 23 (1), 68-72.
10. Hwang, Hyung B Kim – Phototoxic effects of an operating microscope on the ocular surface and tear film cornea: 2014, 33 (1), 82-90.