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# Awareness, Practices and Compliance of Contact Lens Wear among Medical Students

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**Original Research Article**

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**Abstract:** Contact lens (CL) have become popular for cosmetic purpose and for correction of refractive errors [1,2]. Non-compliance and poor hygiene among CL wearers are major cause of ocular complications associated with CL use, esp. corneal ulcer [3, 4]. A cross– sectional survey, using self-designed semi-structured questionnaire of 20 elements was used. Data was collected from medical students of I$^{st}$ to IX$^{th}$ semester of a private medical college in south India. In this survey, out of 754 students, 82 contact lens wearer students (10.87%) have participated. 48 students (58.53%) were using CL for vision correction. 38 students (46.34%) were using CL between 6months to 2 yrs. 45 students (54.87%) were using three monthly disposable CL. 57 students (69.51%) were using CL daily. 68 students (82.92%) were always washing hands before applying CL. 56 students (68.29%) were cleaning CL before and after wear. 80 students (97.56%) were cleaning CL with CL solution but 72 students (87.80%) were reusing (topping up) CL solution. 68 students (82.92%) were rinsing their CL case 1-2 times per week and nearly 69 students (84.14%) were replacing their CL case less than a year. 43 students (52.43%) were using CL for more than recommended time. 52 students (63.41%) had CL related complications though 52 students (63.41%) knew that CL related complications can lead to blindness. Most of the students were aware of about CL hygiene and its related complications. Large proportion of students was non-compliant despite knowing its importance. Education and awareness alone is not sufficient for improved behaviour and newer strategies are needed to improve compliance.
**Keywords:** Awareness, compliance, contact lens, hygiene, medical students.

## INTRODUCTION

Contact lens [CL] is an optic device to be worn on eye, placed directly over the cornea [1, 5]. It is floating on a layer of tears which separate it from cornea and with each eye blink, lens moves slightly allowing fresh tears to flow under the lens [6, 7]. CL is mainly of soft and rigid gas permeable variety and are used for refractive errors correction, for cosmetic reasons (fashion) [1, 8, 9] where it is believed to enhance the beauty of wearer. It is also used therapeutically in symptomatic corneal diseases like keratoconus, irregular astigmatism and in sports like hockey, tennis, cricket, football, polo etc. [7].

Contact lens has been first used in 1887 [10]. During its evolution, softer and gas permeable CL was developed. Toric lenses used for astigmatism were developed in 1970's. In 1990's, varifocal lenses and disposable lenses became common [11].

CL use is becoming popular in medical college students due to its convenience, increased availability and affordability. Improper use and reduced compliance for hygiene may lead to inflammation and infection of cornea and conjunctiva due to reduced tissue resistance [1, 12]. Complications include dryness of eye, giant papillary conjunctivitis, corneal oedema, corneal abrasions, corneal ulcers and neovascularisation [13].

CL related eye complications especially corneal ulcers are troublesome. Risk of microbial keratitis is increased by 5 times who wear CL during sleep at night [3, 14, 15, 16]. Swimming with CL was reported in one third of the cases of corneal ulcer associated with CL use [16, 17].

Earlier reports showed that Pseudomonas aeruginosa, Staphylococcus aureus and Acanthamoeba Castellani were the frequently isolated organisms [18, 19, 14, 20-22]. Herpes simplex and protozoa Acanthamoeba have been implicated in such conditions [23].

Ky *et al*. reported that 80% of CL induced complications are directly related to improper maintenance and poor compliance towards hygiene [24]. Moreover having a tropical climate favours the growth of micro-organisms.

Knowledge of correct CL wear practice can prevent complications associated with inappropriate behaviour. One of the ways to investigate is to know the person's perception towards his own knowledge of CL wear [25] Therefore study of this knowledge of CL wear and care practises will help in formulation of policies for health campaign aiming at reducing the complications associated with CL wear in our society.

The current study was conducted among medical students. The selection of this group of population is on the assumption of better awareness regarding CL wear and ocular health education. The objectives were to determine the knowledge and behaviour of CL wear, practise related to CL cleaning and maintenance. We further assessed the knowledge of complications associated with CL wear and its relationship with subsequent patient's behaviour.

## MATERIALS AND METHODS

A cross-sectional semi-structured questionnaire survey of 20 elements conducted among 82 students using CL in semester I to IX$^{th}$ of a medical college located in south India. Students whosoever has worn CL for whatever reason and for any period has been enrolled for study. These 82 students were interviewed using a semi structured, self-designed questionnaire after taking their consent for participation. Prior to execution of questionnaire, the purpose of study has been explained. The questionnaire was in English & consisted of multiple choice questions. Questionnaire focusses on knowledge, attitude & practice of CL use with its daily care. It also includes the awareness of hygienic practices & ocular complications associated with improper use. A pre-test was conducted in four faculties (excluded from study) 3 weeks prior to research work to see any ambiguity or misunderstanding of questions and then modified to present form.

## RESULTS

### Demographic characteristics

Out of 754 medical students studying in I$^{st}$ to IX$^{th}$ semester, only 82 students were CL wearer. The prevalence of CL wearer at the time of study was 10.87%. The age of students was between 17 to 25 years. Majority of CL users were female (76, 92.68%) with female to male ratio of nearly 9:1.

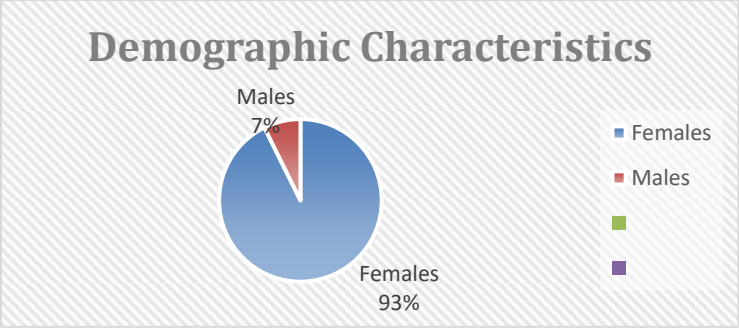


**Fig-1**

### Regarding CL wear

40 students (48.78%) came to know about CL through their friends and relatives, media was the second source in 24 students (29.26%), followed by eye care provider recommendation in 18 students (21.95%). 48 students (58.53%) cited refractive error correction as main reason for CL use followed by cosmesis or aesthetic effect 16 students (19.51%) whereas 18 students (21.95%) cited both as a reason. Majority of the students 45 (54.87%) were using three monthly disposable and rest 37 students (45.12%) were using conventional yearly replacement CL. The duration of CL wear was between 6 months to 2 years in 67 students (47.07%), whereas recent users of less than 6 months were 38 students (46.34%). 12 students (14.63%) were using CL for more than 2 yrs. 57 students (69.51%) were using CL daily whereas 18 students (21.95%) were using on occasions followed by weekly 4 students (4.87%) and monthly 3 students (3.65%).

72 students (87.80%) removed CL before going to sleep but 9 students (10.97%) reported sleeping with CL sometimes (1-2 times a month) which included day time naps, dozing and overnight sleep.

7 students (8.53%) recalled that they had been taken shower sometimes while wearing CL but 1 student (1.21%) was taking shower regularly.

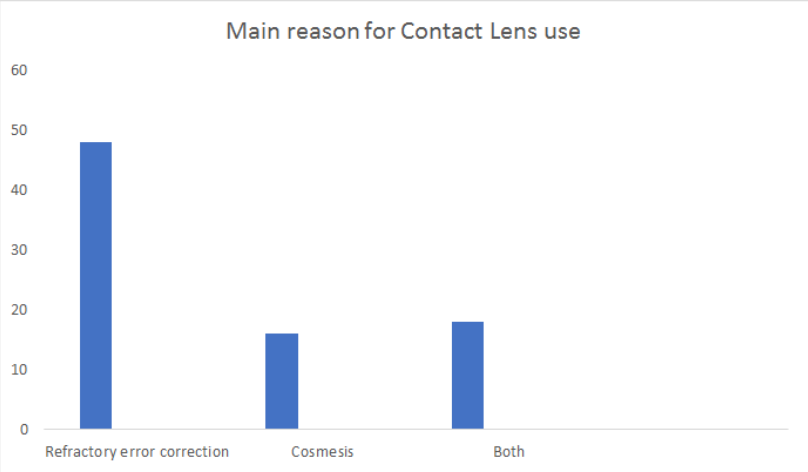


**Fig-2**

**Regarding hygiene and care of contact lens**

Sixty-eight students (82.92%) washed their hands before handling CL. Only small number of students 3 (3.65%) had never washed their hands. Majority of students 80 (97.56%) were cleaning their CL with commercially available CL solution bought from pharmacies. Regarding the practise of cleaning CL before and after wear, 56 students (68.29%) were doing so. On inquiring about reusing or topping up of CL solution, 72 students (87.80%) were doing so. Only small number 6 students (3.94%) were always changing CL solution.

Majority of the students 68 (82.92%) were rinsing their CL case 1-2 times per week. Sixty-nine students (84.14%) were replacing their CL case on yearly basis. Forty-three students (52.43%) admitted that they were replacing CL after its recommended time whereas 39 students (47.56%) were replacing it at recommended time. Majority of students 68 (82.92%) have not been trained on how to wear and take care of contact lenses.

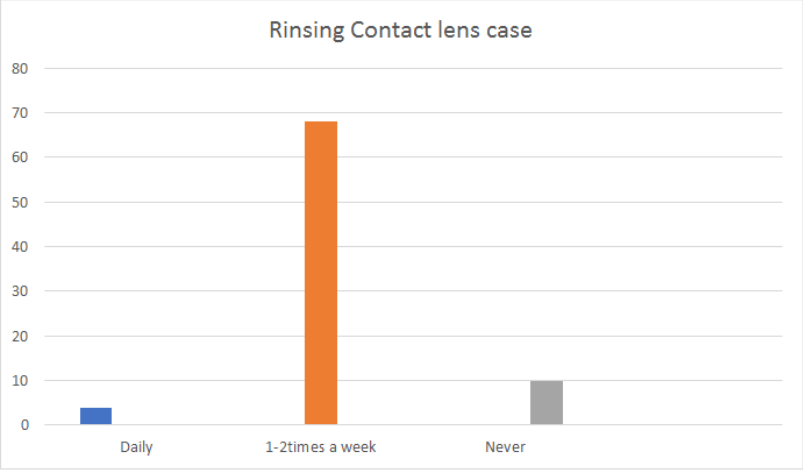


**Fig-3**

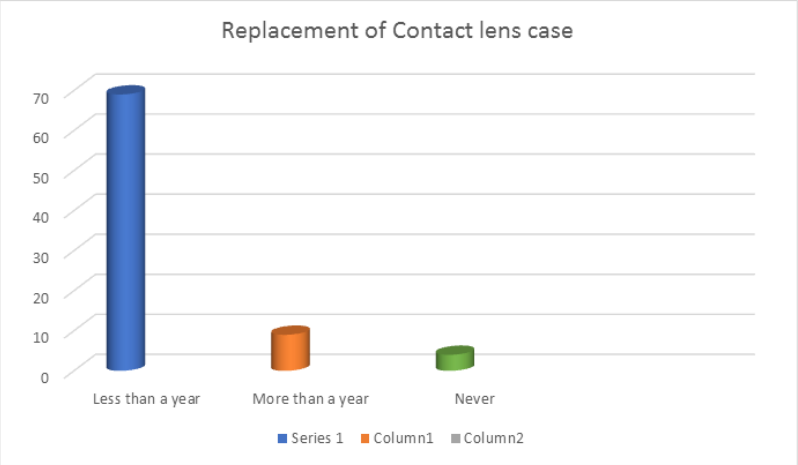


**Fig-4**

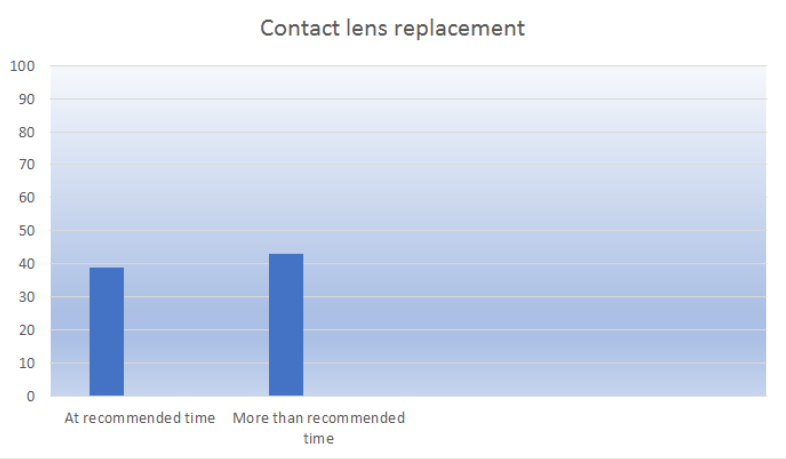


**Fig-5**

**Regarding the knowledge of contact lens wear complications**

Only 6 students (7.31%) have been informed about the possible complications associated with CL usage at the time of prescription. 32 students (39.02%) were aware of Pseudomonas aeruginosa, 25 students (30.48%) for Staphylococcus aureus and 18 students (21.95%) for Acanthamoeba Castellani as causative organism for Corneal ulcer associated with CL use. Large number of students 41 (50.00%) experienced redness in eye due to CL use whereas 4 students (4.87%) had experienced dry eye / gritty sensation. 7 students (8.53%) admitted that they continued to use CL after eye problems. Majority of the students 50 (60.97%) knew CL related complications can lead to blindness.

**DISCUSSION**

The prevalence of CL use among medical students in our study was 10.87% which was lower than a similar study reported by Vidotti *et al*. from Brazil (27.4%) [26] in present study majority of CL wearer were female (92.68%). In studies conducted in Malaya, Karachi, Brazil females were more common having 87.6%, 92.6% & 69.2% [27, 25, 22].

In our study, most of the students 58.53% were wearing CL for refractory error 19.51% for cosmetic purpose. In a similar study by Reem. A. Alasiri *et al*. 2015, majority of medical students were using CL for cosmetic purpose (41%) compared to (29%) for refractive errors [28].

When we asked about source of knowledge 48.78% students got the knowledge from friends and relatives, 29.26% from Media (TV/ Magazines/internet) and only 21.95% from eye care provider. This indicates that further educational programmes are needed to increase CL wearer's knowledge.

In present study 69.51% were using CL daily & 21.95% on occasions (party, functions). Study done by Reem. A. Alasiri *et al*. among medical students mostly 69.3% were occasional users and 30.7% were daily users [28].

In our study, 10.97% students were sleeping wearing CL occasionally. People wearing Contact lenses during sleep are more prone for ocular complications due to corneal anoxia resulted from prolonged contact of contact lenses on cornea [29]. A higher incidence of keratitis (96.4%) has been reported by Morgan *et al.* [30] in people who were sleeping with contact lenses in comparison to people who were using CL only during waking hours.

Regarding water exposure, 8.53% students admitted taking showers sometimes while wearing the soft CL. As certain silicon hydrogel demonstrates increased preferential attachment of Acanthamoeba to lens surface, avoiding lens exposure to water is necessary for prevention of Acanthamoeba keratitis [31, 32].

Poor hand washing is one of the established risk factors for complications associated with CL wear [33, 34] In our study 82.92% students were washing hands before handling Contact lenses. Similar results were observed by Reem. A. Alasiri *et al*. (71.7%) and by Abahussin *et al.* 89.4% [28, 35].

With continuous improvement of lens material, disinfection and storing solutions, nowadays only one solution is being used to disinfect and store the contact lenses and has replaced the conventional rubbing and enzymatic cleaning [23]. In present study 97.56% students were using CL solution for disinfection and storage. As per CDC report water can change the shape, swell or stick the CL to eye apart from risk of Acanthamoeba keratitis, 0.11% students were using tap/boiled water for cleaning CL. It may be due to costly CL solution and lack of knowledge of these complications [36].

It is important to change the storage solution as it may get contaminated [29, 37] moreover proliferation of pathogens and their adherence to contact lens surface makes them a vector for eye infection when you wear CL [1]. Storage solution is being taken from sterile CL solution supplied from manufacturer. Self-prepared CL solutions (tap water /boiled water) are invariably contaminated. In present study 87.80% students were reusing /topping up of storage solution.

Lens storage cases are one of the common sources of contamination and regular replacement is of paramount importance [38, 39]. Wu *et al*. observed that CL storage cases replaced frequently (9months) had lesser contamination than those which have been used for longer period [40] In present study, 84.14% students have replaced lens case less than a year.

Failure to replace lenses at recommended schedule is associated with higher incidence of CL associated complications. [41] It is mainly due to forgetting expiry date & monetary reason. Coopersmith *et al*. also found tendency to replace CL at a later date than recommended [42]. In present study also 52.43% students discarded their CL after its expiry date.

In this study, majority of students 82.92% were not properly trained to wear and take care of Contact lenses. Affiong A Ibanga *et al*. has also reported similar incidence of 82.7% [7] In present study, 92.10% students have not been informed about possible complications associated with CL use. Tajunisah *et al*. [22] have reported 52% students were informed about possible complications at the time of prescription, by their prescribers.

There are some common ocular CL related complications which a user may experience including dry eye/ gritty sensation, red eye, excessive tearing of eyes, pain in eye, photosensitivity, blurred vision & haloes in vision [1, 43, 36, 22, 44]. Students in present study have faced less severe symptoms, 50.00% had red eyes, 4.87% students were having dry eye /gritty sensation. Surprisingly, 6.09% students continued to use CL despite symptoms. Tajunisah *et al*. have also reported about 14% students who have continued to use CL lenses after facing symptoms [22] Education to remove CL at the first eye symptom is needed for early recovery from these complications.

These findings suggested that the risk factors for ocular complications associated with CL wear are preventable. For more precise survey, extent of eye care practitioner's instructions for hygiene and how to care Contact lenses are also needed and eye care practitioner's educational programme are needed to remove ambiguity [45, 46].

## CONCLUSION

We conclude that medical students have knowledge regarding usage of contact lens but further education is needed for correct practice and care of contact lenses. Lack of compliance and correct practice even in educated and knowledgeable medical students may lead to avoidable contact lens related ocular complications.

Precise instructions for hygiene and care of contact lens are to be developed which should be provided to all contact lens wearer to reduce contact lens related complications. Effective educational programme for eye care practitioners are to be emphasized.

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**Questionnaire**

1) How do you know about contact lenses?
   a. Media (TV/ Magazines/internet)
   b. Friends and relatives
   c. Eye care provider

2) Why do you wear CL?
   a. Vision correction
   b. Cosmetic
   c. Both

3) Which type of CL are you using?
   a. Three monthly Disposable
   b. Extended wear (upto1 yr.)

4) Since how long are you using CL?
   a. <6mths
   b. 6mths to 2yr
   c. More than 2 yrs.

5) What is the frequency of CL use?
   a. Daily
   b. Weekly
   c. Monthly
   d. On occasions

6) Frequency of sleeping with CL?
   a. Never
   b. Everyday
   c. Sometimes (1-2 days a month)

7) Are you taking shower while wearing lenses?
   a. Everyday
   b. Sometimes
   c. Never

8) Are you cleaning your hands before using CL?
   a. Always
   b. Some-times
   c. Never

9) How are you cleaning contact lenses?
   a. By tap water / boiled water
   b. By CL solution

10) How often are you cleaning your CL?
   a. Before and after wear
   b. Weekly
   c. Once a month
   d. Never

11) Are you reusing or topping up solution?
   a. Always
   b. Occasional
   c. Never

12) Are you rinsing CL case?
   a. Daily
   b. 1-2 times per week
   c. Never

13) Are you replacing your lens case?
   a. Less than a Year
   b. More than a year
   c. Never

14) When are you replacing CL?
   a. At recommended time
   b. More than recommended time

15) Are you been trained on how to wear and take care of your contact lens?
   a. Yes
   b. No

16) Were you informed about the possible complications of contact lens usage at the time of prescription?
   a. Yes
   b. No

17) Which organism commonly causes infection in contact lens related ulcers?
   a. Pseudomonas aeruginosa
   b. Adenoviruses
   c. Acanthamoeba Castellani
   d. Staphylococcus aureus

18) Have you ever experienced any of the eye problems due to contact lens wear?
   a. Dry eye(s)/ gritty sensation in the eyes
   b. Redness in eyes
   c. Conjunctivitis
   d. Any other

19) Do you continue using CL after eye problems?
   a. Yes
   b. No
   c. Can’t say

20) Do you know CL related complications can cause blindness?
   a. Yes
   b. No
   c. I don’t know