

# Contact lens compliance amongst soft contact lens users

Asik Pradhan<sup>1</sup>, Raju Kaiti<sup>2</sup>, Purushottam Dhungana<sup>3</sup>

<sup>1</sup>Cornea and Contact Lens Unit, Tilganga Institute of Ophthalmology, Kathmandu 44600, Nepal

<sup>2</sup>Department of Ophthalmology, Dhulikhel Hospital Kathmandu University, Dhulikhel 45200, Nepal

<sup>3</sup>Refractive Surgery Unit, Tilganga Institute of Ophthalmology, Kathmandu 44600, Nepal

**Correspondence to:** Asik Pradhan. Cornea and Contact Lens Unit, Tilganga Institute of Ophthalmology, Kathmandu 44600, Nepal. asikpr@gmail.com; asik.pradhan@tilganga.org

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## 隐形眼镜使用者的依从性调查

Asik Pradhan<sup>1</sup>, Raju Kaiti<sup>2</sup>, Purushottam Dhungana<sup>3</sup>

(作者单位:<sup>1</sup>尼泊尔,加德满都 44600,蒂尔冈加眼科研究所,角膜和隐形眼镜组;<sup>2</sup>尼泊尔,Dhulikhel 45200,加德满都大学,Dhulikhel 医院,眼科;<sup>3</sup>尼泊尔,加德满都 44600,蒂尔冈加眼科研究所,屈光手术科)

通讯作者:Asik Pradhan. asikpr@gmail.com, asik.pradhan@tilganga.org

### 摘要

**目的:**从卫生和镜片、镜片盒及镜片护理液的更换来调查隐形眼镜配戴者的依从性。

**方法:**以每天配戴镜片至少 8h、持续配戴 ≥6mo 的隐形眼镜配戴者为研究对象。采用半结构化、经过预先测试和验证的问卷调查表,在接受口头知情同意后评估软性隐形眼镜配戴者的依从性。每位受试者都接受访问,收集有关戴隐形眼镜使用历史的信息。年龄、性别、使用的镜片类型、配戴经验(a)、配戴时间和习惯、一天中持续使用镜片的时间和护理方法的细节都进行了记录。

**结果:**共 73 名参与者的平均年龄为 23.63±5.23y。观察到:依从性最高的项目为镜片清洁和消毒程序(98%);依从性最低的是隐形眼镜配件护理(81%)。依从性较差的是:更换镜片盒(41%),检查并丢弃过期的护理液(22%)和未能进行后续随访(22%)。镜片配戴的性别、配戴方式、配戴类型以及隐形眼镜使用年限依从性间无统计学差异。

**结论:**这项研究结果证明总体上配戴者依从性良好。然而,在隐形眼镜盒和护理液等镜片配件的护理中,存在一定程度的不遵嘱执行。我们认为有必要考虑改善镜片护理操作依从性的方法。

**关键词:**隐形眼镜;依从性;镜片护理

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## Abstract

• **AIM:** To investigate the rate of compliance of contact

lens users regarding hygiene and replacement of soft contact lenses, lens case and lens care solution.

• **METHODS:** A candidate who used their lenses for a minimum of 8h a day for a period of 6mo or more was considered as a contact lens user. A semi-structured, pre-tested and validated questionnaire was used to assess the compliance among the soft contact lens users after receiving informed verbal consent. Each candidate was interviewed to collect the information about their contact lens wearing history. Age, gender, type of lens used, wearing experience (y), wearing time and schedule, duration of lens use in a day and details of care system were noted.

• **RESULTS:** The mean (±SD) age of the total 73 participants was 23.63 ± 5.23y. The status of compliance observed was highest in the category of lens cleaning and disinfecting procedures (98%); the least was in the category of care of contact lens accessories (81%). Major non-compliance aspects identified were replacement of lens case (41%), check discard after date of the solution, cleaning lens case (22%) and failure to attend after-care visits (22%). The gender, modality of lens wear, type of lens wear and years of experience in contact lens use did not show any statistically significant difference in the level of compliance.

• **CONCLUSION:** The results from this study demonstrated good compliance overall. However, some degree of non-compliance was present among the subjects in the care of lens accessories like contact lens case and solution. Approaches intended to improve compliance with lens care practices is considered necessary.

• **KEYWORDS:** contact lens; compliance; lens care

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## INTRODUCTION

Contact lenses offer a convenient way of correcting refractive error, and offer great advantages over spectacles in many ways. Soft contact lenses are the most commonly used contact lenses for refractive correction worldwide. It accounts for 91% of contact lens fit<sup>[1]</sup>. Soft contact lenses used under daily wear regimen has various replacement schedule. Daily, biweekly, monthly, 3 to 6 monthly and annually are the most common modes of soft contact lens replacement. It has been observed that in developed countries there is a high population

(> 90%) of the lens users who are using frequently replacement lenses such as daily, biweekly or monthly<sup>[1]</sup>. In contrast, the population (>90%) are using 3 to 6 monthly or annual replacement lenses in developing countries like Taiwan and Nepal<sup>[1]</sup>. As per lens care and maintenance, a cold chemical such as multi-purpose (all-in-one) solution is being commonly used in comparison to peroxide disinfecting system. The disinfectants used in cold chemicals are generally bi-guanide (PHMB) based or polyquad & aldox based. For a proper disinfection, the lenses are dipped after proper rubbing and rinsing step into multipurpose solution (MPS) (disinfecting) inside a lens storage case overnight before reusing it on the following day.

Compliance with lens care and maintenance instructions is considered to be the most important aspect of the safe and comfortable use of lenses<sup>[2]</sup>. Compliance among contact lens wearer is a multifactorial issue that includes many factors like care of the contact lenses, good hand and ocular hygiene before handling contact lenses and lens case, adherence to proper procedures for contact lens wear and replacement schedules. In prior years, good compliance was defined as the fulfillment of three standardized criteria, namely, hand washing before lens handling, correct use of a Food and Drug Administration (FDA)-approved care system, and adherence to a daily wear schedule<sup>[3]</sup>. Despite of educational resources on contemporary contact lens care, still a high rate of non-compliance has been observed. Introduction of simplified lens care system, additional patient education, counseling using different media and development in contact lens materials and designs seem to have little or no effect on patient compliance. Hence, non-compliance with practitioner recommended contact lens wear and care regimen remains a persistent clinical problem.

In general health care, non-compliance is common. Compliance in contact lens wear continues to be a challenge for eye care practitioners. Historically, overall rates of non-compliance with contact lens wear are routinely cited in the literature as ranging from 40%–91%<sup>[4-9]</sup>. Only 53% to 77% contact lens wearers wash their hands before handling their lenses and approximately 6% report unauthorized overnight wear of lenses<sup>[10-14]</sup>, despite the increased risk for contact lens contamination, microbial keratitis like *Acanthamoeba*<sup>[15-17]</sup>. Microbial contamination of lens storage case has been observed to be related to microbial keratitis<sup>[18-19]</sup>.

Delay in replacement of lens and lens care components are currently widespread. For instance, 40% to 74% contact lens wearers do not replace lenses per the manufacturer's recommended replacement schedule<sup>[10,20-23]</sup>. The disposable contact lens users tend to forget the day of replacement or they extend the lens use to save money<sup>[24]</sup>. While, the other major area of non-compliance identified was in the maintenance of lens care accessories<sup>[6,11]</sup>.

Non-compliance may occur in different forms, such as not attending aftercare visits, failure to wash hands before handling lenses and cases, over-wearing lenses, sleeping in

lenses, exposure of the lens or lens case to water, inserting lenses which have fallen on the floor, or other surfaces; improper cleaning, disinfection, or replacement of the lens case and topping-up of old solutions in the lens storage case (Claydon and Efron, 1994<sup>[6]</sup>; Butcko *et al*, 2007<sup>[25]</sup>; Bui *et al*, 2010<sup>[26]</sup>; Morgan *et al* 2011<sup>[27]</sup>. Contact lens care non-compliance may also involve mishandling steps in the lens cleansing regimen such as not rubbing lenses before disinfection, not rinsing lenses thoroughly after rubbing and prior to disinfection, or even neglecting both the rubbing and rinsing steps before overnight disinfection (Cardona and Llovet, 2004<sup>[28]</sup>). Hiti *et al* (2006)<sup>[29]</sup> have stressed the importance of digital, mechanical cleaning by contact lens users because *Acanthamoeba* cysts and trophozoites are able to adhere to the contact lens surfaces.

Non-compliance with contact lens wear and care procedures result in wear of unsuitable contaminated contact lenses which may reduce wearing time, reduce the comfort and may compromise the eyes. A recent report evaluating the relationship between non-compliance and lens-related adverse events suggest a potential correlation with an increased incidence of contact lens-related complications evident among non-compliant lens wearers<sup>[11]</sup>.

It is difficult to expect a person to be wholly compliant. However, if a subject is following the lens care instructions most of the time, it is highly unlikely that a significant complication would occur<sup>[2]</sup>.

Contact lenses are also sold over the counter without any proper eye and contact lens evaluation or prescription. Apart from this, contact lens has an aesthetic use and is common in young population who are reported to be more non-compliant<sup>[3]</sup>. So, it is very likely that this population will have poor compliance and makes them quite vulnerable to the contact lens related complications such as contact lens intolerance and even sight loss due to conditions like microbial keratitis. With the aim of improving compliance it is indispensable to know hygiene behaviors and the demographic profile of lens users. This study was undertaken to provide a proper idea about the level of compliance to contact lens wear and care among the soft contact lens users as no such studies have been done previously in our context.

## SUBJECTS AND METHODS

This study was a descriptive, cross-sectional, and questionnaire based study.

All the soft contact lens wearers (who have worn lenses for a minimum of 8h a day for a period of 6mo) visiting the contact lens unit of Tilganga Institute of Ophthalmology were included in the study. Rigid gas permeable (RGP) contact lens wearers, daily disposable users, wearers who purchased lenses over the counter and contact lens wearers who were not willing to participate were excluded from the study.

The study was carried out from 1<sup>st</sup> October 2015 to 31<sup>st</sup> December 2015 (3mo).

A semi-structured, pre-tested and validated questionnaire was used to assess the compliance among the soft contact lens

users after receiving informed verbal consent. This project work was approved by Institutional Review Board, Tilganga Institute of Ophthalmology. All the procedures carried out with respect to this work have abided by the Declaration of Helsinki, as revised in 2002. Category of lens type included was conventional and disposable (except daily disposable) lenses worn on a daily wear basis. Each candidate was interviewed to collect the information about their contact lens wearing history. Age, gender, type of lens used, wearing experience (y), wearing time and schedule, duration of lens use in a day and details of care system were noted.

A candidate who used their lenses for a minimum of 8h a day for a period of 6mo or more was considered as a contact lens user. If they used their lenses for more than 5d a week they were termed as "regular user" and for less than 5d an "occasional user".

**Assessment of Compliance** To assess the level of compliance, the participants were requested to complete a questionnaire. The questionnaire had been adopted from a published questionnaire<sup>[11]</sup>, the recommendations from Asia-Pacific contact lens care Summit, 2007<sup>[30]</sup> and modified questionnaire<sup>[2]</sup>.

A total of 21 questions were used to assess the compliance status and they were categorized under three major aspects of lens care procedures.

Category-I: Wearing and replacement habits (6 questions).

Category-II: Lens cleaning and disinfecting procedures (9 questions).

Category-III: Care of contact lens accessories (6 questions).

The response to each question was graded using a rating scale from 4 to 1. A score of 4 will be given for the response of always (total compliance), 3 for often, 2 for sometimes and 1 for never (total non-compliance). The questionnaire contains four negative questions too; (Question #3 & 4 in Category-I, Question # 2 in Category-II and Question # 4 in Category-III). For those questions, a response of "never" will be scored with 4, "sometimes" with 3 "often" with 2 and "always" with 1. For the negative questions, a response of "never" indicates fully compliant and "always" indicated fully non-compliant. Subjects were instructed not to give a score more than two if they are not carrying out a particular procedure at least half of the occasions.

Subjects with compliance scoring more than or equal to three will be classified as "Compliant" for that lens care procedure.

To find out the level of compliance in a specific lens care category (Category-I, Category-II & Category-III), the average score of the responses were calculated and a score of 3 or more would qualify the subject to be compliant in that category.

After calculating the individual compliance score for all three categories, the overall level of compliance for a participant was assessed. A participant who gained a score of three or more in all the three lens care categories separately were termed as "Compliant".

**Statistical Analysis** The Statistical Package for Social Science (SPSS) version 16.0 was used for the tabulation and analysis of the data collected. Unpaired *t*-test was used to investigate the relationship between compliance and variables like gender (male *vs* female), type of soft lenses (conventional *vs* disposable), modality of lens wear (regular *vs* occasional), duration of lens use. A *P*-value of < 0.05 was considered to be statistically significant.

## RESULTS

Of the total 73 soft contact lens user included in the study, 44 (60%) were females and 29 (40%) were males. The mean age of the participants was  $23.63 \pm 5.23$ y. The age ranged from 15 to 38y.

The maximum number of participants (60%) had a lens wearing experience of 2y or less with a mean of  $3.15 \pm 3.39$ y. Two (2.8%) of the subjects had 15y of lens wear experience. The duration of lens wear in a day by the participants ranged from 8 to 14h per day with a mean of  $9.67 \pm 1.75$ h.

The subjects in our study used contact lenses almost every day. There were 67 (92%) of the subjects wore their lenses 5d or more in a week (regular user). Only 6 (8%) subjects wore lenses occasionally (< 5d a week). All of the lens wearers were using spherical soft lenses for distance vision correction amongst which 43 (59%) participants were using conventional or annual replacement lenses whereas, 29 (40%) were using monthly replacement lenses. Only one participant used 3 monthly replacement lenses.

Of the total participants 55 (75%) were using Poly-Hexa Methylene Bi-guanide (PHMB) based disinfecting solutions. Only 18 (25%) were using polyquad and aldox based multi-purpose disinfecting solution.

Among the subjects studied, overall compliance was very good. The subjects who were complaint (compliant score  $\geq 3$ ) in all the three categories of lens care was 90%. Only 10% subjects were non-compliant (compliant score < 3).

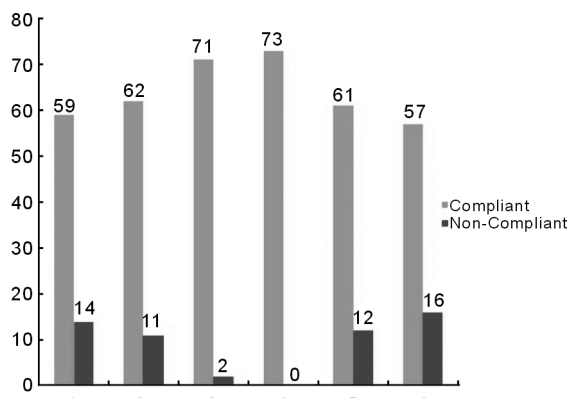
In the category of wearing and replacement habits, 87% of the participants acquired a compliance score of  $\geq 3$  (Table 1).

The assessment showed 19% of the subjects wore their lenses more than the recommended wearing time in a day. And 15% did not discard their lenses and switched to new pair as suggested. Only 3% of the subjects used to sleep for short periods with their lenses on. None of the subjects slept overnight with lenses on. While 16% of the participants did not remove their lenses if eyes looked red or irritated, and 22% of the participants did not attend the after-care visits as recommended (Figure 1).

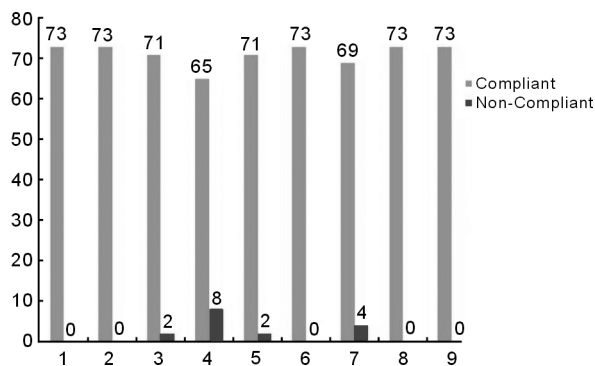
There was a highest level of compliance observed among the participants in cleaning and disinfection procedures category. Of the participants 98% got an average compliance score of  $\geq 3$  (Table 1). The 100% of the participants washed their hands properly before handling the lenses. None of the participants used tap water or saliva to clean lenses if no solution was available. The weakness observed in this category included; 3% did not clean their lenses after wearing; 11% did not rub the lenses with solution on both sides while cleaning; 3% did

**Table 1 Compliance data in each lens care categories**

Parameters	Category I	Category II	Category III
Mean(±SD) compliance score	3.391±0.66	3.725±0.461	3.256±0.834
Status of compliance (%) (Compliance score ≥3)	87	98	81
Median compliance score	3.333	3.888	3.333



**Figure 1 Status of compliance in Category-I** 1: Wear lenses as per the recommended wearing time each day; 2: Discard and switch to a new pair as recommended; 3: Take nap in contact lenses; 4: Sleep overnight in contact lenses (This is a negative question); 5: Remove lenses if eyes look red or irritated; 6: Attend all the recommended after-care visits.

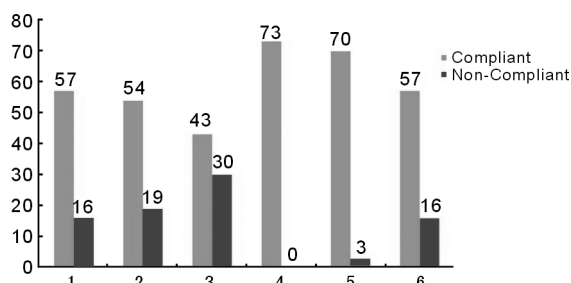


**Figure 2 Status of compliance in Category-II** 1: Wash hands before handling contact lenses; 2: Use tap water/saliva to clean while solution is not available (This is a negative question); 3: Clean lenses every day after wearing; 4: Rub lenses with solution on both sides each time to clean; 5: Rinse contact lenses with solution after cleaning; 6: Check lenses for debris and damage before insertion; 7: Use fresh solution to store/soak lenses after each use; 8: Fill lens case with fresh solution enough to immerse the lens; 9: Soak contact lenses in solution for more than 4h every nights.

not rinse lenses with solution after the cleaning step. And 5% did not use fresh solution to store or soak the lenses after each use. However, all of the participants checked their lenses for debris and damage before insertion. All the subjects filled the lens case enough with fresh solution to cover the lenses completely. All the participants soaked their lenses in the solution for more than 4h every night (Figure 2). The least level of compliance was observed in the category of lens care accessories. Only 81% of the participants were identified to be compliant in this category (Table 1).

**Table 2 Association between gender, modality of lens wear, type of lens and duration of lens use with level of compliance**

Parameters	Components	Compliance rate (%)	P
Gender	Males	93	0.24
	Females	88	
Modality of lens wear	Occasional user	91	0.157
	Regular user	84	
Type of lens wear	Conventional user	86	0.084
	Disposable user	94	
Duration of lens use	Using CL ≤2a	91	0.379
	Using CL >2a	88	



**Figure 3 Status of compliance in Category-III** 1: Clean lens case thoroughly with antiseptic solution/soup and air-dry it once a week; 2: Allow lens case to air-dry after inserting lenses each day; 3: Replace lens case every 3mo; 4: Share lens case with friends (This is a negative question); 5: Recap solution bottle immediately after use; 6: Always check expiry dates of solution and discard them after expiry.

There were 22% of the participants did not clean the lens case thoroughly with antiseptic solution /soap and air-dry it once a week. 26% of the participants did not allow the lens case to air-dry after inserting lenses each day. Of the subjects 41% did not replace their lens cases every three months. All of the participants did not share their lens case with anyone. Only 4% of the subjects did not recap solution bottle immediately after use. And 22% of the subjects were not particular about checking the “discard after” dates of contact lens care solutions (Figure 3).

On comparing the level of compliance between gender [ male vs female ( $P = 0.24$ ) ], modality of lens wear [ regular vs occasional ( $P = 0.157$ ) ], type of lens wear [ conventional vs disposable ( $P = 0.084$ ) ] and duration of lens use [ ≤2y vs >2y ( $P = 0.379$ ) ] did not show any statistically significance.

**DISCUSSION**

The application of contact lenses is ever growing in Nepalese population; however, no studies till date have been reported to explore contact lens-wearing habits, compliance and issues of hygiene in contact lens wearing population. Therefore, this study was carried out to provide the insights into these aspects.

In the context of contact lens wear, compliance can be defined as a wearer adhering to the instructions provided by the practitioner with respect to optimum lens wear and care. While using contact lens, an extra burden is created to the



ocular defensive mechanism due to the presence of lens. It is important to be minimized as much as possible. The changes in ocular surface by the physical presence of lens cannot be completely reverted by any of the techniques. However, it is possible that the increase in bio-burden which occurs during contact lens wear can be reduced by the hygiene and lens handling practices of a contact lens wearer<sup>[2]</sup>.

There were predominantly females among our subjects who still follow contact lenses for aesthetic use. Of the subjects studied, 60% were using conventional or annual replacement lenses. It was significantly different to the similar studies conducted by Noushad *et al*<sup>[2]</sup> and Gyawali *et al*<sup>[31]</sup> where 60% and all (100%) of the subjects were using disposable lenses (monthly or less) respectively. It could be due to the less financial burden and a tedious job of remembering and replacing the lenses as recommended in disposable contact lens wear. The other reason could be the availability of the conventional or annual replacement lenses. In addition, most (92%) of the users were regular users (using contact lenses  $\geq 5$  d a week). The agile youth who are amongst the lens users preferred using lenses daily.

In our study, the level of compliance was high among a group of people wearing soft contact lens. This overall compliance was 90% as compared to 34% found by Noushad *et al*<sup>[2]</sup> study among a group of young university students wearing soft contact lenses. The outcomes varied among different studies as the methods adopted to assess the level of compliance were different. Collins and Carney<sup>[4]</sup> interviewed the subjects first and then asked to demonstrate their care and maintenance procedures. They classified non-compliance as failing in any of the evaluated steps. Conversely, Turner *et al*<sup>[32]</sup> applied a weighting factor to assess the patient behavior with the potential to cause serious clinical problems to have a greater impact on the overall analysis than those with less serious consequences. De Oliveira *et al*<sup>[5]</sup> studied the compliance in college students and health workers using questionnaire alone; while, Yung *et al*<sup>[11]</sup> employed a combination of questionnaire and objective evaluation of the rate of contamination in lens care accessories. Numerous surveys attempting to assess compliance using self-reported written questionnaires have generated estimates of compliance ranging from 9% - 91%<sup>[33-38]</sup>. In contrast to previous questionnaire based studies where they have assessed whether a particular procedure has been carried out or not, the questionnaire used in our study tries to assess the frequency with which each procedure was performed. Moreover, a subject who failed to score a sufficient compliance score in any of the three lens care categories was considered non-compliant. Even though, the classification of candidates was strict in our study, the level of compliance was found to be very high. This could be due to the proper attitude of the subject towards lens wear and care, and a contact lens practitioner delivering proper lens wear, care and maintenance instructions in an effective way at the time of dispensing and during after-care visits. McMonnies<sup>[39]</sup> has also concluded that compliance in contact lens wear may be

improved by explaining the benefits of compliant procedures which is attained by proper communication between a practitioner and a wearer.

In the category of wear and replacement habits, the assessment showed 19% of the subjects wore their lenses more than the recommended wearing time in a day. The responses were similar to the studies carried out previously<sup>[2, 9, 31]</sup>. The majority of the participants in our study were youth requiring vision correction for most of the waking hours. Henceforth, they would have overused the lenses than recommended. Using a contact lens more than a recommended time in a day could compromise with the oxygen supply. Of the participants, 15% did not discard their lenses and switched to new pair as suggested. It was similar to the studies done by Noushad *et al*<sup>[2]</sup> (15%), Yung *et al*<sup>[11]</sup> (22%). Ayatollahi *et al*<sup>[40]</sup> observed that 87% did not scrap their lenses and switched to a new pair as recommended. A study by Stapleton *et al*<sup>[18]</sup> shows a direct relationship between increased rate of infections and using lenses beyond their recommended replacement schedule. Though the case, people think that holding up with same old lenses for couple of days or weeks more may help them financially, especially when it comes to purchase disposable lenses such as monthly. Users have also mentioned about their forgetfulness regarding the exact replacement date for their lenses. The other area of non-compliance in our study was to attend after-care visits (22%) as recommended. In a study by Noushad *et al*<sup>[2]</sup>, 56% of the participants did not attend the after-care visits. The results observed by Bowden *et al*<sup>[13]</sup> was slightly less in a population studied in UK (6.2%) and Germany (7%). However in the study by Ayatollahi *et al*<sup>[40]</sup>, 95.2% did not attend the suggested after care visits. Gyawali *et al*<sup>[31]</sup> found that 39.3% did not remember the recommended aftercare visit schedule in the Maldivian population. The reason behind these contrasting findings between developed and developing countries could be due to the lack of awareness and carelessness of the lens users not to show up in the clinics until something goes wrong with the lenses and eye. The other probable reason could be lack of health insurance and ease of transportation. Naushad *et al*<sup>[2]</sup> observed that 32.4% of the participants took NAP with the lenses and 5.6% slept with the lenses overnight, whereas; Ayatollahi *et al*<sup>[40]</sup> found 37.2% used to sleep for short periods with their lenses. In another study, 25.2% of the patients were sleeping with lenses, which included overnight wear, daytime naps or dozing<sup>[31]</sup>. Conversely, only 3% of the subjects in our study admitted to have slept for short periods with their lenses on, whereas; none of them acknowledged to have slept overnight wearing the lenses. The higher prevalence of nap and sleeping overnight with lenses, observed in prior studies may be due to the contentment from both practitioner and patient side to stress the importance of this step especially when dispensing disposable lenses<sup>[2]</sup>; however majority of the participants in our study were conventional lens users, who might have been stressed not to sleep with the lens on. It is important to note

that the unscheduled overnight use with disposable lenses is associated with a four-fold increase in the risk of microbial keratitis<sup>[15]</sup>.

Highest level of compliance is always expected in the category of cleaning and disinfection for a successful contact lens wear. Not surprisingly in our study too, this category showed the highest level of compliance (98%) among the subjects (Table 1). All the subjects in our study washed their hands before handling their lenses. Almost all of them washed hands with soap before handling the lenses and eye. Noushad *et al*<sup>[2]</sup> also observed a high level of compliance among his subjects, as high as 92% washed their hands before handling their lenses. Previous researches showed higher rate of non-compliance among their subjects; Gyawali *et al*<sup>[31]</sup> -11.2%, Collins and Carney<sup>[4]</sup> -16%, Turner *et al*<sup>[32]</sup> -40% and Yung *et al*<sup>[11]</sup> -35%, Hickson-Curran *et al*<sup>[10]</sup> -44% -49%. The better performance by the participants in both the studies can be attributed to a superior awareness of hand hygiene among the young population of contact lens users. Yet, 3% did not clean their lenses once after wearing them for day long, 11% did not rub the lenses with solution on both sides while cleaning, 3% did not rinse lenses with solution after the cleaning step and 5% did not use fresh solution to store or soak the lenses after each use. Cleaning a lens after its day-long use makes more sense and is important in order to remove the debris and possibly to reduce the microbial adherence. Comparing our study to Noushad *et al*<sup>[2]</sup> the non-compliance observed in proper cleaning of both surface of lenses was 21% and 27% did not rinse their lenses after the cleaning step and 29% responded that they did not clean their lenses once after they had worn them. Similarly, Hickson - Curran *et al*<sup>[10]</sup> observed his subjects that 75% -77% was not rubbing the lenses so as to clean and 46% did not rinse the lens with solution after cleaning. However, study by Ayatloahi *et al*<sup>[40]</sup> showed that 84.1% did not clean their lenses after they wore them, 77.2% did not rub both the sides of the lens while cleaning and 66.9% did not perform the rinsing step after they completed the lens cleaning. Similarly, 20.5% of the participants admitted not cleaning the lenses with the rub and rinse technique before insertion. The disinfection procedure is less burdensome nowadays due to the accessibility of easy-to-use (all-in-one) MPS in the market. It may be the finding that was reflected in our results too. The better performance observed in the disinfection category could be due to the ease of the cleaning care system and to the greater effort given to this area at the time of dispensing by the practitioner.

The noted level of compliance observed in our study was the least in the care of lens accessories among all the categories (Table 1). Of the participants, 80.82% scored an average compliance score of more than three. Noushad *et al*<sup>[2]</sup> observed about 52% non-compliance in the subjects studied where major setbacks were; 76% did not replace lens case in 3mo, 46% did not disinfect their lens case thoroughly once in a week and 68% did not allow air-drying their lens cases after inserting the lenses. Gyawali *et al*<sup>[31]</sup> reported that 40.

2% did not disinfect the lens case whereas, Ayatollahi *et al*<sup>[40]</sup> reported that 51.7% were not particular about replacing their lens cases every three months, 31.7% did not air dry their lens cases after inserting the lenses and 60% of the subjects did not disinfect their lens case thoroughly once in a week. In our study, it was found that 41.1% did not replace lens case in 3mo, 26% did not allow the case to air-dry after inserting the lenses and 21.91% did not clean the lens case with antiseptic solution and air-dry once a week. Moreover, 21.91% of the participants also did not check the "discard-after" dates of lens care solutions. The results observed by Hickson-Curran *et al*<sup>[10]</sup> also had poor compliance (53%) on cleaning and disinfecting lens case with antiseptic soap/solution once a week. Collins and Carney<sup>[4]</sup> observed the second highest level of non-compliance rate in maintaining the lens cases out of the 14 aspects of lens care they studied. The least level of compliance in the care of lens accessories was no different from the results of other studies<sup>[11,32]</sup>. A significant non-compliance in the maintenance of lens accessories could also be partially credited to the level of practitioner conformity. The possibility could be when importance and stress was given to lens cleaning and maintenance steps while dispensing; leaving the procedures of accessory care less effective.

Overall, the observed compliance was remarkable among the subjects in the care and maintenance of their contact lenses. Compliance was relatively better in conventional daily wear lens wearers with overall observation of less infection/complications in contact lens users. From the subjects who participated in this study, it was eminent that some degree of non-compliance was present in their contact lens care. The least level of compliance observed among the subjects was in the maintenance of lens care accessories like contact lens case and solution. Contact lens wear recommendations are predominantly preventive in nature and the wearers do not receive immediate benefit from following the recommendations. This could be a major reason which can lead to a high prevalence of non-compliance. Though, it is always difficult to improve a person's behavior, effort needed to maintain an optimal cleaning regime or adequate knowledge and awareness about safe lens wear may help to minimize a possible contact lens related ocular complication.

There are several limitations of our study: 1) compliance data of the lenses dispensed over the counter were not recorded; 2) information about the financial and educational status of the contact lens user was not gathered.

We recommend: 1) comparison of compliance level between practitioner dispensed and over the counter dispensed lens wearer can be assessed further; 2) effect of education on level of compliance can be evaluated as a next step; 3) impact of financial status on the replacement schedule can be compared in the next research.

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