



Factors Associated with Discontinuation of Contact Lens Use and Measures to Improve Adherence: A Pilot Quasi Experimental Study

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Abstract Background: Contact lenses are widely used for refractive correction; however, discontinuation of lens wear and poor adherence to recommended lens care practices remain common concerns that may affect visual outcomes and ocular health. **Aim:** To identify factors associated with contact lens discontinuation and evaluate measures to improve adherence among contact lens wearers. **Methods:** A quantitative pilot study with a quasi-experimental pre-test and post-test design was conducted among 30 contact lens users attending a tertiary eye care center. Participants underwent comprehensive ocular examination, visual acuity assessment, slit lamp evaluation and counseling on appropriate lens wear and care practices. Data were collected using demographic and clinical assessment tools. Descriptive statistics were used for data analysis. **Results:** The mean age of participants was 29.3 ± 4.7 years and 76.7% were working professionals. Monthly disposable lenses were the most commonly used type (53.3%). Nearly half of the participants (46.7%) had used contact lenses for 1-3 years and 63.3% adhered to recommended replacement schedules. The mean daily wear duration was 13.2 ± 2.8 hours. The mean refractive power was -3.4 ± 1.6 D in both eyes, while the mean Tear Break-Up Time was 10.1 ± 1.5 seconds. Although unaided distant visual acuity varied among participants, all achieved N/6 distance and near visual acuity following contact lens correction. At follow-up, 100% maintained N/6 best-corrected visual acuity and slit lamp examination findings remained normal. **Conclusion:** Contact lenses provided effective refractive correction with excellent visual outcomes and favorable ocular health. Proper lens fitting, adherence to replacement schedules and appropriate lens care practices were associated with successful contact lens wear and maintenance of optimal visual performance.

Key Words Contact Lens Compliance, Patient Adherence, Refractive Errors, Eye Care and Pilot Study

INTRODUCTION

Contact lenses represent one of the most widely adopted optical devices globally, serving over 140 million wearers worldwide for purposes ranging from refractive correction to therapeutic and cosmetic applications. Despite their widespread use, a substantial proportion of wearers discontinue lens use prematurely or fail to adhere to prescribed wear and care regimens, posing significant risks to ocular health and representing a critical challenge for eye care practitioners [1].

Discomfort, classified as Contact Lens Discomfort (CLD), is among the most frequently cited reasons for discontinuation, closely linked to lens material properties, tear film stability and the presence of ocular surface disease [1,2].

The phenomenon of contact lens discontinuation is multifactorial, encompassing patient-related, lens-related and systemic determinants and its consequences extend from mild discomfort to potentially sight-threatening complications. Studies have consistently demonstrated that up to 99% of contact lens wearers do not follow the necessary directions to keep their lenses pathogen-free, highlighting the magnitude of the adherence problem [2,3].

The global prevalence of contact lens wear has grown substantially in recent decades, driven by advances in lens materials, designs and care systems, as well as the expanding therapeutic and diagnostic applications of contact lens technology. Contact lenses are now employed not only for the correction of refractive errors such as myopia, hyperopia

and astigmatism but also as platforms for sustained ocular drug delivery, intraocular pressure monitoring and myopia control in pediatric populations [4].

Microbial keratitis, the most severe infectious complication of contact lens wear, is recognized as a leading cause of visual impairment globally, with the overwhelming majority of cases attributable to non-adherent lens wear behaviors including overnight wear, failure to disinfect lenses and exposure to water while wearing lenses [5]. Acanthamoeba keratitis, a rare but devastating corneal infection predominantly affecting contact lens wearers, has similarly been linked to poor hygiene practices, non-adherence to replacement schedules and environmental exposures, with global incidence rising in parallel with the growing popularity of contact lenses [6].

Non-adherence to contact lens wear guidelines encompasses a broad range of behaviors, including sleeping in lenses beyond prescribed schedules, failure to clean and store lenses in appropriate solutions, non-adherence to replacement schedules and inadequate hand hygiene prior to lens handling [7]. These findings underscore the gap between knowledge and practice in contact lens wear and highlight the need for targeted, evidence-based interventions to improve adherence.

Factors influencing adherence include patient awareness, treatment complexity, side effects, sociodemographic characteristics and patient-provider communication [8]. Similarly, in contact lens wear, factors such as discomfort, fear of complications, lens care burden and inadequate counseling may contribute to discontinuation.

In the Indian context, contact lens use and discontinuation remain inadequately explored. India is one of the fastest-growing markets for contact lenses due to the rising prevalence of refractive errors, increasing urbanization and a large young population [9]. However, limited evidence is available regarding the factors associated with contact lens discontinuation and adherence behaviors among Indian users. Variations in health literacy, access to eye care services and patterns of lens use may contribute to unique adherence challenges. The lack of India-specific evidence highlights the need for targeted and contextually appropriate interventions to improve contact lens adherence.

Although several studies have examined contact lens complications and care practices, limited research has systematically explored the various factors associated with contact lens discontinuation and the effectiveness of adherence-improvement strategies. Most existing studies are retrospective or cross-sectional in nature, limiting their ability to establish causal relationships or assess intervention outcomes.

Therefore, pilot studies are needed to identify the determinants of contact lens dropout and evaluate strategies to improve adherence. In this context, the present pilot study was undertaken to identify the demographic, behavioral and clinical factors associated with contact lens discontinuation

among Indian contact lens users and to assess the feasibility of selected adherence-improvement measures. The findings may help reduce contact lens-related complications and improve the quality of life of contact lens wearers.

Aim of the Study

The aim of the study was to identify the factors associated with discontinuation of contact lens use and to evaluate measures to improve adherence among contact lens wearers in a selected clinical population.

METHODS

Design and Population

The present study adopted a quantitative research approach using a quasi-experimental pre-test and post-test pilot design to evaluate the feasibility of an adherence-improvement program for contact lens users who had discontinued lens wear. The study was conducted in the Department of Ophthalmology at Sankara Eye Hospital, Pammal. The study population consisted of contact lens users aged between 18 and 39 years who had discontinued contact lens wear.

Sampling Criteria

Participants who fulfilled the inclusion criteria were selected for the study. The inclusion criteria included contact lens users aged between 18 and 39 years, best corrected visual acuity of 6/9 or better, history of contact lens dropout within the previous six months to two years and refractive error ranging from +6 Dsph to -9 Dsph and plano to -2.25 cyl. Patients with presbyopia, ocular pathology, previous ocular surgery such as LASIK and contact lens dropout beyond two years were excluded from the study.

Data Collection Procedure

After obtaining informed consent, participants underwent a comprehensive ocular examination, including visual acuity assessment, slit lamp examination, counseling regarding appropriate contact lens options and reinforcement of proper lens care and hygiene practices. The causes of contact lens discontinuation were assessed using the Theoretical Domains Framework (TDF). Semi-structured interviews and theory-based surveys were also used to identify barriers and facilitators influencing adherence behavior among contact lens users.

Intervention

Participants in the experimental group received interventions including eye exercises, lubricants, counseling, educational sessions, reminders and adherence-promoting strategies. The interventions were designed to improve behavioral changes and adherence to contact lens wear and care practices. Post-test ocular re-examination and TDF assessment were conducted on the 45th day and after three months of intervention to evaluate behavioral changes, adherence practices and reduction in contact lens dropout among the participants.

Ethical Considerations

Ethical clearance was obtained from the Institutional Ethics Committee of Saveetha Medical College Hospital, Chennai (Approval No. 002/04/2024/IEC/SMCH; dated 25.04.2024). Written informed consent was obtained from all participants prior to data collection.

Statistical Analysis

The data were analyzed using descriptive statistics. Quantitative variables were presented as mean, Standard Deviation (SD) and Standard Error (SE), while qualitative variables were expressed as frequency and percentage distributions. A p-value of <0.05 was considered statistically significant.

RESULTS

Table 1 presents the descriptive characteristics of the contact lens users. Among the 30 participants, the majority were working staff (76.7%), while students constituted 23.3%. Regarding the type of contact lens used, monthly disposable lenses were the most commonly used (53.3%), followed by annual disposable lenses (20.0%), whereas daily disposable and bi-weekly disposable lenses were each used by 13.3% of participants. Concerning the duration of contact lens use, nearly half of the participants (46.7%) had been using contact lenses for 1-3 years, 33.3% had used them for less than one year and 20.0% had used them for more than three years. With respect to replacement practices, 63.3% of the participants reported replacing their contact lenses on time, whereas 36.7% did not follow the recommended replacement schedule.

Table 2 presents the descriptive statistics of the continuous variables among the contact lens users ($n = 30$).

The mean age of the participants was 29.3 ± 4.7 years, with a standard error of 0.9. Participants wore contact lenses for an average of 13.2 ± 2.8 hours per day. The mean PGP values for both the right eye (OD) and left eye (OS) were -3.4 ± 1.6 diopters, with a standard error of 0.3. Similarly, the mean acceptance power for both eyes was -3.4 ± 1.6 diopters, with a standard error of 0.3. The mean Tear Break-Up Time (TBUT) was 10.1 ± 1.5 seconds, indicating the tear film stability of the participants. The mean keratometry readings were 43.5 ± 1.0 diopters for the right eye and 44.0 ± 1.1 diopters for the left eye, with standard errors of 0.2 for both eyes. Regarding the trial lenses, the mean power for Trial 1 lens was -3.325 ± 1.524 diopters in the right eye and -3.275 ± 1.448 diopters in the left eye, with standard errors of 0.278 and 0.264, respectively. Overall, the findings indicate relatively similar refractive and fitting characteristics between the right and left eyes of the contact lens users.

Table 3 presents the descriptive analysis of refractive error and visual outcomes among the contact lens users. For unaided distant vision in the right eye (OD), the most common visual acuities were 6/18 and 6/24, each observed in 23.3% of participants, followed by 6/12 and 6/60 (20.0% each). In the left eye (OS), 26.7% of participants had unaided distant vision of 6/12, while 23.3% had 6/24 and 20.0% each had 6/36 and 6/60. All participants (100%) achieved N/6 unaided near vision in both eyes. Following contact lens wear, all participants attained N/6 distant and near visual acuity in both eyes. Similarly, at follow-up, 100% of participants achieved N/6 Best-Corrected Visual Acuity (BCVA) in both eyes and N/6 near BCVA binocularly (OU). Slit lamp examination findings were normal in all participants, indicating no adverse ocular findings associated with contact lens wear during the study period.

Table 1: Descriptive Information of the Contact Lens Users

S. No.	Variable	Categories	Number	Percentage
1	Occupation	Student	7	23.3
		Working staff	23	76.7
2	Contact lens modal	Daily disposable	4	13.3
		Bi-weekly disposable	4	13.3
		Monthly disposable	16	53.3
		Annual disposable	6	20.0
3	Duration of contact lens use	<1 year	10	33.3
		1-3 years	14	46.7
		>3 years	6	20.0
4	Replacements followed in time	Yes	19	63.3
		No	11	36.7

Table 2: Descriptive Analysis of the Continuous Variables of the Contact Lens Users

S. No.	Variable	Mean	SD	SE
1	Age (years)	29.3	4.7	0.9
2	Avg Daily Wear Hours	13.2	2.8	0.5
3	PGP OD	-3.4	1.6	0.3
4	PGP OS	-3.4	1.6	0.3
5	Acceptance OD	-3.4	1.6	0.3
6	Acceptance OS	-3.4	1.6	0.3
7	TBUT	10.1	1.5	0.3
8	Mean Keratometry OD	43.5	1.0	0.2
9	Mean Keratometry OS	44.0	1.1	0.2
10	Trial 1 Lens OD	-3.325	1.524	0.278
11	Trial 1 Lens OS	-3.275	1.448	0.264

Table 3: Descriptive Analysis of the Refractive Error of the Contact Lens Users

S. No.	Variable	Categories	Number	Percentage
1	Unaided Distant Vision OD	6/9	2	6.7
		6/12	6	20.0
		6/18	7	23.3
		6/24	7	23.3
		6/36	2	6.7
		6/60	6	20.0
2	Unaided Distant Vision OS	6/12	8	26.7
		6/18	3	10.0
		6/24	7	23.3
		6/36	6	20.0
		6/60	6	20.0
3	Unaided Near Vision OD	N/6	30	100.0
		Others	0	0.0
4	Unaided Near Vision OS	N/6	30	100.0
		Others	0	0.0
5	Distant Vision with CL OD	N/6	30	100.0
		Others	0	0.0
6	Distant Vision with CL OS	N/6	30	100.0
		Others	0	0.0
7	Near Vision with CL OD	N/6	30	100.0
		Others	0	0.0
8	Near Vision with CL OS	N/6	30	100.0
		Others	0	0.0
9	BCVA Follow-up OD	N/6	30	100.0
		Others	0	0.0
10	BCVA Follow-up OS	N/6	30	100.0
		Others	0	0.0
11	Near BCVA Follow-up OU	N/6	30	100.0
		Others	0	0.0
12	Slit Lamp Outcome	N/6	30	100.0
		Others	0	0.0

DISCUSSION

The present study enrolled 30 contact lens wearers with a mean age of 29.3 ± 4.7 years, comprising predominantly working staff (76.7%) and students (23.3%). This demographic profile aligns with the well-established pattern of contact lens adoption among young, visually active adults. Ngozika *et al.* [10] similarly reported that contact lens use in Trinidad and Tobago was predominantly observed among individuals aged 18-30 years, with age and employment status identified as key determinants of lens wear characteristics. Ishak *et al.* [11] further corroborated this finding, noting that most contact lens wearers in Malaysia were students and young working adults.

Monthly disposable contact lenses were the most commonly used lens type in this study (53.3%). This finding is directly mirrored by Ishak *et al.* [11], who reported that 53.3% of their Malaysian participants preferred monthly disposable lenses. Khoza *et al.* [12] similarly found that monthly disposable soft lenses were the most prevalent wearing modality (63.8%) among young contact lens wearers in South Africa and Haddad *et al.* [13] reported that monthly disposable contact lenses dominated the Jordanian contact lens market, accounting for 50.9% of lens fits. Stellwagen *et al.* [14] also noted that soft monthly disposable contact lenses were the most commonly worn lens type (43%) in their case-control study of microbial keratitis, further confirming the global predominance of this modality.

Regarding replacement schedule adherence, 63.3% of participants in the present study reported replacing their contact lenses according to the recommended schedule. This finding is consistent with Ishak *et al.* [11], who reported that 63.4% of contact lens wearers demonstrated good compliance towards lens care. However, non-compliance remains a broader concern in the literature. Wagner *et al.* [15] highlighted that reactive replacement-replacing lenses only when a problem arises-was a common non-compliant behaviour, particularly among wearers of two-weekly and monthly lenses. Rhee *et al.* [16] further noted that 24% to 52% of contact lens wearers replace their lenses at intervals longer than prescribed, with monthly disposable wearers showing a non-compliance rate of 33.9%.

Nearly half of the participants (46.7%) had been using contact lenses for 1-3 years and the average daily wear duration was 13.2 ± 2.8 hours. Maqsood and Algalban [17] reported that most female students wore contact lenses for 8-12 hours per day, with only 14% wearing lenses for more than 12 hours, which is lower than the mean observed in the present study. Balıkcı *et al.* [18] similarly reported that 38.8% of healthcare professionals wore contact lenses for more than 12 hours per day, a finding more comparable to the extended wear duration observed in the present cohort. Prolonged daily wear is a recognised risk factor for ocular surface complications, including contact lens-induced dry eye and corneal metabolic disturbances [18].

The mean refractive power of -3.4 ± 1.6 D bilaterally confirmed that the study population was predominantly myopic, consistent with low-to-moderate myopia. This refractive profile aligns with the broader epidemiological literature identifying myopia as the most common refractive error necessitating contact lens correction in young adults [17]. Balıkcı *et al.* [18] similarly reported that the majority of their healthcare professional participants wore soft contact lenses primarily for myopia correction. The mean keratometry readings of 43.5 ± 1.0 D in the right eye and 44.0 ± 1.1 D in the left eye were within the normal physiological range, consistent with values expected in a healthy young adult population presenting for standard soft contact lens fitting [11].

The mean TBUT of 10.1 ± 1.5 seconds observed in this study is at the lower boundary of the clinically accepted normal range. Mohidin and Zulkipli [19] reported significantly lower TBUT values in contact lens wearers compared to non-contact lens wearers, with statistically significant differences between the two groups. The relatively preserved tear film stability in the present study, compared to the values reported by Mohidin and Zulkipli [19], may be attributable to the monthly disposable lens modality used by the majority of participants and the relatively short duration of contact lens use among nearly half of the cohort. These borderline TBUT values nonetheless underscore the importance of regular monitoring of tear film parameters in contact lens wearers, particularly those with extended daily wear durations, as contact lens wear is well-documented to adversely affect tear film stability [19].

The most clinically significant finding of the present study was the achievement of N/6 distant and near visual acuity in 100% of participants following contact lens wear, with maintenance of this level of visual acuity at follow-up. Rhee *et al.* [16] affirmed that contact lenses are a safe and effective method for the correction of refractive error, with daily disposable wearers demonstrating better vision, overall satisfaction and fewer complications compared to conventional daily wear groups. Fogt *et al.* [20] similarly reported excellent visual performance among satisfied monthly replacement contact lens wearers, confirming the high visual performance achievable with soft contact lens correction.

CONCLUSIONS

The study demonstrated that contact lenses are an effective and safe option for correcting refractive errors. All participants achieved and maintained N/6 distance and near visual acuity following contact lens wear, with no adverse ocular findings observed during follow-up. Appropriate lens fitting, adherence to replacement schedules and proper lens care contributed to excellent visual outcomes and satisfactory ocular health among the contact lens users.

Limitations

This pilot study was conducted with a small sample size from a single tertiary eye care center, which may limit the

generalizability of the findings. The absence of a control group and the short follow-up period restricted the evaluation of long-term adherence and sustained contact lens use. Adherence was assessed primarily through participant-reported replacement practices, which may be subject to recall and reporting bias. Additionally, psychological, socioeconomic and lifestyle factors influencing contact lens discontinuation were not comprehensively evaluated. Future studies with larger multicenter samples, longer follow-up and objective measures of adherence are recommended to validate these findings.

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