ORIGINAL ARTICLE

The Comparison of Contact Lens Wear Clinical Symptoms between Different Modality of Lenses

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ABSTRACT

Background: Dry eye is a common reason for discomfort and discontinuation among soft contact lens (SCL) wearers. This study compared the frequency and intensity of contact-lens–related symptoms between disposable and conventional SCL wearers in Kuantan, Malaysia. **Methods:** This cross-sectional study recruited thirty-two SCL wearers aged 18–37 years during routine aftercare visits at an optometry clinic. Participants were categorized into disposable (n = 16) and conventional (n = 16) SCL groups based on their optometrist-prescribed lens modality. The Women's Health Study Questionnaire (WHSQ) served as a preliminary screening, followed by the Contact Lens Dry Eye Questionnaire–8 (CLDEQ-8) to assess symptom frequency and intensity. **Results:** Mann–Whitney U tests showed no significant differences between disposable and conventional lens wearers for the frequency or intensity of dryness, discomfort or blurry vision (all p-values > 0.05). Dryness was the most frequent symptom, while discomfort showed the highest intensity. Spearman correlation analyses demonstrated strong associations between symptom frequency and intensity, particularly for dryness ($r_s = 0.882$, $p < 0.001$), followed by discomfort ($r_s = 0.449$, $p = 0.013$) and blurry vision ($r_s = 0.520$, $p = 0.003$). **Conclusion:** Dryness, discomfort and blurry vision remain prevalent among SCL wearers. The strong correlation between symptom frequency and intensity highlights the need for routine symptom monitoring during aftercare visits to improve patient comfort and compliance.

INTRODUCTION

Contact lens (CL) wear has gained increasing popularity among teenagers and young adults. Globally, an estimated 140 million people wear contact lenses (Stapleton, 2009) with approximately 6–7% of the Malaysian population using them mainly for refractive correction (Mohidin & Fung, 2009). Over the past two decades, international prescribing surveys have shown a significant shift toward daily disposable modalities due to their convenience, comfort and potential benefits for ocular health (Efron, Morgan & Woods, 2013; Morgan et al., 2024; Morgan & Nichols, 2025).

Despite these advantages, many wearers report symptoms such as dryness, discomfort and fluctuating vision which often leading to reduced wearing time or lens removal to seek relief (Begley et al., 2000; Chalmers et al., 2012). Poor compliance with lens care practices as reported among Malaysian wearers (Bhandari & Rou, 2012) may further exacerbate these complications.

Among all symptoms, dryness is the most frequently reported and is a leading cause of contact lens discontinuation (Chalmers et al., 2006; Richdale et al., 2007). The TFOS Dry Eye Workshop identified contact lens wear as a significant risk factor for dry eye, characterized by discomfort, visual disturbance and tear film instability (DEWS, 2007; TFOS DEWS II, 2017). Previous studies have also shown that dryness and discomfort worsen toward the end of the day due to tear film instability, lens dehydration, deposit buildup and reduced blinking (Begley et al., 2001; Guillon & Maissa, 2005; McMonnies, 2013). Consequently, understanding symptom patterns is crucial for effective patient management and informed lens selection.

Validated questionnaires such as the Contact Lens Dry Eye Questionnaire-8 (CLDEQ-8) and the Women's Health Study Questionnaire (WHSQ) are commonly used to assess dry eye symptoms (Nichols et al., 2002; Schaumberg et al., 2003). In this study, the WHSQ served as a preliminary screening tool, while the CLDEQ-8 assessed frequency and intensity of contact-lens-related symptoms. Despite improvements in lens design, dryness remains the most

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persistent complaint among SCL users, underscoring the need for routine monitoring (Dumbleton et al., 2013; Lazon de la Jara & Efron, 2022).

Although disposable lenses are generally believed to reduce dryness compared to conventional lenses, findings remain inconsistent across studies (Wolffsohn et al., 2010). Evidence comparing these modalities in the Malaysian population is also limited. Therefore, this study aimed to compare the frequency and intensity of contact-lens-related dry eye symptoms among disposable and conventional soft lens wearers using validated questionnaires to provide clinically relevant insight into symptom patterns within this population.

MATERIALS AND METHODS

Study Design and Participants

This cross-sectional study was conducted at the Optometry Clinic of the International Islamic University Malaysia (IIUM). Thirty-two soft contact lens (SCL) wearers were recruited during routine aftercare visits. Participants were categorized into two groups based on the lens modality prescribed and verified by the optometrist: disposable (n=16) and conventional (n=16). Disposable lenses were defined as those replaced daily, bi-weekly or monthly, while conventional lenses were defined as those designed for extended use, typically up to one year.

Study Procedure and Questionnaires

After providing written informed consent, eligible participants completed a questionnaire set. The study followed four sequential stages: identification, screening, eligibility assessment and final inclusion as illustrated in Figure 1.

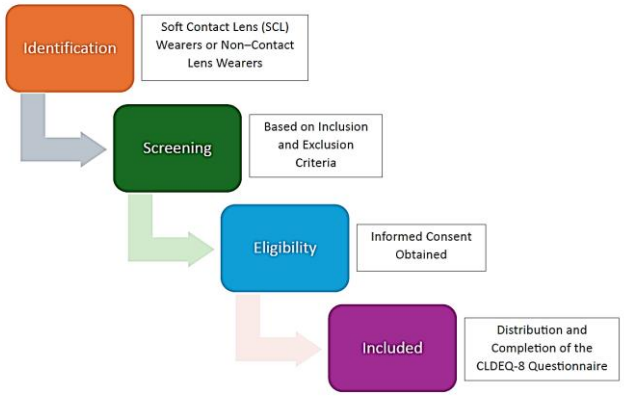

Figure 1: Flow chart of the study

Identification

Potential participants were identified from patients attending routine aftercare visits at the clinic. To be considered for screening, individuals had to be current SCL wearers aged between 18 and 40 years.

Screening

The WHSQ was used as an initial screening tool to identify individuals with symptoms suggestive of ocular dryness. Participants responded to three items addressing previous dry eye diagnosis, frequency of dryness and frequency of irritation, using categorical response options such as *Yes/No* or *constantly, often, sometimes, never*.

Although WHSQ was originally developed for large-scale epidemiological studies in women, it was employed in the present study as a gender-neutral screening tool to identify individuals with self-reported ocular dryness.

Eligibility Asessment

Participants who met the inclusion criteria based on WHSQ responses then had their medical history reviewed. Individuals with a history of ocular surface disease, systemic conditions affecting tear film stability, previous ocular surgery or those using medications known to induce dry eye symptoms were excluded at this stage.

Final Inclusion and Data Collection

Participants who passed the eligibility assessment were included in this study. Then, the Contact Lens Dry Eye Questionnaire-8 (CLDEQ-8) must be completed, which assessed the frequency and intensity of five key symptoms: eye discomfort, dryness, changeable or blurry vision, the urge to close the eyes and the need to remove lenses. Each item was scored on a Likert-type scale from 0 (*never/not intense*) to 5 (*constantly/very intense*). All questionnaires were completed under researcher supervision to address any participant questions without influencing responses.

Ethical Considerations

The study protocol was approved by the IIUM Research Ethics Committee (IREC). All procedures adhered to the principles of the Declaration of Helsinki. Participants received a thorough briefing before enrolment and provided written informed consent prior to data collection.

Figure 1: Flow chart of the study

Statistical Analysis

Data were analyzed using SPSS version 12.0.1 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were presented as mean ± standard deviation. Given the small sample size and ordinal nature of the questionnaire data, non-parametric tests were used for analysis. The Mann-Whitney U test was applied to compare symptom scores (frequency and intensity) between the disposable and conventional lens groups. Spearman's rank correlation coefficient was used to assess the relationship between symptom frequency and intensity. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The study included 32 participants, evenly divided between disposable (n=16) and conventional (n=16) contact lens wearers.

Comparison between disposable and conventional SCL wearers

Descriptive statistics for symptom frequency and intensity are presented in Table 1. Disposable lens wearers consistently reported lower mean scores across all symptomatic parameters compared to conventional wearers as shown in Figure 2. However, Mann-Whitney U tests revealed no statistically significant differences between the two groups for any parameter (all p-values > 0.05).

Specifically, no significant differences were observed in discomfort (U = 110.00, Z = –0.75, p = 0.515), dryness (U = 126.00, Z = –0.08, p = 0.956), blurry vision (U = 114.50, Z = –0.54, p = 0.616) or the tendency to close the eyes (U = 124.50, Z = –0.14, p = 0.897). Likewise, there were no significant differences in the frequency of removing lenses (U = 88.00, Z = –1.60, p = 0.138), intense discomfort (U = 105.00, Z = –0.90, p = 0.402), intense dryness (U = 126.00, Z = –0.08, p = 0.956), or noticeable blurry or foggy vision (U = 120.50, Z = –0.29, p = 0.780).

Table 1: Comparison of symptom frequency and intensity between disposable and conventional contact lens wearers

Symptoms	Disposable (n=16) Mean ± SD	Conventional (n=16) Mean ± SD	p-value
Frequency of discomfort	1.38 ± 0.72	1.56 ± 0.81	0.453
Frequency of dryness	1.56 ± 1.03	1.56 ± 1.26	0.938
Frequency of blurry vision	1.19 ± 0.98	1.38 ± 1.09	0.591
Frequency of closing eyes	1.19 ± 1.22	1.19 ± 0.91	0.891
Frequency of lens removal	1.88 ± 1.31	2.50 ± 1.41	0.110
Intensity of discomfort	1.94 ± 1.29	2.00 ± 1.09	0.369
Intensity of dryness	1.94 ± 1.39	2.00 ± 1.41	0.939
Intensity of blurry vision	1.31 ± 1.01	1.50 ± 1.41	0.770

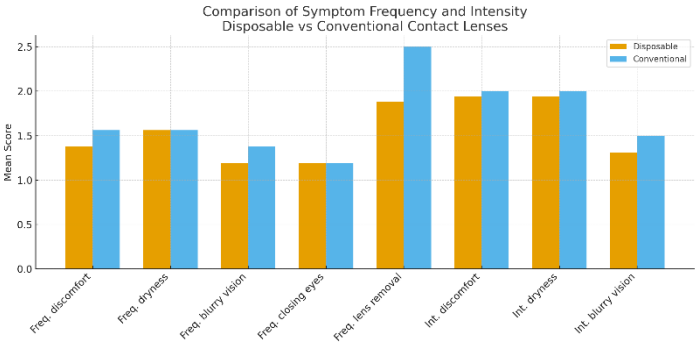

Figure 2: The comparison of symptom frequency and intensity of the disposable and conventional contact lenses

Symptom Patterns and Correlations

Dryness was the most frequently reported symptom, whereas discomfort was reported as the most intense symptom among all wearers. The disposable lens group indicated that while the frequency of symptoms was relatively low, the intensity was perceived as higher when symptoms occurred.

Spearman correlation analysis revealed significant positive relationships between the frequency and intensity of key dry eye symptoms (Figure 2). The association was strongest for dryness ($r_s = 0.882$, $p < 0.001$), followed by blurry vision ($r_s = 0.520$, $p = 0.003$) and discomfort ($r_s = 0.449$, $p = 0.013$).

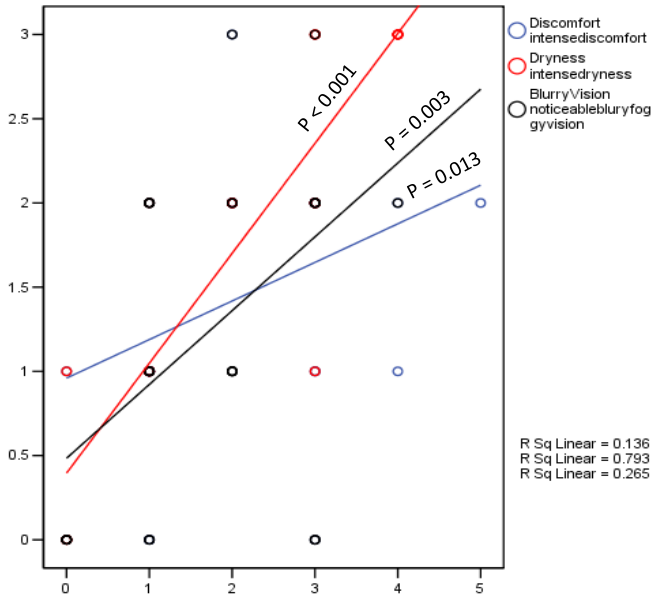

Figure 2: The association between the frequency and intensity of the dry eye symptoms

DISCUSSION

The present study investigated dry eye symptoms among disposable and conventional CL wearers using the CLDEQ-8 and the Women's Health Study Questionnaire (WHSQ). The findings revealed that dryness was the most prominent and frequently reported symptom in both groups, followed by discomfort, blurry vision and the need to close the eyes. This pattern is consistent with previous studies, which highlight dryness and discomfort as the primary complaints among SCL wearers (Fonn, 2007; Pult et al., 2009).

Although the WHS Questionnaire identified participants with a previous dry eye, most continued to wear their lenses despite reporting symptoms. This suggests that symptom severity was insufficient to cause discontinuation. Previous studies have reported similar findings, where up to 40–50% of SCL wearers experienced dryness or discomfort but did not remove their lenses (Pult et al., 2009). This behaviour may reflect adaptation strategies, symptom tolerance or the mitigating effects of advances in lens material and design (Morgan et al., 2009).

Recent evidence supports the notion that newer contact lens materials and designs especially silicone hydrogel and water-gradient lenses can reduce dryness symptoms. For example, a study evaluating Lehfilcon A silicone hydrogel water-gradient daily disposables demonstrated improved tear film stability and reduced CLDEQ-8 scores in both low- and high-symptom groups (Farias et al., 2023). Moreover, a 2024 comparative trial found that Verofilcon A lenses provided significantly better tear breakup times, lower conjunctival hyperemia and higher subjective comfort compared to Narafilcon A among wearers reporting ocular discomfort (Güell et al., 2024).

In previous studies, the prevalence of dry eye is known to increase with age particularly among women and individuals over 40 years (Albietz, 2000; Lin et al., 2003). However, the present sample consisted primarily of younger adults, which may explain the relatively low discontinuation rate despite reported symptoms. Younger wearers generally have more stable tear film function than older populations, thereby tolerating dryness better. Nonetheless, differences in diagnostic criteria may also account for variations in prevalence estimates across studies (Schein et al., 1997).

Disposable and Conventional Contact Lenses

The study found no statistically significant difference in dry eye symptoms between disposable and conventional lenses. This may be attributed to the limited sample size, which restricted the statistical power to detect differences. However, the trend indicated that conventional lens wearers reported slightly higher scores for dryness and discomfort compared to disposable CL wearers.

This observation is consistent with Marshall et al. (1992), who reported that conventional lenses are more prone to protein accumulation due to extended replacement cycles, potentially increasing ocular discomfort. In contrast, disposable or frequently replaced lenses minimize deposit formation and are associated with fewer complications (Fonn, 2007). The present study supports this notion as disposable CL wearers generally reported lower symptom intensity.

Disposable Contact Lenses

Within the disposable lens group, dryness emerged as the most prevalent and pronounced symptom, aligning with previous reports indicating that hydrogel lenses tend to lose water content during wear, thereby contributing to ocular discomfort. The introduction of silicone hydrogel lenses with higher oxygen transmissibility has enhanced comfort, particularly toward the end of the day (Morgan et al., 2009). The current findings suggest that while symptoms persist, disposable lenses especially those made of silicone hydrogel may help maintain comfort and reduce the lens removal.

Behavioural factors such as hygiene practices and compliance also play an important role in symptom perception. Wu et al. (2010) highlighted the impact of lens care behaviour on ocular health outcomes. Similarly,

previous surveys in Malaysia reported poor compliance with lens care practices among wearers (Bhandari & Rou, 2012) which could contribute to symptom persistence. In the present study, the finding that symptoms were common yet not severe enough to be reported as a reason for discontinuation. This suggests that comfort and lifestyle needs outweigh mild to moderate dryness. Sapkota et al. (2015) similarly observed that wearers often persist with lens use particularly with disposable modalities.

An additional finding was the statistically significant relationship between symptom frequency and intensity. This reinforces the understanding that greater symptom frequency is typically accompanied by higher intensity, which together contribute to the subjective burden of dry eye in SCL wearers.

The results emphasize that dryness is a critical clinical indicator in the assessment of CL-related dry eye and should be routinely monitored during aftercare. Although no statistically significant differences were found between lens modalities, the trend toward lower symptom burden in disposable wearers supports the clinical preference for frequent replacement schedules to enhance comfort and ocular surface health.

To our knowledge, this is the first study to evaluate dry eye symptoms in Malaysian SCL wearers using both the WHSQ and CLDEQ-8. By combining validated questionnaires, the study provides localized evidence that contributes to the global literature on contact lens-related dry eye and highlights the importance of symptom monitoring in clinical practice.

CONCLUSION

This study demonstrates that dryness is the most prominent dry eye symptom among both disposable and conventional SCL wearers. Although there was no significant difference between lens modalities, conventional wearers tended to report higher intensity of dryness and discomfort, consistent with previous literature linking longer replacement schedules to greater ocular surface complications. The relationship identified between symptom frequency and intensity underscores the importance of regular monitoring and patient education.

The findings support the current trend of prescribing disposable lenses as both appropriate and beneficial, supporting global shifts in practice patterns (Long et al., 1998; Morgan et al., 2009). For clinicians, raising awareness about the early signs of contact lens-related dry eye is crucial to promote patient adherence and long-term ocular health.

Future research should build upon this study by including larger and more diverse populations, and by exploring the role of environmental and behavioural factors in symptom variability. The use of standardized tools such as CLDEQ-8 and WHS questionnaires can provide valuable insights for both practitioners and researchers in understanding and managing contact lens-related dry eye.

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