PREVALENCE OF CONTACT LENS RELATED DRY EYE (CLRDE) AMONG CONTACT LENS WEARER IN MALAYSIA

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ABSTRACT

Objective: To determine the prevalence of contact lens related dry eyes among contact lens wearer in Malaysia, to identify the association between age and the dry eye symptoms and to study the association between duration of contact lens wear and the dry eye symptoms. **Materials and methods:** An online survey of Contact Lens Dry Eye Questionnaire (CLDEQ-8) was distributed through media socials. Information on participants' age, gender, type of contact lens wear, and duration of wearing contact lens were included. **Results:** A total of 140 contact lens wearer completed the online survey with 94.3% of female participants. The type of contact lens used by the participants were mostly soft contact lens (98.6%) with monthly disposable modality (75.0%) followed by daily disposable modality (15.7%). Most of the participants reported eye discomfort "sometimes" (48.6%) for the last 2 weeks with the intensity level of discomfort on scale "3" (31.4%), followed by dryness "sometimes" (39.3%) with intensity of "2" (29.3%) at the end of the wearing time. There are significant correlation between age and the dry eyes symptoms which are the frequency of eyes discomfort and having to remove lenses ($p < 0.05$). However, there is no association between the duration of contact lens wear and the dry eyes symptoms ($p > 0.05$). **Conclusion:** Eye dryness is the most reported symptom which is more frequent and intense at the end of wearing time.
Keywords: contact lens; dry eyes symptoms; CLDEQ-8

INTRODUCTION

Contact lens is a medical device that can be worn to correct vision, as well as for cosmetic or therapeutic reasons such as to treat myopia, presbyopia, and astigmatism as alternatives to spectacles. Despite of its safety, effectiveness and many visual benefits, the contact lens is still not considered to be risk-free (American Optometric Association, 2018).

According to Markoulli and Kolanu (2017) in the past few years, about 10% - 50% contact lens wearers dropout were reported within the first 3 years of contact lens wear with most cited reason being contact lens discomfort (CLD). The most common symptom reported was sensation of dry eye (Markoulli and Kolanu, 2017). In order to address the CLD issue, Tear Film and Ocular Surface Society (TFOS) commissioned a CLD workshop, which defined CLD as being "a condition characterised by episodic or persistent adverse ocular sensations related to lens wear" resulted from "reduced compatibility between the contact lens and the ocular environment" (Markoulli and Kolanu, 2017).

The CLDEQ-8 was chosen in this study as the questionnaire has been used in several other study internationally (Chalmers et al., 2012; Yuksel and Yaman, 2018). Originally, the CLDEQ was used in order for soft contact lens wearer to describe symptoms of dryness (Chalmers et al., 2012). The similar research team also reported on the development and validation of a short form of CLDEQ-8 that can be used for soft contact lens wearer to describe symptoms; which suggested that the CLDEQ-8 score significantly reflected the baseline status and can be used as a measure to reflect the opinion of soft contact lens. Another related study was conducted in 2018 by Yuksel and Yaman using the CLDEQ-8 to compare two silicone hydrogel contact lens brands of lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) and samfilcon A (Bausch and Lomb Ultra®) fitted to 30 patients age between 19 to 35 years old and the result showed no significant difference between the two brands.

In Malaysia, the latest study linked to the contact lens related dry eyes using the Contact Lens Dry Eye Questionnaire (CLDEQ) was published in 2016 by Reddy and Hui Ying among university students in Malaysia. The study compared the dry eye symptoms experienced by contact lens wearer and non-contact lens wearer. They suggested that the dry eye symptoms were more prevalent among contact lens wearer compared to non-contact lens wearer (Reddy and Hui Ying, 2016).

Our study focused on the prevalence of contact lens related dry eyes in the country while identifying the association between age and the dry eye symptoms and the association between duration of contact lens wear and the dry eye symptoms.

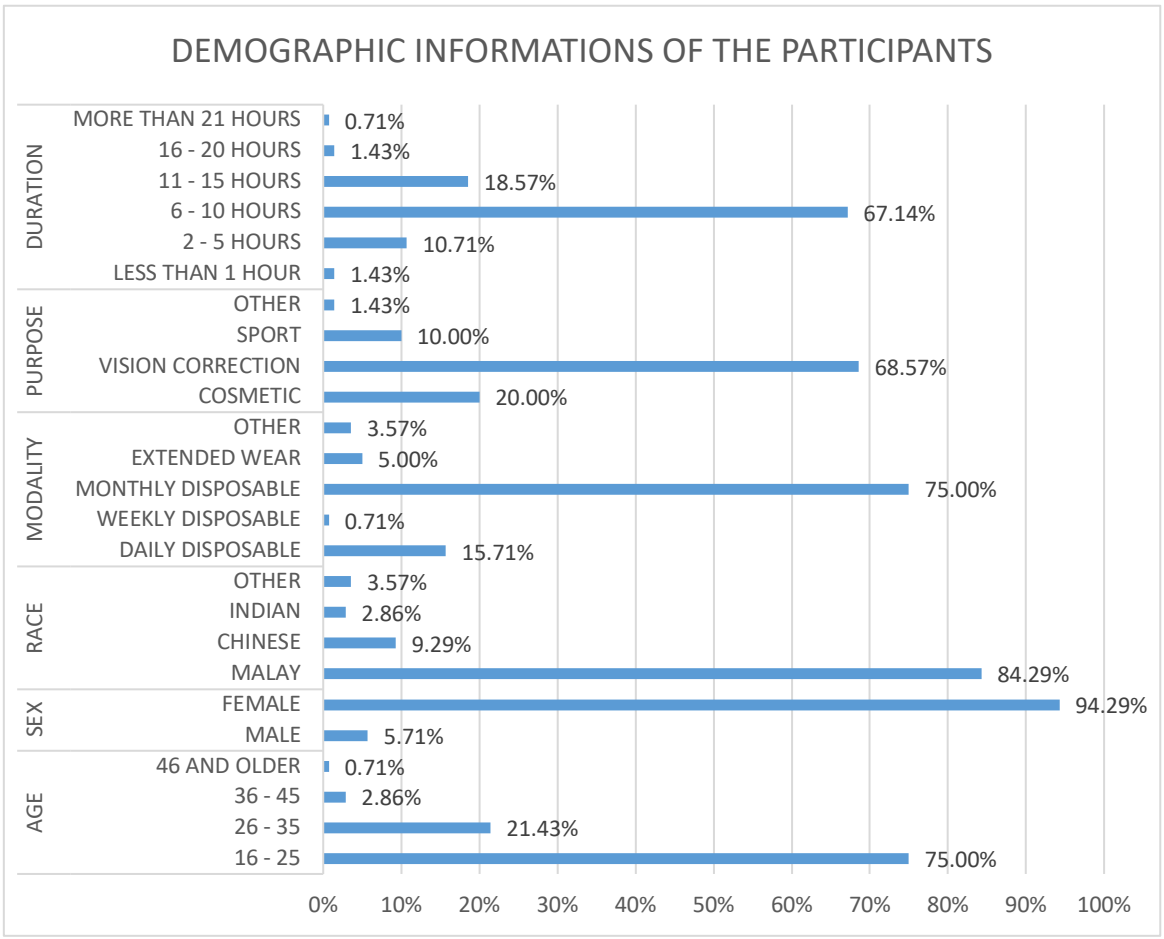
MATERIALS AND METHODS

This study was conducted through an online survey distributed using media socials platform such as Facebook, Instagram, Telegram and WhatsApp among Malaysian who wear contact lens over a period of six months. The online survey was shared to active Facebook groups (Malaysian Optometrist Group @ Facebook that have 3300 members, Warga Kuantan group that have 157000 members and IIUM Online group that have 39000 members), spread to students of other university through Instagram, and distributed to 450 members of Association of Malaysian Optometrists (AMO) through WhatsApp. The participants were explained on the purpose of the research and consent was taken from them. Participants who wear contact lens for at least a month, had no ocular disease or trauma and never smoke were eligible to participate in the research. Participants then answered questions through Google Form link provided about their basic information such as sex, race, type of contact lens wear, contact lens modality and wearing hours of contact lens before responding to the CLDEQ – 8 questionnaire. The CLDEQ – 8 were used to report the frequency and intensity of the symptoms experienced while wearing contact lens included discomfort, dryness, changeable, blurry of vision and removing lenses. Shapiro – Wilk test was used to identify the normality of data and the correlation analyses (Spearman's correlation) were used to study the relationship between demographic information of participants which were age and duration of contact lens wear and the frequency and intensity of contact lens related dry eyes. The survey data and correlation were analysed by using IBM SPSS Statistics Version 23.

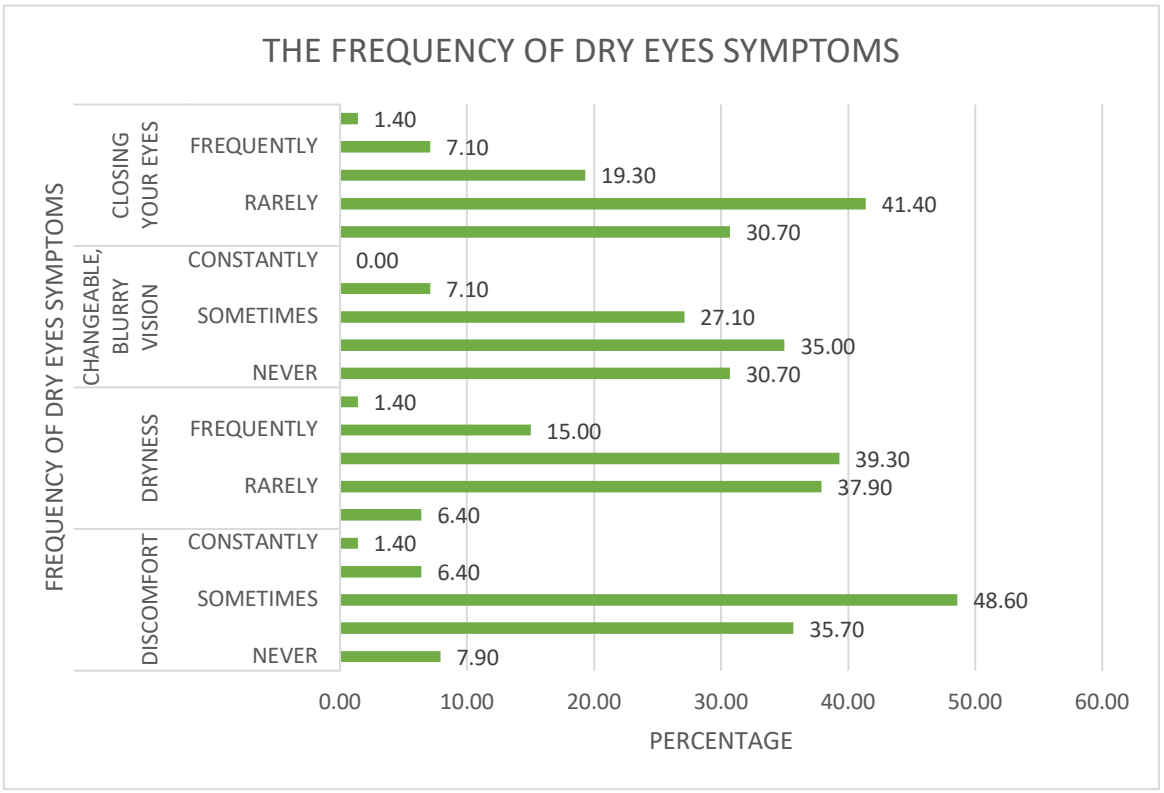
RESULTS

Females represent the majority (94.3%) among the 140 participants (Graph 1). Most of the participants were from the age group of 16 – 25 years old (mean 24.96 of age). Only 2 (1.4%) wear rigid gas permeable contact lens while 138 (98.6%) participants wear soft contact lens. Among the soft contact lens wearer, 105 (75.0%) participants wear monthly disposable modality, 22 (15.7%) participants wear daily disposable modality, followed by 7 (5.0%) wear extended wear modality contact lens. In addition, about 96 (68.6%) contact lens wearer wear contact lens for vision correction, cosmetic purposes 28 (20.0%) participants and 14 (10.0%) for sport. Most of the participants wear the contact lens around 6 to 10 hours per day (mean 8.58 hours).

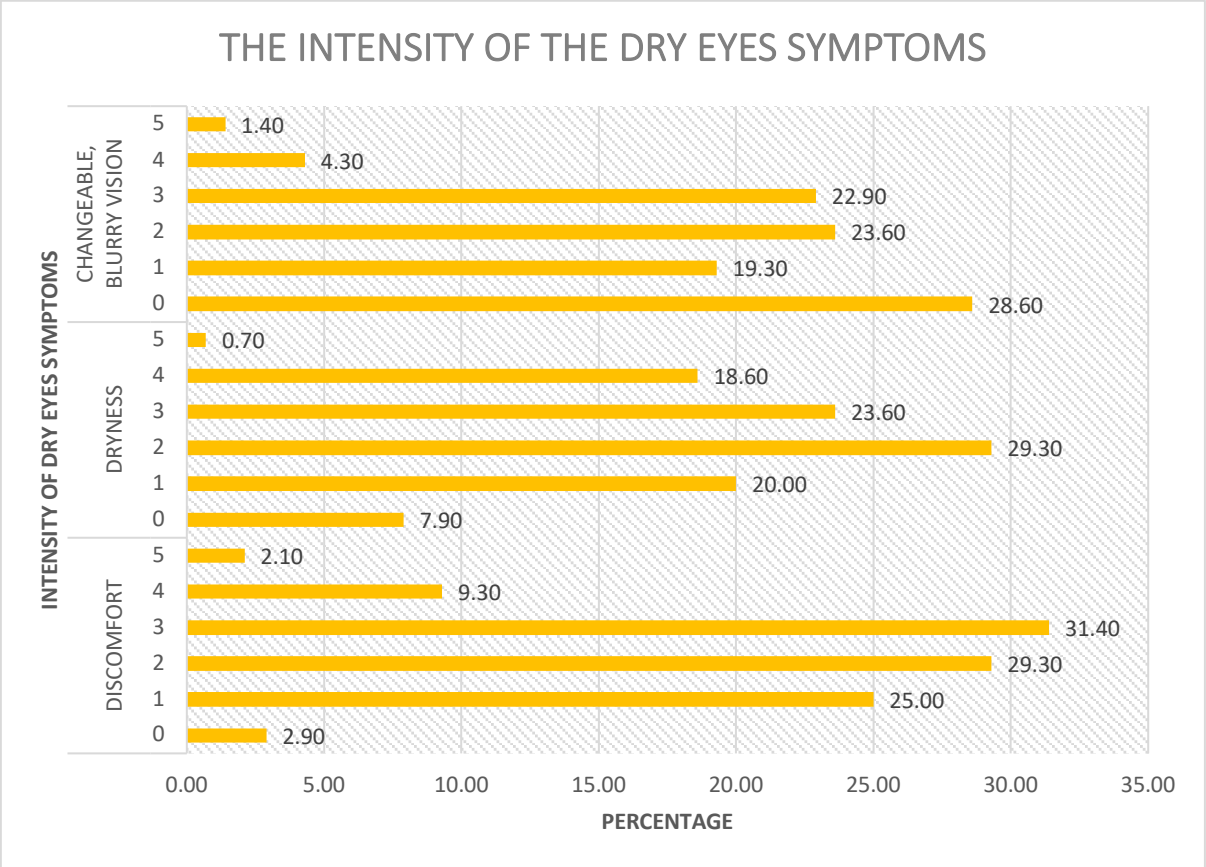
Based on the CLDEQ-8 (Graph 2 and Graph 3), 68 (48.6%) participants reported eye discomfort "sometimes" for the past 2 weeks of wearing contact lens with about 44 (31.4%) participants gave a scale of "3" for the intensity of the eye discomfort at the end of wearing time. However, about 1.4% participants reported constant discomfort with about 2.1% feeling that the discomfort was very intense at the end of wearing time. Based on the study, the complaint of dryness during the past 2 weeks, 55 (39.3%) reported "sometimes" with 41 (29.3%) reported intensity of the dryness of scale "2" at the end of wearing time. Only 1.4% from our study population reported constant dryness with 0.7% claimed that the dryness was very intense. Most of the participants about 49 (35.0%) "rarely" had the complaint of changeable, blurry vision with "0" scale of intensity towards the end of wearing time. For the past 2 weeks, most of the participants about 58 (41.4%) "rarely" complained about frequently wanted to close their eyes and about 57 (40.7%) participants "never" had to take out contact lens due to inconvenience of wearing contact lens.



Graph 1: The demographic information of the participants



Graph 2: The frequency of dry eyes symptoms reported



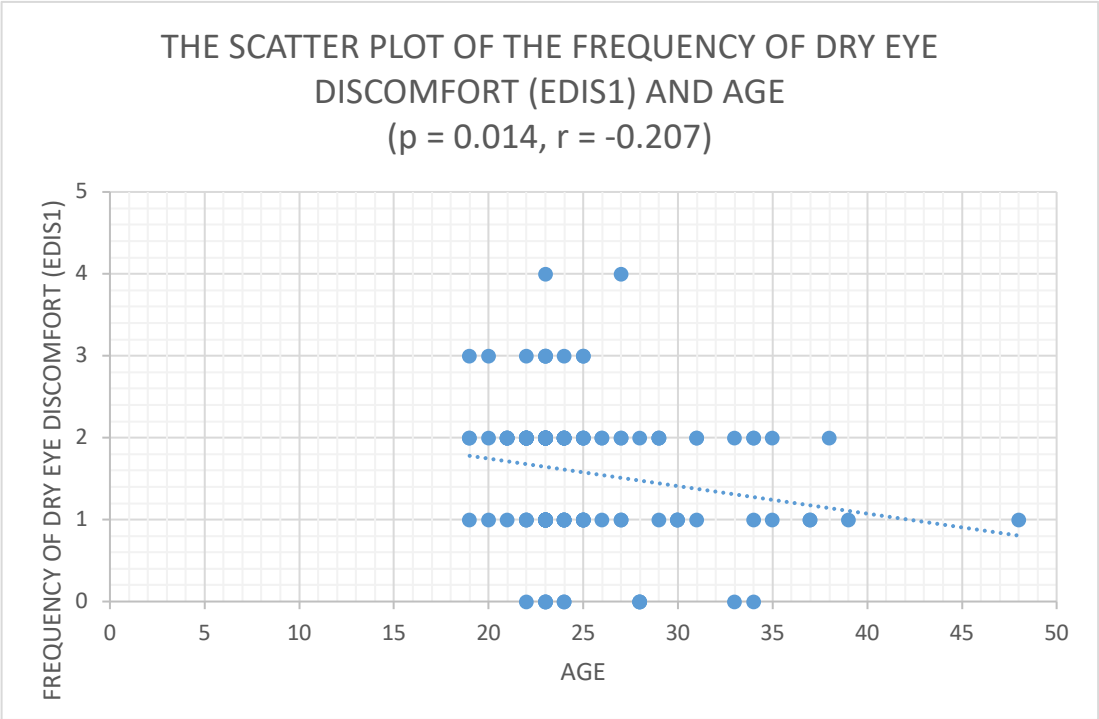
Graph 3: The intensity of the dry eyes symptoms reported by participants

The spearman's correlations was used to investigate the correlation between age and duration of contact lens wear with the dry eyes symptoms. In Table 1, Spearman's correlations shows that there were a significant negative correlations ($p < 0.05$) between age with the dry eyes symptoms which were the frequency of the dry eyes discomfort, and the frequency of removing lenses. However, there is no association ($p > 0.05$) between the duration of contact lens wear with the dry eyes symptoms.

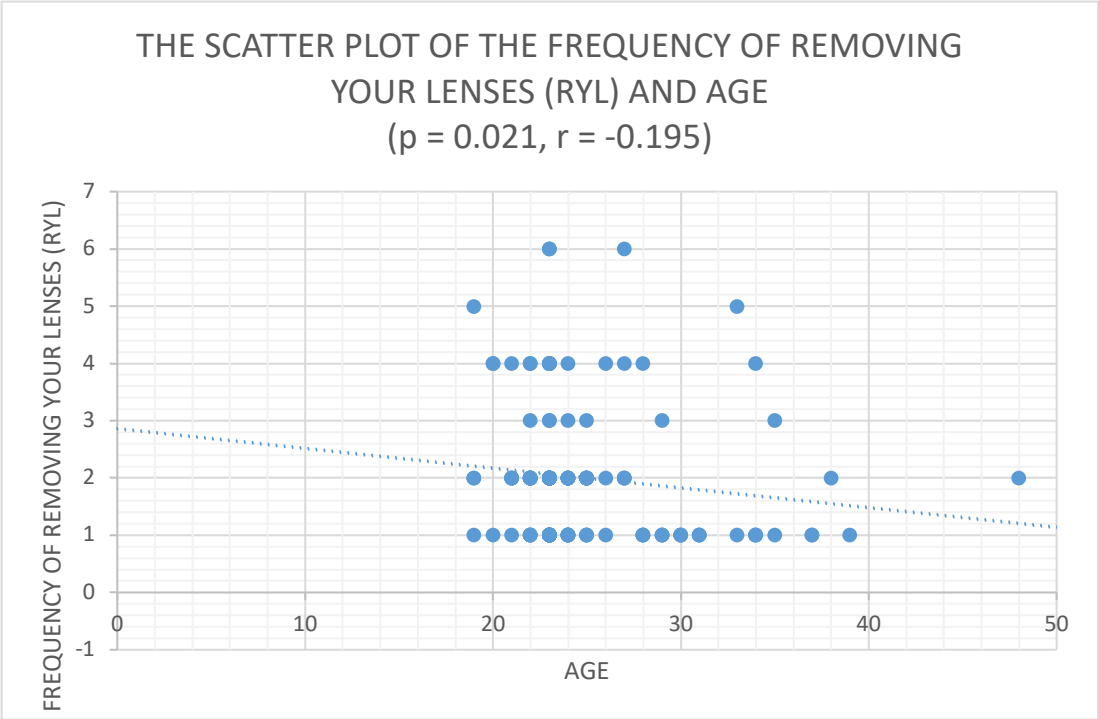
Table 1: Spearman's correlations between age and duration of contact lens wear with the frequency and intensity of contact lens related dry eyes symptoms (N = 140)

SYMPTOMS	CORRELATION (p value)	
	AGE	DURATION OF CONTACT LENS WEAR
EDIS1[a]	0.014*	0.614
EDIS2[b]	0.921	0.198
EDRY1[c]	0.623	0.306
EDRY2[d]	0.935	0.497
CBV1[e]	0.567	0.816
CBV2[f]	0.458	0.848
CYE[g]	0.968	0.903
RYL[h]	0.021*	0.202

Note. [a]EDIS1: *frequency of eye discomfort.* [b]EDIS2: *intensity of eye discomfort.* [c]EDRY1: *frequency of eye dryness.* [d]EDRY2: *intensity of eye dryness.* [e]CBV1: *frequency of changeable, blurry vision.* [f]CBV2: *intensity of changeable, blurry vision.* [g]CYE: *frequency of closing your eyes.* [h]RYL: *frequency of removing your lenses.*
*. Correlation is significant at the 0.05 level (2-tailed).



Graph 4: The scatter plot of the frequency of dry eye discomfort (EDIS1) and age



Graph 5: The scatter plot of the frequency of removing your lenses (RYL) and age

DISCUSSION

There were only a few data available on the prevalence of contact lens related dry eyes in Malaysia regardless of increasing number of contact lens wearer in the country (Mohidin, Norhan and Lee Fung, 2009; Reddy and Hui Ying, 2016). In the current study, females contributed to the highest percentage of contact lens wearer in the country as similarly revealed by Mohidin et al. (2009). Most of the participants aged between 16 to 25 years old and this range was almost similar to the finding in 2016 (18 to 25 years old) by Reddy and Hui Ying. In our study, the main reasons for contact lens wear were vision correction and cosmetic purpose. In general, majority of female and younger people are more concern about their appearance and style, so, contact lens being one of the choice for them to be free from spectacle temporarily especially for special occasion and event.

From this study, monthly disposable contact lens modality were mostly used by contact lens wearer followed by daily disposable modality and only a few participants wear extended wear modality contact lens. Although the daily disposable contact lens was highly recommended for being more hygienic, the monthly disposable contact lens was more affordable especially for avid contact lens wearer. The extended wear contact lens was not a popular choice as it has a higher risk for complications. Mohidin et al. (2009) reported that none of practitioners recommend their patient to wear the extended contact lens for a week or more and advised them to remove it after 1 to 2 days or after 3 to 5 days.

With regards to the wearing hours, the majority of contact lens wearer wear the contact lens for about 6 to 10 hours per day almost similar to finding by Pili et al. (2014) from Croatia which was about 4 to 13 hours and Reddy and Hui Ying (2016) from Malaysia which was about 4 to 12 hours. According to Mohidin et al. (2009), dry eye related problems were the main concern reported during aftercare visit. In addition, Reddy and Hui Ying (2016) reported that contact lens wearers complain more about the symptoms of dry eye compared to non-contact lens wearer in their study population. Our study revealed that almost half of the number of contact lens wearers reported of eye discomfort and dryness "sometimes" in the past 2 weeks with intensity range from 0 to 3 at the end of wearing hours. Less than 20% reported frequent and constant eye discomfort and dryness with intensity ranging from 4 to 5. The more frequent and intense the symptoms was related to the wearing hours. The similar finding was also reported by Reddy and Hui Ying (2016) and Nichols et al. (2002). This shows that most contact lens wearer in Malaysia abide to the wearing hours recommended by the practitioners. The awareness of eye health was also good among them especially about the complication of contact lens if they exceed the recommended wearing hours or sleep with the contact lens.

The majority of contact lens wearers reported having changeable or blurry vision while wearing contact lens. However, only less than 2% contact lens wearers stated that the changeable or blurry vision was very intense at the end of their wearing time. Our finding is supported by Sapkota et al. (2015) from Nepal. The symptom might be contributed by the computer usage. Reddy and Hui Ying (2016) found that those who use computer for more than 2 hours reported more dry eyes symptoms which may be aggravated with contact lens wear.

In the current study, almost half of contact lens wearer "rarely" have to close their eyes while using contact lens and almost half never had to remove their contact lenses due to the uncomfortable feeling. This can be related to the compliancy to the duration of contact lens wear as recommended by practitioners. The dry eyes symptoms reported were also lesser and not significant. However, those who exceed the recommended wearing hours will have a more frequent and intense dry eyes symptoms especially at the end of the day. A study by R. L. Chalmers and Begley in 2006 found that the eye discomfort and eye dryness were more frequent and intense at the end of wearing hours. One of the way to cope with the frequent and intense dry eyes symptoms is by removing the lenses and usage of contact lens comfort drops (R. L. Chalmers and Begley, 2006).

According to our study, there is a significant negative correlation between age and the frequency of eyes discomfort and lens removal. This downward trend might be due to majority of contact lens wearers in our study population aged between 16 to 35 years old and only about 3% of contact lens wearers aged 36 and above. In addition, the shorter wearing hours of contact lens, the use

of eye discomfort and better lens care system might also contribute to lesser complaint reported by contact lens wearers.

CONCLUSION

Based on our study, there is an increasing pattern in frequency and intensity of contact lens related dry eyes symptoms towards the end of wearing time. We also found that the most reported symptom of dry eyes among contact lens wearer are eye dryness (93.6%), followed by discomfort (92.1%). More than 50% of participants choose to remove their contact lens to relieve the symptoms of dry eyes. Contact lens wearers are suggested to oblige to the recommended wearing hours and use artificial tear or comfort drops as a mean to reduce the dry eyes symptoms especially while wearing contact lens when necessary.

There are some limitations of the study. The survey should be distributed not only through internet in term of online survey form but also through other mediums such as distribute the offline survey form to all optometric premises to reach more contact lens wearer in order to obtain a larger number of respondents that might give a better overview about the prevalence of contact lens related dry eyes among contact lens wearer in Malaysia. Secondly, our study only used questionnaire as an instrument to measure the dry eyes symptoms based on participants responses without any further clinical examination as a confirmation of the type of dry eyes symptoms. For future study, more information should be asked especially the material of contact lens and brand of the contact lens as it can also contribute to the contact lens related dry eyes.

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APPENDIX

SURVEY ON PREVALENCE OF CONTACT LENS RELATED DRY EYES (CLRDE) AMONG CONTACT LENS WEARER IN MALAYSIA

*Required

1. **Email address** *

_____

Personal Information and Contact Lens Information

2. **Age** *

_____

3. **Sex** *

Mark only one oval.

- o Male
- o Female

4. **Occupation**

_____

5. **Race** *

Mark only one oval.

- o Malay
- o Chinese
- o Indian
- o Other: _____

6. **Type of Contact lens (Other: RoseK, Prosthetic contact lens, etc)** *

Mark only one oval.

- o Rigid Gas Permeable (RGP)
- o Soft lenses
- o Other: _____

7. **Contact lens modality (Other: Bi-weekly, Bi-monthly, etc)** *

Mark only one oval.

- o Daily disposable
- o Weekly disposable
- o Monthly disposable
- o Extended wear
- o Other: _____

8. **Purpose of wearing contact lens** *

Mark only one oval.

- o Cosmetic
- o Vision correction
- o Sport
- o Other: _____

9. **Wearing duration (hours/day)** *

_____

Questions about EYE DISCOMFORT

10. **During a typical day in the past 2 weeks, how often did your eyes feel discomfort while wearing your contact lenses?** *
Mark only one oval.
- Never
- Rarely
- Sometimes
- Frequently
- Constantly

11. **When your eyes felt discomfort with your contact lenses, how intense was this feeling of discomfort. At the end of your wearing time?** *
Mark only one oval.

	0	1	2	3	4	5	
Never have it	◯	◯	◯	◯	◯	◯	Very intense

Questions about EYE DRYNESS

12. **During a typical day in the past 2 weeks, how often did your eyes feel dry?** *
Mark only one oval.
- Never
- Rarely
- Sometimes
- Frequently
- Constantly

13. **When your eyes felt dry, how intense was this feeling of dryness. At the end of your wearing time?** *
Mark only one oval.

	0	1	2	3	4	5	
Never have it	◯	◯	◯	◯	◯	◯	Very intense

Questions about CHANGEABLE, BLURRY VISION

14. **During a typical day in the past 2 weeks, how often did your vision change between clear and blurry or foggy while wearing your contact lenses?** *
Mark only one oval.
- Never
- Rarely
- Sometimes
- Frequently
- Constantly

15. **When your vision was blurry, how noticeable was the changeable, blurry, or foggy vision. At the end of your wearing time?** *
Mark only one oval.

	0	1	2	3	4	5	
Never have it	◯	◯	◯	◯	◯	◯	Very intense

Question about CLOSING YOUR EYES

16. **During a typical day in the past 2 weeks, how often did your eyes bother you so much that you wanted to close them?** *

Mark only one oval.

- o Never
- o Rarely
- o Sometimes
- o Frequently
- o Constantly

Question about REMOVING YOUR LENSES

17. **How often during the past 2 weeks, did your eyes bother you so much while wearing your contact lenses that you felt as if you needed to stop whatever you were doing and take out your contact lenses?** *

Mark only one oval.

- o Never
- o Less than once a week
- o Weekly
- o Several times a week
- o Daily
- o Several times a day