



RESEARCH ARTICLE

KNOWLEDGE AND PRACTICE OF CONTACT LENS USE AMONG YOUNG WEARERS

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ABSTRACT

Aim: To assess the knowledge and practice of contact lens (CL) use among the young current users using a piloted questionnaire.

Materials and Methods: An observational study was conducted between July and August 2013 in two colleges among young, current CL wearers undergoing various professional courses.

Results: A total of 122 current CL users between 18-23 years were evaluated of which 67.2% were females. About 79.5% of the students were using soft CL of which 44.3% were disposable CL users. The participants preferred CL because they looked better (45.9%), improved their self confidence (30.3%) or felt more comfortable (30.3%) as compared to spectacles. About 37.7% of the students had the habit of sleeping with their CL on. CL were being cleaned regularly on removal by 73% while 5.7% were cleaning it only occasionally. Multipurpose solution was used for rinsing the lenses by 59% of the students. About 62.3% of contact lens users had problems/complications related to lens usage and the most frequent complications were general discomfort (26.2%), dryness (22.1%) and itching of eyes (17.2%). Only 61.8% of those who had complications consulted an Ophthalmologist.

Statistical analysis used: Cross tab analysis using Fisher's exact test to assess various correlations and categorical variables using frequencies and percentages.

Conclusion: About 26.6 to 45.1% of young CL users do not follow the recommended lens care and hygiene practices. CL education on wear and care is of paramount importance and a regular follow up with an Ophthalmologist is mandatory.

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INTRODUCTION

Contact lenses (CL) are primarily used to correct refractive error with an estimated 125 million global CL users with youngsters comprising the bulk of users (Key, 2007; Lee et al., 2000). Studies have revealed increased CL related complications with poor compliance to the recommended wear and care practices as the main cause (Foulks, 2006; Robertson and Cavanagh, 2011; Donshik et al., 2007; Steinemann et al., 2005). Most often regular follow up with an Ophthalmologist is lacking and medical help is sought only when intolerable discomfort is experienced. Delayed presentation to an eye care service can result in irreversible sequelae despite adequate treatment. CL users are increasing because of changing consumer preferences, growing awareness of the availability and improving net capita income. With eyewear becoming more of a lifestyle accessory clubbed with long working hours and wearing time, it is important to look at the needs of the wearer in terms of lifestyle and the knowledge towards CL (Contact Lens Market, 2015). Adherence to the use and care of CL guidelines was found to be unsatisfactory among users who

attended the CL clinic at our hospital especially among the younger generation. With this in mind, knowledge regarding use and care, complications and practice pattern were assessed using a piloted questionnaire, among the young CL users.

MATERIALS AND METHODS

This was an observational study conducted among young current CL wearers undergoing various professional courses at a medical college and an engineering college, in July and August 2013 in South India. The study questionnaire was designed to assess the knowledge and practice pattern of CL users. The study protocol was approved by the institutional review board and ethics committee as per the ICMR guidelines (IRB Min No. 8288).

Subjects and Methods

Current CL wearers between 18-23 years of age using CL for the correction of refractive errors were chosen through the representatives of the concerned professional colleges and were enrolled after informed consent. Individuals using CL for cosmetic benefit alone or for therapeutic indications were excluded.

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Table 1. Responses regarding contact lens cleaning and hygiene (N - Number of responses)

When do you clean your contact lens	N =122 (%)
On removal of my contact lenses off my eyes, before putting into the lens case	30 (24.6)
Before insertion of contact lenses on my eyes	26 (21.3)
I clean my contact lenses after removal and before insertion	59 (48.4)
I clean my lenses when I get time	5 (4.1)
I clean when I experience discomfort of my eyes with my contact lenses on	2 (1.6)
Knowledge of practice pattern prior to handling contact lens	N =122 (%)
You should rinse your hand with water prior to handling contact lenses	38 (31.1)
You should wipe your hands with alcohol rub prior to handling contact lenses	3 (2.5)
You should wash hands with soap and water prior to handling contact lenses	79 (64.8)
You can handle contact lenses with unwashed dry hands	2 (1.6)
Method of contact lens cleaning practised	N =122 (%)
Rub the lenses with solution using finger tips and wash with solution	67 (54.9)
Put contact lenses into the lens case which contain the solution	29 (23.8)
Do not rub with fingertips but wash very well with solution	26 (21.3)

Table 2. Responses on problems with contact lenses and ocular management (N - Number of responses)

Problem with contact lens use *	N = 76 (%) #
General Discomfort	32 (26.2)
Eyes feel dry	27 (22.1)
Red eyes with contact lenses	18 (14.8)
Itching of eyes	21 (17.2)
Foreign body sensation	10 (8.2)
Poor vision	5 (4.1)
Others	3 (2.5)
Treatment advised *	N = 47 (%) †
Asked to discontinue contact lenses	10 (21.0)
Asked to replace contact lenses	20 (42.5)
Treatment on outpatient basis, to replace contact lens solution	5 (10.6)
Treatment on outpatient basis and prescribed topical drops	17 (36.1)
Hospital admission	1 (2.1)
Reason for consultation with an Ophthalmologist *	N = 122 (%) #
When discomfort of the eyes is experienced	34 (27.9)
When vision is poor	24 (19.7)
When contact lenses gets damaged or lost	23 (18.9)
Six monthly review	55 (45.1)
Yearly review	18 (14.8)
Other Reason	10 (8.2)

The piloted questionnaire was self-administered to assess their knowledge and practice pattern of CL use which consisted of 21 questions (open and closed ended questions, multiple choice questions or a yes/no response) evaluating the various aspects. Questionnaires were given to batches of students and ensured that all questions were answered at submission.

Sample size calculation

Sample size was calculated using 'prevalence for single proportion' based on the study done by Unnikrishnan *et al* in 2009.⁸ Assuming the prevalence of CL related problems to be 79% and with an expected precision of 10%, the number of participants to be interviewed with the self administered questionnaire was calculated to be 65.66 participants.

Data processing and statistical analysis

The categorical variables in the study were analysed using frequencies and percentages. Cross tab analysis was performed using Fisher's exact test to assess the correlation between knowledge of CL use, various practice patterns and complications encountered.

RESULTS

A total of 122 current CL users (110 from engineering college and 12 from medical college) participated. There were 40 males (32.8%) and 82 (67.2%) females with age ranging between 18-23 (Mean 20.04) years. 79.5% of the participants used soft CL with majority using disposable CL (44.3%).

Monthly disposables were the most commonly used among the disposable CL (Figure 1). The main reasons for CL use cited by our participants were, looked better (45.9%), improved self confidence (30.3%) or more comfortable compared to spectacles (30.3%). About 37.7% of the participants slept with the CL on and the sub-analysis of the frequency is shown in Figure 2. The participant's first portal of enquiry for a lens prescription was from an Ophthalmologist (66.4%), optical shop staff (28.7%) or through friends or over the counter (4.9%). Knowledge regarding the basic hygiene prior to CL handling showed that a majority (64.8%) knew that hands should be washed with soap and water prior to handling lenses. About 73% were cleaning their lenses after removal with multipurpose solution (MPS) while 5.7% were cleaning only on an occasional basis (Table 1). About 31.1% felt that rinsing with water alone is sufficient and 1.6% felt it was alright to handle their lenses with unwashed dry hands. On analyzing the practice of CL cleaning, it was found that after removal about 54.9% rubbed the lenses with solution using finger tips, while 23.8% just stored in the lens-case with solution without cleaning. Only 59% were using the prescribed MPS with 12.3% using tap water and 10.7% using home made saline (Figure 3). CL case was cleaned at least once a week by 73.4% of our respondents.

Knowledge of CL associated complications and practice pattern of treatment taken

About 76 (62.3%) responded to have had problems or complications with CL (Table 2) with 47 (61.8%) consulting an Ophthalmologist. Majority were managed with topical

medications or advised change or discontinuation of CL or lens-care solution. Only one individual (0.2%) required hospital admission. When the pattern of review with Ophthalmologist was analyzed, nearly 45 % of our respondents visited an Ophthalmologist every six months (Table 2).

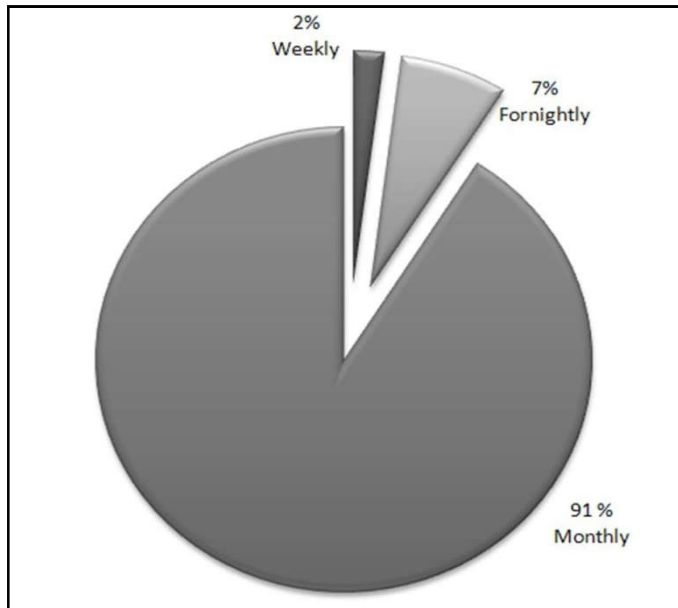


Figure 1.

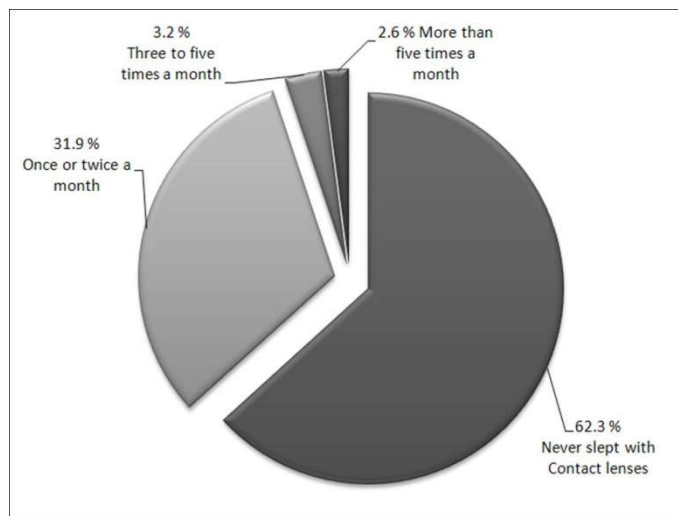


Figure 2.

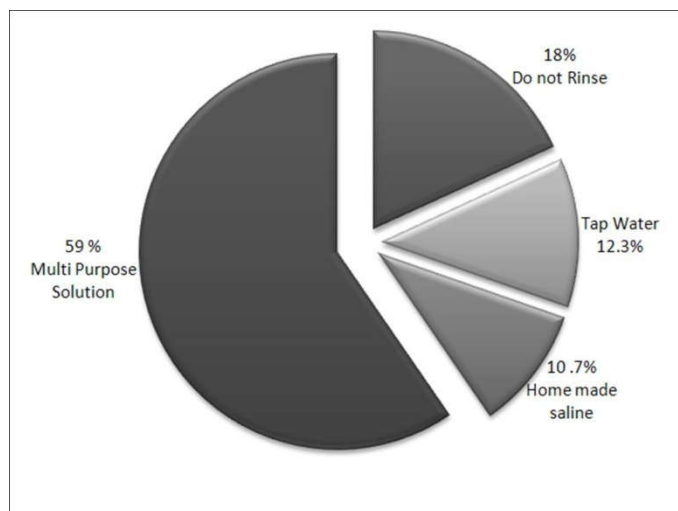


Figure 3.

Association between CL wear, care practices and lens related complications

Sleeping with CL on had an increased association with lens related complications (p = 0.024, Fisher’s Exact Test). Participants who did not receive their CL from an Ophthalmologist or Optometrist were associated with increased complications (p=0.029, Fisher’s Exact Test). Participants who were taught by friends or relatives regarding the use and care, who were occasionally cleaning or used tap water for rinsing were associated with a definite increased rate of complications, although it was not statistically significant.

DISCUSSION

All over the world the younger generation comprises the bulk of CL users for reasons like sports activities and cosmesis (Lee *et al.*, 2000). As adherence to follow guidelines is questionable amongst youngsters, we chose to conduct the study among college students undergoing professional courses. The age range in our study was 18-23 years (mean, 20.4 years) which was similar to the study by Gyawali *et al.*, among users attending the CL clinic (20.64±4.4 years) and the study by Lee *et al* among the general population (21-30 years) (Lee *et al.*, 2000; Gyawali *et al.*, 2014). Women formed the majority of CL users reported from studies done from all over the world, which was similar in our study with 67.2% (Lee *et al.*, 2000; Unnikrishnan and Hussain, 2009; Edwards *et al.*, 2009). CL are categorized based on the types or replacement schedules and majority of the users in the world are wearers of soft CL (Key, 2007). Disposable CL are available for daily, weekly, fortnightly or monthly use and have gained popularity owing to its low replacement cost. In the United States approximately 85% and in India about 98% of CL wearers use soft CL (Foulks, 2006; Unnikrishnan and Hussain, 2009; Edwards *et al.*, 2009). Our study and the study by Edwards *et al*¹⁰ showed the majority to be soft CL users with 79.5% and 66.7% respectively. Study by Unnikrishnan *et al* over a six year period showed a steady increase of disposable CL users from 48 to 60% (Unnikrishnan and Hussain, 2009). Majority of the respondents evaluated in our study preferred disposable CL (44.3%) followed by conventional lenses (31.1%) which is similar to the study by Lee *et al* (42.8% disposable, 30.8% conventional) (Lee *et al.*, 2000). The disposable CL has added advantage of decreased lens deposits or spoilage as they are used only for a short period and preferred by users on occasions (Stapleton *et al.*, 2007).

Most of the participants in our study used monthly disposable lenses (91%) which is similar to the Bharati Vidyapeethstudy (65%) (Thite *et al.*, 2013). CL are preferred over spectacles as they provide a wider field of vision, better cosmesis, do not fog, boost one’s self confidence and are more convenient. In our study cosmetic advantage (45.9%) was cited as the most common reason followed by improved self confidence (30.3%), comfort (30.3%) and convenience (26.2%). Respondents evaluated by Unnikrishnan *et al* (among college students) and by Lee *et al* (among the general population) also preferred CL owing to its comfort, convenience and cosmetic advantage (Lee *et al.*, 2000; Unnikrishnan and Hussain, 2009). Wearing the CL while sleeping is an unhealthy practice which seems to be increasing. In our study 37.7% of the study population had the habit of sleeping wearing their CL. The study conducted by Purushottam *et al.*, 2012 and the Contact Lens Assessment in Youth (Chalmers *et al.*, 2011) study

reported occasional overnight use in 18.96% and 17.9% of the wearers respectively. Study by Robertson *et al* showed > 90% of the CL users seen by private practitioners and at the medical centre were aware of the harmful effects of sleeping with CL on, still 56% in both the groups continued this practice (Robertson and Cavanagh, 2011).

The major source of oxygen to the cornea is from the atmosphere, when the eye is open and the presence of a CL with the eye closed further worsens the hypoxia which results in anaerobic metabolism causing corneal swelling (Stapleton *et al.*, 2012). There is a significant drop in the partial pressure of oxygen when the eyelids are closed (155 to 55 mmHg) which is further worsened by the presence of CL, more so with overnight wear. Extended wear CL are made of high Dk materials with increased oxygen permeability. Our study showed a statistically significant increase in complications with the overnight use of CL (Fisher's Exact Test, $P=0.024$). In our study, majority of the participants who wore their CL during sleep did that for two or less times/month with about 5.8% wearing it for more than 3 times/month. Other studies also revealed a high incidence of complications with the overnight use of CL (Stapleton *et al.*, 2012; Schein *et al.*, 1989). A prospective case-control study among daily wear CL users with microbial keratitis showed an overnight lens wear of 23% among the study population with 6.5 times increased risk for microbial keratitis among overnight users (Stapleton *et al.*, 2012). Another population based study of CL users with a daily wear schedule and occasional overnight wear had a 9 times increased risk of developing microbial keratitis (Schein *et al.*, 1989).

Easier accessibility, faster prescription and lower cost of consultation at the Optometry Clinics without the involvement of an Ophthalmologist have shown a steady rise in the global profile. Participants in our study procured their lenses from an Ophthalmologist (66.4%) while 28.7% were prescribed by an optical shop staff and 4.9% were prescribed by others. In the study conducted by Lee *et al.*, a large proportion were prescribed by an Optometrist (92.3%) while only 7.7% were prescribed by the Ophthalmologist (Lee *et al.*, 2000). Respondents in our study who procured lenses from sources apart from an Ophthalmologist or optical shop staff had more lens related complications and this association was found to be statistically significant (Fisher's Exact Test, $P = 0.029$). Suboptimal or lack of CL education, inadequate eye examination maybe reasons for increase in complications in this group. Knowledge of CL care and maintenance is of utmost importance and has a great influence on the success of CL use and patient's satisfaction. CL should ideally be cleaned both after removal and prior to insertion or at least after removal from the eye and placed in the lens case with fresh MPS (Mannis *et al.*, 2004). Cleaning the lenses prior to insertion alone is not an acceptable practice and will not result in appropriate disinfection (Andrew Gasson, 2010; Mannis *et al.*, 2004). About 5.7% of participants were not cleaning lenses on a regular basis and were found to have increased complications but was not statistically significant probably due to the small number in this subgroup (Fisher's Exact Test, $P = 0.508$). Hand washing with soap and water is mandatory prior to CL handling to prevent contamination of lenses (Andrew Gasson, 2010; Monika Chaudhary, 2007). In the study by Robertson *et al* 90% of the users seen by private practitioners & in optometry clinics and 100% of the lens wearers evaluated at the South Western Medical Centre at Dallas were aware of

the importance of hand hygiene but only 49% in both the groups practised it (Robertson and Cavanagh, 2011). Since the knowledge regarding basic hand hygiene was less (64.8%) among our participants, we can presume a smaller proportion will actually be practising it.

CL cleaning if performed with the no rub method is ineffective in removing loosely-bound deposits. It is advocated to rinse the lens with MPS after cleaning (Andrew Gasson, 2010; Monika Chaudhary, 2007). Lack of a manual rubbing-cleaning step in the MPS disinfection process is considered as a risk factor for microbial keratitis (Ahearn *et al.*, 2008). About half of our study participants (45.1%) did not practice the rub method of CL cleaning. About 59 % of our wearers appropriately used MPS for rinsing while 18% did not rinse their lenses after cleaning. Contact of lenses with tap water is known to increase the incidence of microbial keratitis which is a dreaded complication of CL wear (Illingworth and Cook, 1998). About 12.3% of participants used tap water for rinsing with increased complications seen in this subgroup, but not statistically significant. Thirteen of fifteen students who used tap water for rinsing had CL related complications (Fisher's Exact Test, $P = 0.195$). CL case hygiene is also of importance to minimize CL related complications. The lens case should be cleaned with soap and water; air-dried and finally rinsed with MPS at least once a week (Monika Chaudhary, 2007). Lens case hygiene was found to be optimal in 73.4% of our respondents.

In the study by Robertson *et al* 47% of users, both seen by private practitioners and at the medical centre did not perform appropriate lens case hygiene (Robertson and Cavanagh, 2011). In spite of improvements in CL materials & design, problems related to CL use continue to persist. About 62.3% of our participants experienced problems related to CL wear. General discomfort and dryness of the eyes (48.3%) were the commonest problems which are similar to the study by Unnikrishnan *et al.*, where 79.3% had general discomfort, dryness and watering of eyes as the common problems. Despite the fact that CL care was suboptimal in about 26.6% to 45.1% of our study population with respect to various aspects of CL cleaning and unhealthy practices like sleeping with lenses on and use of tap water to rinse the lenses, only one user had serious complication which required hospital admission. Even though our study group comprised of educated youngsters studying in professional colleges only 61.8% approached a doctor when they had a CL related problem and only less than half the users (45.1%) visited an Ophthalmologist at six monthly intervals. Though the participants had good access to media and information there were lacunae in their knowledge. This information would prove useful in educating young users with appropriate instructions pertaining to lens wear and care.

Limitations

Although our study population included two groups, medical and non-medical, the statistical difference with respect to their knowledge and practice pattern could not be studied, as the numbers in the medical group were a minority. Corresponding practice based question to the knowledge related questions was avoided as it gave a clue to the answer or make the answer rather obvious for an educated population; Cross tabulations were done to evaluate the correlation between practice patterns to overcome this.

Conclusion

There is a rising trend in the popularity of CL use among men and of disposable soft CL. Young CL users were not compliant to the recommended lens care and hygiene practices. Education regarding CL use and care is of paramount importance especially in these groups as they form the bulk of CL users. Overnight use of CL should be strongly discouraged. CL users need to seek medical aid at the earliest when encountered with a problem as delay in treatment can result in adverse outcomes.

REFERENCES

- Ahearn, D. G., Zhang, S., Stulting, R. D., Schwam, B. L., Simmons, R. B., Ward, M. A. *et al.* 2008. Fusarium keratitis and contact lens wear: facts and speculations. *Med Mycol.*, 46:397-410.
- Andrew Gasson, Judith Morris, 2010. The Contact Lens Manual, 4th edition, Butterworth-Heinemann Ltd., Jul.
- Chalmers, R. L., Wagner, H., Mitchell, G. L., Lam, D. Y., Kinoshita, B. T., Jansen, M. E. *et al.* 2011. Age and Other Risk Factors for Corneal Infiltrative and Inflammatory Events in Young Soft Contact Lens Wearers from the Contact Lens Assessment in Youth (CLAY) Study. *Invest Ophthalmol Vis Sci.*, 52:6690-96.
- Contact Lens Market (Gas Permeable Contact Lens and Soft Contact Lens) - Global Industry Analysis, Size, Share, Growth, Trends and Forecast, 2013 - 2019. February 10, 2014. Available at: <http://www.transparencymarketresearch.com/contact-lens-market.html>. Accessed on January 30, 2015
- Donshik, P. C., Ehlers, W. H., Anderson, L. D., Suchecki, J. K. 2007. Strategies to better engage, educate, and empower patient compliance and safe lens wear: compliance: what we know, what we do not know, and what we need to know. *Eye Contact Lens*, Nov;33:430-34.
- Edwards, K., Keay, L., Naduvilath, T., Stapleton, F. 2009. A population survey of the penetrance of contact lens wear in Australia: rationale, methodology and results. *Ophthalmic Epidemiol.*, 16:275-80.
- Foulks, G. N. 2006. Prolonging Contact Lens Wear and Making Contact Lens Wear Safer. *Am J Ophthalmol.*, 141:369-73.
- Gyawali, R., Nestha Mohamed, F., Bist, J., Kandel, H., Marasini, S., Khadka, J. 2014. Compliance and hygiene behaviour among soft contact lens wearers in the Maldives. *Clin Exp Optom.*, 97:43-7.
- Illingworth, C. D., Cook, S. D. 1998. Acanthamoeba keratitis. *Surv Ophthalmol.*, 42:493-508.
- Key, J. E. 2007. Development of Contact Lenses and Their Worldwide Use: *Eye Contact Lens Sci Clin Pract.*, 33: 343-5.
- Lee, Y. C., Lim, C. W., Saw, S. M., Koh, D. 2000. The prevalence and pattern of contact lens use in a Singapore community. *CLAO J.*, 26:21-5.
- Mannis, M.J. Zadnik, 2004. Coral Ghanem, Kara Jose. Contact Lenses in Ophthalmic Practice, 3rd edition, New York: Springer-Verlock.
- Monika Chaudhary, 2007. Contact lens primer, 1st edition, India: Jaypee Brothers.
- Purushottam, A. G., Waman, M. C., Deepak, B. P., Surekha, V. B. 2012. Knowledge and Practice of Contact Lens Wear and Care Among Contact Lens Users Medical Students of Rural Medical College, Loni, Maharashtra, India. *Int J Biol Med Res.*, 3:1385-87
- Robertson, D. M., Cavanagh, H. D. 2011. Non-compliance with contact lens wear and care practices: a comparative analysis. *Optom Vis Sci Off Publ Am Acad Optom.*, Dec; 88:1402-8.
- Sanker, N., Noushad, B. 2013. Trend of soft contact lens prescribing in an optometry centre in India: a 6-year analysis. *Cont Lens Anterior Eye.*, Aug;36:196-8.
- Schein, O. D., Glynn, R. J., Poggio, E. C., Seddon, J. M., Kenyon, K. R. 1989. The relative risk of ulcerative keratitis among users of daily-wear and extended-wear soft contact lenses. A case-control study. *Microbial Keratitis Study Group. N Engl J Med.*, Sep 21;321:773-8.
- Stapleton, F., Edwards, K., Keay, L., Naduvilath, T., Dart, J. K., Brian, G. *et al.* 2012. Risk Factors for Moderate and Severe Microbial Keratitis in Daily Wear Contact Lens Users. *Ophthalmology*, 119:1516-21.
- Stapleton, Keay, L., Jalbert, I., Cole, N. 2007. The epidemiology of contact lens related infiltrates. *Optom Vis Sci.*, Apr;84:257-72.
- Steinemann, T. L., Fletcher, M., Bonny, A. E., Harvey, R. A., Hamlin, D., Zloty, P. *et al.* 2005. Over-the-counter decorative contact lenses: Cosmetic or Medical Devices? A Case Series. *Eye Contact Lens*, 31:194-200.
- Thite, N., Noushad, B., Kunjeer, G. 2013. Contact lens prescribing pattern in India - 2011. *Cont Lens Anterior Eye.* Aug;36:182-5.
- Unnikrishnan, B., Hussain, S. 2009. Pattern of use of contact lens among college students: A cross-sectional study in coastal Karnataka. *Indian J Ophthalmol.*, 57:467-9.
