RESEARCH ARTICLE

Contact Lens Use and Practice Among Health Sciences and Business Management Students: A survey

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Abstract:

This qualitative study aimed to determine the practices in contact lens use and care among contact lenses wearers from Health Sciences and Business Management students. Participants were required to answer the electronic questionnaire regarding the contact lens care regimen and practices in daily life. The behavior of wearing lenses longer than 12 hours and routine of using enzyme remover tablet in both groups showed significant result (H: 5.7%, B: 21.4%, p = 0.03) and (H: 25.7%, B: 50.0%, p = 0.04) respectively. The common improper behaviors of lens care were similar in both groups, including wearing lenses longer than recommended, not changing the lens storage solution daily, and not washing hands before handling lenses. Health Sciences students had better knowledge and behavior of contact lens care than Business Management students. However, both groups were still lacked in care knowledge and did not practice the proper contact lens use. Therefore, to prevent contact lens-related complications, awareness of the good practices in contact lens use is warranted to all contact lens wearers, regardless of formal study areas.

Keywords: Awareness, contact lens care, contact lens compliance, contact lens complication

1. INTRODUCTION

Contact lens is a convenient way of correcting refractive error and provides significant advantages over spectacles by eliminating prismatic effects and widening the field of view. Furthermore, as it helps to improve aesthetics' value, contact lens has become a new trend of correcting refractive error among the younger population. In 2016, it was reported that there were 40.9 millions contact lens wearers in the United States, with the majority of them are young adults (Cope et al., 2015). Another aspect that drives popularity among young people, particularly students or young working adults, is the increased availability of contact lenses in the market and affordable prices (Efron et al., 2015).

While the number of contact lens wearers is increasing daily, the correct recommendations for contact lens use are not entirely followed (Aldebasi, 2012; Kumar 2013). Some of the causative factors to this turbulent behavior of a contact lens wearer include a lack of knowledge on the proper ways to use contact lenses and its potential adverse effect from improper use (Gyawali et al., 2014). The same author has discovered that majority of the participants were lack of adequate hand hygiene (60.7%), swimming with their contact lens on (35.5%), and not following the manufacturer-recommended replacement schedule (24.3%) despite the increased risk for contact lens contamination. The contact lens care regime's complexity, frequency, and cost seem to contribute to poor contact lens hygiene and maintenance (Kumar, 2013).

A significant relationship was found between inadequate practice in contact lens use and the presence of lens wearing complications such as corneal staining, lens deposition, and subjective symptoms, with more than 80% of causes related to poor hygiene and maintenance (Gyawali et al., 2014). Meanwhile, the significantly associated aspects of poor contact lens wear with corneal epithelial staining were the periodic replacement of the disinfecting solution and poor lens case or hand hygiene (Wu et al., 2010). The incidence of surface deposits on the lenses was then associated with irregular use of a daily cleaner and periodic replacement of disinfecting solution (Tilia et al., 2014).

The common complications associated with the use of contact lens were dry eye, keratitis, neovascularization, giant papillary conjunctivitis, corneal abrasion, corneal edema, and a corneal ulcer (Khan et al., 2013). Microbial keratitis is the most severe sight-threatening complication, mainly caused by a bacterial infection from inappropriate contact lens care hygiene. Improper contact lens care practice is often considered a significant risk factor for adverse contact lens-related events (Bamahfouz et al., 2016). The previous study reported that 80% of contact lens complications are directly

related to poor maintenance of contact lens, including cleaning, disinfecting, lens case hygiene, and lack of regular eye examination (Ibanga et al., 2017).

Therefore, awareness and recommended practices are crucial to optimize contact lens safety and reduce the chances of developing contact lens complications. Young adult such as university students are among the frequent contact lens users, knowledge on the correct practice related to primary care of the contact lens is required. The primary areas of concern regarding contact lens care practices and maintenance are contact lens wear schedule, lens care regime including cleaning, rinsing, and disinfecting, contact lens replacement schedule, and aftercare appointment (Aldebasi, 2012). To prevent contact-lens related complications, contact lens wearers must comply with good contact lens care practice. Aside from the lens care regime, behavior and knowledge are also essential aspects of contact lens practice to minimize complications. Several studies reported that microbial keratitis among contact lens users was due to sleeping in their lenses, swimming with their lenses, and poor hand hygiene (Bui et al., 2010). More recently, a study reported that more than half of the patients with corneal ulcers wore their lenses while swimming (Abbouda et al., 2016).

The highest incidence of contact lens-related complication occurs among younger generations, especially those who wear contact lenses only for cosmetic purposes. This indicated a lack of awareness of contact lens complications and knowledge on proper contact lens practice. with younger wearers lack the knowledge on the risk associated with inadequate contact lens care and maintenance (Robertson et al., 2011). However, another study found that 80% of the contact lens wearer were conscious of the knowledge on contact lens practice and the risk factors associated with improper contact lens care. Yet, awareness did not influence negative behavior (Bui et al., 2010). This is supported by another study that showed only 84% of contact lens wearers adhered strictly to proper hygiene and contact lens care despite being aware of the risks associated with inadequate contact lens practice (Ramamoorthy et al., 2010). Consequently, many inter-related factors have been suggested as influencing the negative behaviors among contact lens wearers.

1.1 Factors contribute to the improper contact lens practice

Age and gender were demonstrated to be significant factors contributing to the behavior and hygiene of contact lens wearers. Patients under age 18 were more likely to strictly report reluctance to adhere to proper contact lens practice (Jansen et al., 2011). This is supported by another study showing that the number of contact lens wearers who correctly followed the contact lens practice was decreasing with age. In terms of gender, women were predicted to be more compliant to contact lens hygiene compared to men. However, a more recent study showed that factors suchas socioeconomic status, education, occupation, gender, and age had no influence over inadequate contact lens care practice (Gawain et al., 2014). These findings are also consistent with the previous study where age and gender showed very little relation to their behavior and practice in contact lens care (Ramamoorthy & Nichols, 2014). Interestingly, both age and gender aspects are likely to be correlated with the higher risk-taking propensity of young males compared to older people and females (Nicholson et al., 2005).

Regarding the lens modality, several authors have found that daily disposable contact lens wearers were associated with the least ignorant to contact lens care and maintenance followed by extended wear and the remaining lens group including conventional monthly soft lens and rigid lens (Wu et al., 2010). However, much of this dominance over other lens types is likely due to the absence of care solutions and lens cases. A recent study showed that factors that affect the behavior in contact lens practice include complexity, frequency, duration, and the cost of the contact lens care regime (Kumar, 2013). A study by Abbouda and colleagues (2016) reported that 60% of contact lens users did not rub and cleansed their contact lens before storing it, and 40% did not change the contact lens solution in the contact lens case until they used the contact lens again. This behavior may be attributed to the complexity of the contact lens care regime.

Contact lens wearers were more likely to practice proper contact lens care maintenance when they had consulted with the eye care practitioner about the risk associated with insufficient contact lens practice (Efron et al., 2010). Previous study showed that those who purchased contact lenses online were less likely to adhere to lens care practice as no recommended care instructions were provided (Fogel & Zidile, 2008). Similarly, another study found that internet purchase of lenses is associated with poor aftercare awareness (Gyawali et al., 2014). As internet purchase is convenience and is becoming more common, there are health concerns regarding this purchase method. For instance, a study found that uninformed contact lens wearers who purchased their contact lens online without prescription or fitting are more potentially at risk of ocular complications due to improper contact lens usage (Fogel & Zidile, 2008).

1.2 Complications of improper contact lens practice

Improper use of contact lenses is one of the significant factors when considering contact lens failures and related ocular complications. For instance, overnight wear of contact lenses has previously been associated with a five times higher risk of microbial keratitis (MK) (Chalmers, 2012). Although MK remains an uncommon complication of contact lens wear

yet, MK is a severe health issue for the million contact lens wearers as it is the only sight-threatening complication related to contact lens usage (Wu et al., 2010). The risk associated with extended contact lens wear is not solely due to the lack of routine disinfection but also due to decrease oxygen supply to the cornea. According to Sauer and colleagues (2011), daily-wear soft hydrogel contact lens has a higher risk of developing MK than daily wear rigid contact lens due to poor oxygen transmissibility in contrast to the fixed lens.

The use of contact lens disinfection products and case storage has a significant potential source of eye infection due to bacterial biofilm development. According to Tilia and colleagues (2014), 80% of lens cases were found to be contaminated with microorganisms, and the level of contamination increases with case age. Similarly, a more recent study reported that up to 81% of lens cases are contaminated, with cases 9 months or more have the highest contamination rate (Wu et al., 2010). Infrequent replacement of lens cage has been linked to serious eye infections. According to Stapleton (2012), almost 50% of all moderate and severe eye infections could be eliminated by better adherence to lens case hygiene and 27% by regular storage case replacement alone.

Therefore, improper contact lens practice would only bring harm to the contact lens wearer. Unfortunately, the improper care and practice occurred even among educated contact less wearers including university students. However, there are various field of formal tertiary study such as health and non-health areas, which could contribute to the level of practice itself. Hence, this study aims to compare the practices of contact lens use among Faculty of Health Sciences students and Business Management students in UiTM Selangor, Puncak Alam Campus.

2. MATERIALS AND METHODS

This study is a cross-sectional study that used purposive sampling via a self-administrative questionnaire online (google form). The descriptive data was evaluated demographically, and the comparison of contact lens practices between Health Sciences students and Business Management was deeply analyzed with an independent t-test with the significant standard p-value < 0.05 using Statistical Package for Social Sciences (SPSS) software Version 21.0 (SPSS Inc. Chicago, IL, USA).

All participants were soft contact lens wearers among the students of UiTM Selangor, Puncak Alam (35 students from the Faculty of Health Sciences and 28 students from Faculty of Business Management) that recruited based on the inclusion and exclusion criteria where the participants need to have the visual acuity higher than 6/12 for distance and N8 for near vision. The participants must be free from any contact lens complication or eye diseases. The participants were mostly females aged between 21 to 25 years with a mean age of 23.0±1.4 years. The history taking and the written informed consent were obtained prior to the study.

The questionnaire used was modified and adapted from (Şengör et al., 2018), which comprised ten questions related to practices in the contact lens. Participants were asked to circle the appropriate number based on the given scale to rate the frequency of the practice toward their statements. The electronic structured questionnaire was distributed among the students via an online platform (Google Form). The participants were asked to answer the questions based on their primary care and practices regarding the contact lens which includes lens wear schedule, lens care regime including cleaning, rinsing, and disinfecting and the contact lens replacement schedule. Next, the questionnaires were thoroughly checked for completeness. The incomplete questionnaires were rejected, and the complete questionnaires were analyzed.

3. RESULTS AND DISCUSSION

3.1 Demographic Characteristic of the Participants

There were 63 students responded to the questionnaire. Out of the 63 students, 35 students were from Faculty of Health Sciences (55.6%) and 28 students were from Faculty of Business Management (44.4%). Most of the respondents was female (62, 98.4%) with one (1.6%) male respondent. The distribution of the participants based on age was illustrated in Figure 1.

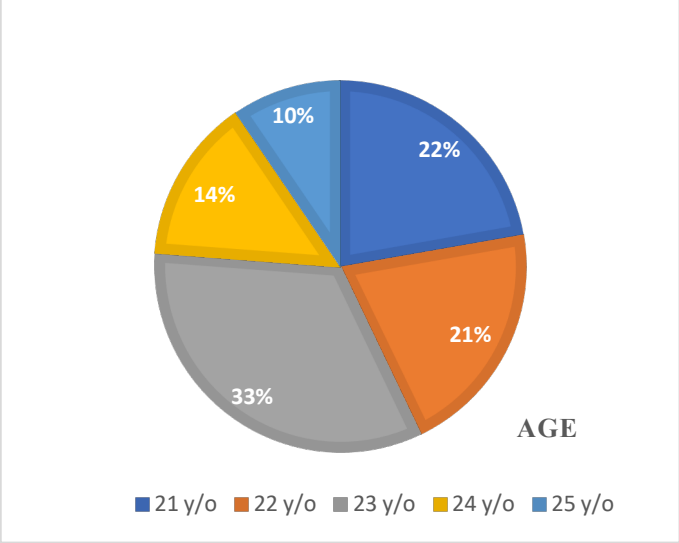

Figure 1. Percentage of the participants based on age.

The prevalence of contact lens wearers was higher in the health sciences students than the Business Management students (55.6%, 44.4%) even though most studies reported that the prevalence of contact lens wearers was higher in non-medical students compared to medical students (53.5%, 32.2%) (Leeamornsiri & Titawattanakul, 2015). This was due to the active approach toward health sciences students compared to business management during the data collection, as this study used the purposive sampling method. Result also shown that there were more female contact lens wearers (98.4%) than males (1.6%), which closely resembled the previous study did by Bhandari (2014) that showed a higher clinical finding of females' preference in wearing contact lenses in Malaysia. The mean age of the university student participants was 23.0±1.4 years which was relatively young and within the range of age as the previous study conducted in Bloomington, Indiana (Jansen et al., 2011).

3.2 Contact Lens Practice Profile

Regarding contact lens hygiene, 56 students (88.9%) followed hand hygiene before handling contact lenses. In comparison, only 5 students (7.9%) reported rarely observed hand hygiene, and 2 students (3.2%) indicated that they never washed their hands before handling contact lenses. Furthermore, 54 students (85.7%) claimed to adhere strictly to the cleaning instructions, while 3 students (4.8%) never comply strictly with the cleaning instructions, and 6 students (9.5%) claimed that they rarely adhere strictly to the cleaning instructions.

Most of the students (35, 55.6%) reported that they wear the contact lens less than 8 hours a day, while 8 (12.7%) students admitted they regularly wear their contact lenses more than 12 hours per day. Furthermore, two students (3.2%) admitted that they occasionally did not remove their contact lenses before sleeping at night Most of the students (58, 92.1%) never sleep at night with their contact lenses on. Furthermore, 53 students (84.1%) reported that they regularly replace with new contact lenses as per the schedule according to the manufacturer, while 7 students (11.1%) occasionally replace their contact lens according to schedule and 3 students (4.8%) admitted never replace with new contact lenses as per the schedule according to the manufacturer. Regarding the replacement schedule of the contact lens storage solution, 40 students (63.5%) regularly change their contact lens storage solutions every day, while 16 students (25.4%) admitted to occasionally shift the storage solutions every day. The distribution of the contact lens practice was shown in Figure 2.

3.3 Contact Lens Practices Between Health Sciences and Business Managements Students

Both groups of students showed no difference in the contact lens practice regarding the cleaning practice, such as hand wash before wearing CL and cleaning the lens strictly to the instructions. However, there was a significant difference among health sciences and business management students in the routine of cleaning the lens using an enzyme remover tablet, $t(62)=-2.97$, $p = 0.04$. Meanwhile, in wearing practice, both groups showed no differences except for wearing time longer than 12 hours $t(62)=-2.21$, $p = 0.03$. Nonetheless, others use and practices such as sleep with lenses, know the lifespan of lenses, and change the storage solution every day showed no difference between groups. The difference in contact lens practice and use of the two groups were shown in Table 1.

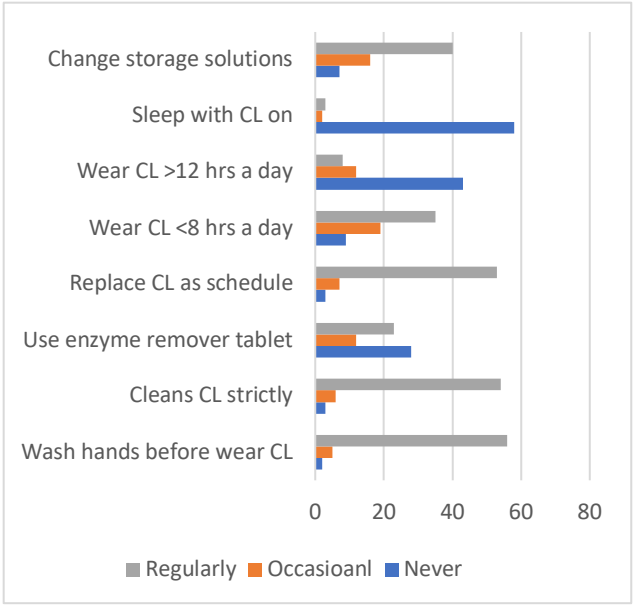

Figure 2. Distribution of the contact lens practice.

Table 1. Comparison of contact lens use practice of between health sciences and bussiness management students.

Contact Lens Use and Practice	Std. Deviation	t	p- value
Wash hands thoroughly before wearing CL	0.00	1.42	.160
Cleans CL adhering strictly to the instructions	0.45	1.12	0.27
Use enzyme remover tablet	0.98	-2.07	0.04
Replace new CL as per schedule according to manufacturer	0.96	-0.03	0.98
Wear CL <8 hours in a day	0.99	0.77	0.44
Wear CL between 8 to 12 hours in a day	0.79	-0.23	0.82

Wear CL >12 hours in a day	0.02	-2.21	0.03
Sleep with CL on	0.15	-0.99	0.33
Know the lifespan of CL	0.30	-0.48	0.63
Change the storage solution every day	0.74	-0.70	0.48

From the result, most of the participants regularly followed the regimen of cleaning and maintenance of their contact lenses, including regularly washing their hands before handling the contact lens and cleans the contact lens while adhered strictly to the instructions. In terms of cleaning routine using enzyme remover tablet, the significant difference was corroborated with a previous study that found 43% of the subjects admitted never used enzyme remover tablet (Tajunisah et al., 2008) even though this routine is an essential component of soft contact lens wear to remove protein deposits on the lens that can contain pathogens and cause eye irritation and infection.

Meanwhile, there were no significant differences in both groups regarding the contact lens replacement scheduled. Both business and health sciences students were regularly replacing new contact lenses as per the schedule according to the manufacturer, with only three students who rarely change their contact lens according to the manufacturer. This finding was contradicted from the previous in which 39.8% of the participants replaced their lenses at the intervals longer than the manufacturer's recommendation (Bamahfouz et al., 2016). Moreover, most of the students regularly change the contact lens storage solution similar to the previous study among medical students in the University of Malaya, which reported 79.3% of the participants changing the contact lens storage solution daily at night (Tajunisah et al., 2008).

On the other hand, most of the participants in both groups were wearing contact lenses for less than 8 hours and 12 hours with more frequent in Business Management students compared to Health Sciences students. This finding has shown that the medical-related students had a higher awareness compared to non-medical students, which corroborated with previous studies done by Ibrahim et al., (2018) and Tajunisah et al., (2008), where most of the medical-related students were aware of the contact lens use care and complication despite practicing improper lens care. Also, students from the Faculty of Business Management that sleeping with the contact lenses were more compared to the students from respectively with no significant difference from both groups. A higher observation was found in a similar study in Thailand that reported 9% of the students wore contact lenses more than 12 hours per day (Leeamornsiri & Titawattanakul, 2015).

A few limitations were found in this study in which the apparatus used to evaluate the practice in contact lens among the students was solely dependent on the online questionnaire where the previous study reported that written answers on questionnaires were not utterly honest by the participants, specifically online survey (Saleh, 2017). The potential bias in this study lies in the written questionnaire without oral administration by the interviewer, which can lead to the chance of misunderstanding the questions. Moreover, the condition of the overall eye health condition based on the participant's routine of care was not evaluated. Hence, it is recommended in the future to conduct a full eye and contact lens assessment via slit lamp evaluation with an oral administration survey in the future.

4. CONCLUSION

From this study it can be concluded that health sciences students had better awareness and attitude in contact lens care and practice than business management students. However, both groups of students were still lacked appropriate awareness and were not compliant with the contact lens care regime.

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CONFLICT OF INTEREST

There is no conflict of interest to declare in this study.

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