

## **KNOWLEDGE, PRACTICES AND COMPLIANCE DURING CONTACT LENS WEAR AMONG STUDENTS IN SEGi UNIVERSITY, KOTA DAMANSARA, SELANGOR**

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### **ABSTRACT**

*Contact lenses have become popular with university students due to its convenience, affordability and wide availability. A study was carried out to assess the level of awareness and pattern of behavior among students in SEGi University with regards to contact lens usage. This study involved 125 SEGi University art and science stream students who are contact lens wearers, using a questionnaire. Demographic profile, level of awareness and compliance with proper contact lens care and knowledge about lens-related complications were wwwanalyzed. The majority of contact lens wearers were female (76.8%). Contact lenses were used for cosmetic reasons, therapeutic reasons and a combination of both in near equal number. 68% used monthly disposable contact lenses. Even though 89.6% of the students replied that they were aware of proper wear and care procedures, only 28% were found to be compliant with all the procedures listed. The study also found no association between academic stream and the awareness of proper wear and care of contact lenses. There was also no association between academic stream and the level of compliance to proper practices. We conclude that awareness about contact lens does not affect the practice of contact lens wear and care among SEGi University students.*

### **1.0 Introduction**

Contact lenses are small optic corrective lens that appear to be worn in direct contact to the cornea, but are actually floating on a layer of tears that separates them from the cornea. The contact lens has had a remarkable history for more than 500 years, ever since its idea was conceived by Leonardo da Vinci in 1505. Throughout the 20<sup>th</sup> century, the contact lens continued to develop dramatically. In the 1960's and 1970's, the more comfortable and safer soft lens and gas permeable lens were developed. The toric lens, which helps the correction of astigmatism, was invented in the late 1970's. In the 1980's and 1990's, the varifocal lens and disposable lens became more common.

Today, the contact lens has become an effective treatment for vision problems. Aside from its known therapeutic purposes, it is also used for cosmetic reasons. It has become more popular with the younger generation, especially among college and university students. This is due to its convenience, increased availability and affordability. There are mainly two types of contact lenses, namely soft and hard contact lenses. Hard contact lenses were widely used before soft contact lenses were introduced in the market.

However, most users are not aware of the proper handling and care of the contact lens. There are a number of studies that have been carried out to ascertain the knowledge and

practice among contact lens users in colleges and universities. One of the studies investigated the knowledge and practice of contact lens wear and care among medical students in University of Malaya (Tajunisah *et al.*, 2008). This study found that the knowledge of contact lens usage alone may not ensure the correct practice of contact lens wear and care. Another study on contact lens compliance among a group of young, university-based lens users was carried out in South India, and found that the poorest level of compliance was in the care of lens accessories like contact lens cases and solution (Noushad *et al.*, 2012). Improper contact lens care will bring adverse effects to the user, ranging from transient redness to severe keratitis. Infectious keratitis is one of the most common contact lens-associated complications, and is usually caused by *Herpes Simplex* virus or the protozoa *Acanthamoeba* (Knoop *et al.*, 2009).

Research carried out at the University of Texas Southwestern Medical Center at Dallas, Texas concluded that perceived compliance was not an appropriate indicator for respondents' behavior and that a large proportion of patients remained non-compliant despite knowing the risks (Bui *et al.*, 2010). In another study, a significant proportion of the study's respondents exhibited non-compliance despite knowledge about the risks associated with non-compliance (Robertson & Cavanagh, 2011). Most respondents thought they had good practice but in reality exhibited behavioral non-compliance which increased the risk of contact lens-wearing complications.

Another study showed that compliance with replacement frequency remains a problem (Dumbleton *et al.*, 2010). Eye care practitioners generally recommend that the replacement frequency should be consistent with the lens manufacturer's recommendations. However, more than half of the subjects who did not replace their lenses reported that it was due to forgetfulness. It was suggested that there was a need for eye care practitioners to carefully counsel their patients with respect to contact lens procedures (Dumbleton *et al.*, 2010). Drawing upon the findings of the various studies, it is felt that education alone was insufficient and that newer approaches for improving lens care compliance was needed.

In this study, the authors examined the demographic profile, level of awareness of lens-related complications and its risk factors, the standard of lens care and compliance among SEGi University students who are contact lens users. The authors also hypothesized that the knowledge, practices and compliance of contact lens usage would be higher among SEGi University students from the Science Stream as compared to students from the Art Stream. Hypothesis was derived based on the fact that Science Stream students are expected to be more knowledgeable in lens care because of their educational background.

## **2.0 Methodology**

A cross-sectional study was conducted among students in SEGi University, Kota Damansara, Petaling Jaya, Selangor, Malaysia who have worn contact lenses at least once in their lifetime. The approach used was convenience sampling and involved the participation of 125 respondents. The various schools and faculties of SEGi University were classified into two different streams, as depicted in Table 1. 75 respondents were from the Art stream and 50 respondents were from the Science stream. The data collection

was carried out over a two week period from 10<sup>th</sup> July – 20<sup>th</sup> of July 2012, and was stopped once the target sample size was achieved.

<b>Art Stream</b>	<b>Science Stream</b>
1. School of Creative Design 2. School of Communication Studies 3. School of Business, Accountancy & Management 4. Foundation in Arts and Commerce 5. American Degree Programme <ul style="list-style-type: none"> <li>• Communications</li> <li>• Marketing</li> <li>• Management Finance</li> </ul>	1. School of Engineering and the Built Environment 2. School of Allied Health Sciences 3. Foundation in Science 4. American Degree Program <ul style="list-style-type: none"> <li>• Psychology</li> </ul>

**Table 1: The Classification of Various Schools/Faculties into Art or Science Stream**

Prior to the execution of the questionnaire, the purpose of the study was explained and consent obtained from the students. The questionnaires were then distributed to the students in order to collect data consisting of contact lens wearing history, practice of contact lens wear and care and the associated complications that may arise. The questionnaire was in English and consisted of sixteen questions, excluding brief demographic questions. Students who had worn contact lens at any time at all during their lifetime were considered as a contact lens user. Students from the Faculty of Medicine, Faculty of Optometry, School of Nursing and Faculty of Dentistry were excluded as they were considered to have substantial background knowledge regarding optic care and related complications from their course of study. Seven incomplete survey forms or consent letters were considered as voided and not included in this study.

For the purpose of this study, actual compliance was defined based on a compliance score. Respondents who answered “yes” to all seven questions regarding the proper wear and care practices of contact lens were considered as compliant, whereas those who answered “no” to any of the questions were considered as non-compliant.

The questions used to determine compliance were:

- Do you dispose of the contact lens after its expiry date?
- Do you remove your lens before going to sleep?
- Do you wash your hands before handling the contact lens?
- Do you wash your lens?
- Do you use lens solution as cleaning material?
- Do you clean your contact lens case?
- Do you change the contact lens case?

The Statistical Package for Social Sciences (SPSS) version 20.0 was used for the tabulation and analysis of the data collected. Descriptive study was used to analyze the demographic profile and responses to each questionnaire question. Fisher’s Exact Test was used to investigate the relationship between compliance and variables such as awareness of proper wear and care practice and awareness of contact lens-related complications. The relationship between academic stream and variables such as awareness of proper wear and

care practice and awareness of contact lens-related complications were investigated using the Chi-square test. Any result with a  $p$  value of  $<0.05$  was considered to be statistically significant for purposes of this study.

### 3.0 Results

The demographic profile of the contact lens users who had participated in this study is shown in Table 2. The majority of the sample population were students aged between 18 and 19 years old (56.8%). There were more female respondents compared to male respondents (76.8% vs. 23.2%). The sample population consisted of 60% Art students and 40% Science students.

Parameter	Frequency (n)	Value (%)
<b>Age</b>		
<18 years old	15	12.0
18 – 19 years old	71	56.8
>19 years old	39	31.2
<b>Gender</b>		
Female	96	76.8
Male	29	23.2
<b>Race</b>		
Malay	32	25.6
Chinese	60	48.0
Indian	28	22.4
Others	5	4.0
<b>Academic stream</b>		
Arts	75	60.0
Science	50	40.0

**Table 2: Demographic profile of the 125 respondents**

85 (68%) of the contact lens users interviewed used 1-3 month disposable contact lenses, making it the most commonly used type of contact lens. Daily disposable contact lens was the second most prevalent (14.4%) among contact lens users, whereas flexible/extended wear type was the least prevalent with only 2.4% of users choosing to use them (Figure 1).

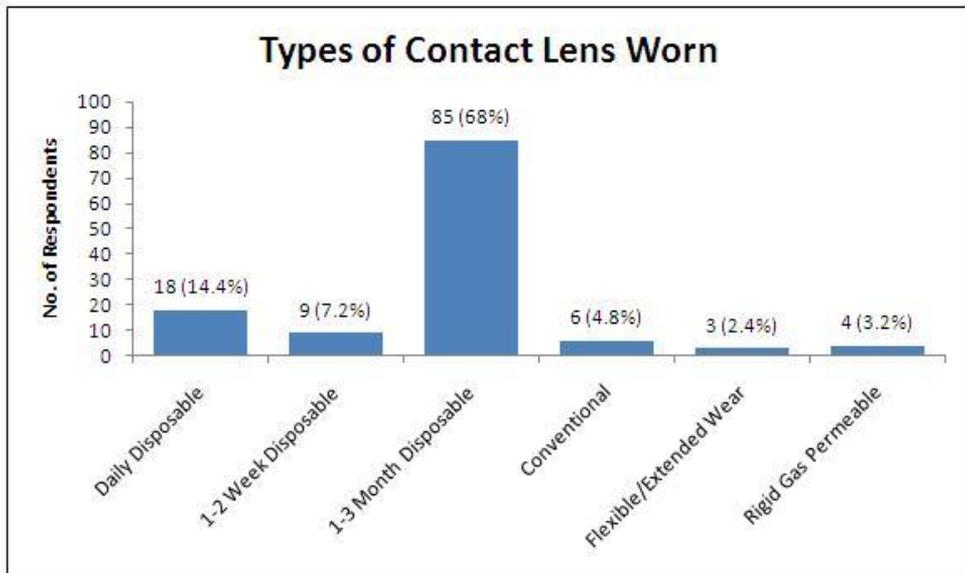


Figure 1: Types of Contact Lenses Worn

The majority of contact lens users (63.2%) purchased their contact lens from an eye care practitioner. The purpose of wearing contact lens was generally evenly distributed among refractive error correction (31.2%), cosmetic (38.4%) or both refractive error correction and cosmetic purposes (38%). Besides that, 71 (56.8%) respondents chose to wear contact lens mainly due to self interest, as opposed to recommendations from eye care practitioner, friends or family members. Most students (35.2%) wear contact lenses between four to eight hours a day. The remaining students wear contact lenses with frequency of less than four hours (15.2%), more than eight hours (24%) and occasionally (32%)

When the respondents were asked about their awareness regarding the wear and care of contact lenses, almost 90% claimed that they knew the proper wear and care procedures, leaving only a minority of students (10.4%) who admitted that they were not aware of the procedures (Figure 2). However, when it came to the actual practice of wear and care procedures, the number of non-compliant contact lens users was almost 3 times higher than the compliant users (72% vs. 28%) (Figure 3). 69.3% of Arts and 76% of Science students were categorized as non-compliant as they did not follow all the recommended steps in maintenance of contact lenses.

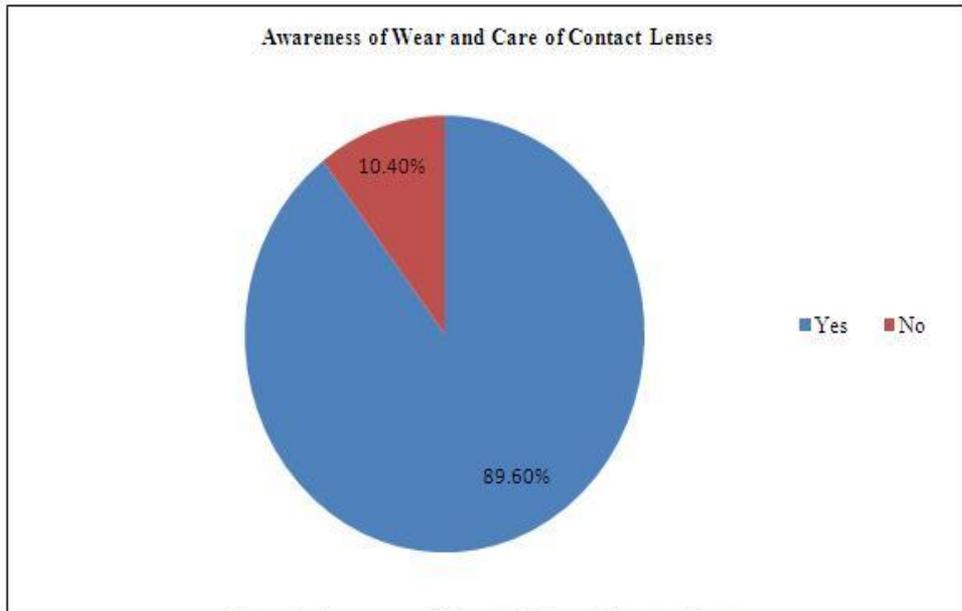


Figure 2: Awareness of Wear and Care of Contact Lenses

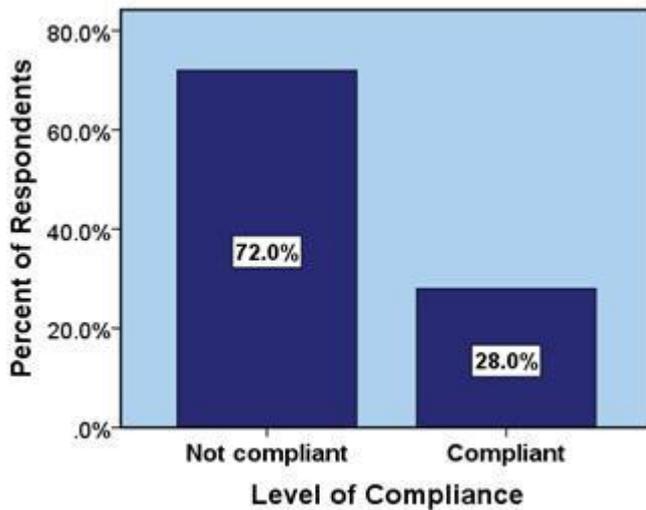


Figure 3: Actual level of compliance among 125 respondents

When further analyzing the students' responses on actual wear and care practices, we found that 72% of the respondents disposed their contact lens after the expiry date (Figure 4). Among the respondents who did not dispose their contact lens after its expiry date, only 4% of them claimed that it was because no clear instructions were given to them. The main reason given was that they had forgotten the expiry date of the contact lens (14.4%). Almost all of the contact lens users (94.4%) removed their lens before sleeping and washed

their hands before handling contact lens (91.2%) (Figure 5 & 6). For contact lens washing and handling, most of them who washed their hands before handling the lenses also washed their lenses (79.2%). As for cleaning material used, the majority (94.4%) used lens solution to wash their lens (Figure 7). For cleaning of contact lens cases, the compliance was quite satisfactory with 76% of users reporting that they cleaned their contact lens case (Figure 8). However, only half of the users (52.8%) were compliant with changing their contact lens case as required, making it the step with the least adherence when compared to the other steps (Figure 9).

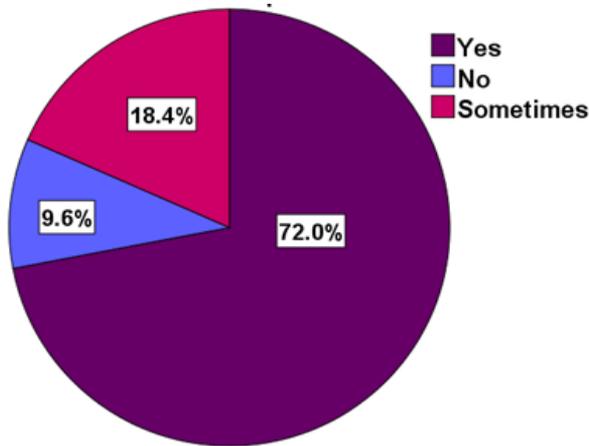


Figure 4: Disposal of expired contact lens by the 125 respondents

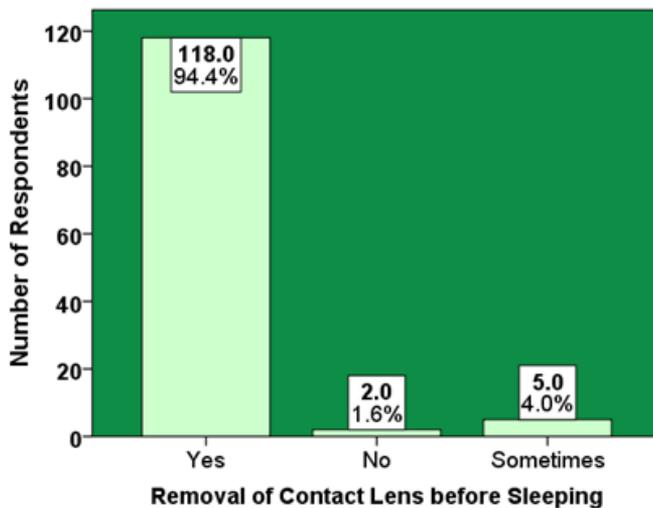


Figure 5: The removal of contact lens before sleep by the 125 respondents

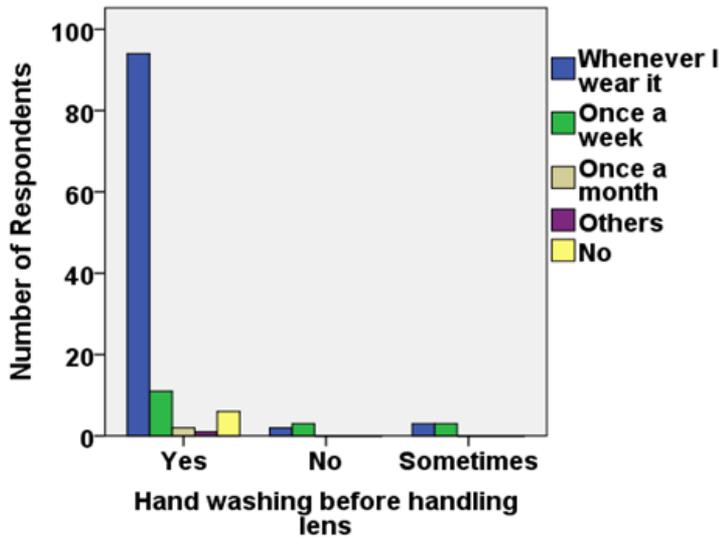


Figure 6: Handling of contact lens by the 125 respondents

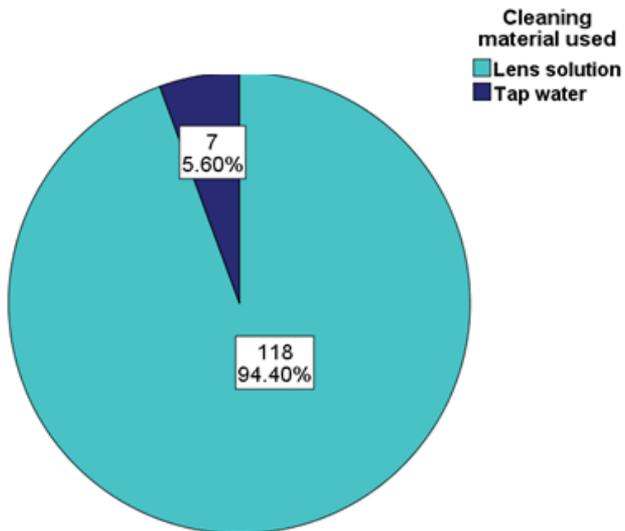


Figure 7: Usage of different cleaning material by the 125 respondents

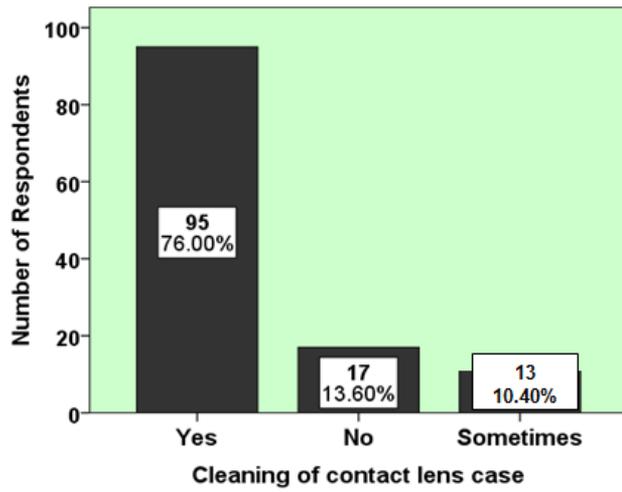


Figure 8: Cleaning of contact lens case

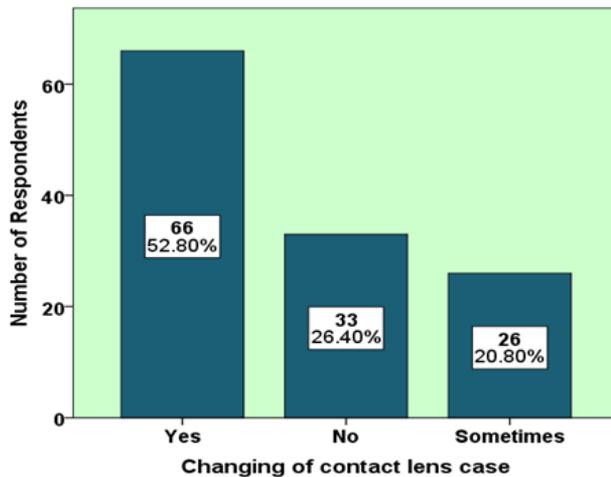


Figure 9: Changing of contact lens case

With respect to contact lens-related complications, there were 81 respondents (64.8%) who did not report having dry eyes while 44 respondents (35.2%) reported having dry eyes. Apart from that, there were 107 students (85.6%) who did not report watery eyes and 18 students (14.4%) who reported having issues with watery eyes. There were 120 students (96%) who did not have poor vision while wearing contact lenses, and only 5 students who suffered poor vision while wearing contact lenses. It was found that 89 students (71.2%) did not suffer red eyes whereas 36 students (28.8%) did. Among the 120 respondents, 36 students (28.8%) admitted to discomfort when wearing contact lenses. It is interesting to note that 89.6% of the respondents were aware that improper care of contact lens can lead

to eye damage. Our study revealed that almost half of them (42.4%) had the impression that contact lens care-related eye complications were only moderately prevalent at the scale of 3 when asked to rate the prevalence from a scale of 1-5.

The study also found that there was no statistically significant difference:

1. in the knowledge and practices between contact lens-wearing students in Science and Arts streams with Chi-Square value of 1.145 ( $p = 0.350$  with  $\alpha = 0.05$ ,  $Df = 1$ )
2. in the awareness of contact lens care as a cause of eye damage to the level of compliance with Chi-Square value of 1.145 ( $p = 0.350$  with  $\alpha = 0.05$ ,  $Df = 1$ )
3. when comparing academic stream to the awareness of proper wear and care of contact lenses with Chi-Square value of 1.731 ( $p = 0.188$  with  $\alpha = 0.05$ ,  $Df = 1$ )
4. in the relationship between academic streams and the awareness of contact lens care as a cause of eye damage with Chi-Square value of 0.229 ( $p = 0.632$  with  $\alpha = 0.05$ ,  $Df = 1$ )
5. when studying the relationship between academic streams to the level of compliance with Chi-Square value of 0.661 ( $p = 0.416$  when  $\alpha = 0.05$ ,  $Df = 1$ )

#### 4.0 Discussion

Compliance is defined as the degree of constancy and accuracy with which a patient follows a prescribed regimen. So in the context of a contact lens wearer, the definition of compliance can be interpreted as the wearer adhering to the instructions given by eye care practitioners or the guidelines provided by manufacturers regarding optimum contact lens wear and care. In our study, a minimum of 70% pass rate (demonstrating 7 of correct behaviors) was required to be categorized under average compliance and 60% or worse pass rate (demonstrating 6 or fewer correct behaviors) was considered as poor compliance with reference to the study done by the Optometry Clinic at The University of Texas Southwestern Medical Center (Bui *et al.*, 2010). It is important that any potential complications to the eyes caused by the presence of the contact lens be minimized as much as possible by correct hygiene practices.

Our study showed that there were more female (76.8%) contact lens users than males (23.2%). This is similar to the study done in University of Malaya which found that 87.6% of their subjects were female (Tajunisah *et al.*, 2008). In this study, the main reason for using contact lens was for cosmetic purposes, similar to the observation made in the University of Malaya study (Tajunisah *et al.*, 2008). The two most common types of contact lens used by SEGi University students are the 1-3 months disposable lens (68%) and the daily disposable lens (14.4%) and the flexible/extended wear type was the least popular. This finding is similar to the study done in Karnataka which stated that extended wear-soft types were the least popular type (Unnikrishnan & Hussain, 2009).

It is important to follow the recommended steps in the wear and care of contact lens. In the present study, most students (35.2%) wore the contact lens for between 4-8 hours/day only as compared to the study in India (Giri *et al.*, 2012) where the majority of students (65.52%) wore contact lenses for ten to fifteen hours daily. Individuals who practiced prolonged wear of contact lens were more prone to *Pseudomonas* and *Acanthamoeba* infections (Knoop *et al.*, 2009). It was heartening to note that in this study majority of the respondents (72%) discarded their contact lenses after its expiry date. The remaining

respondents correctly disposed of the lenses at times (18.4%) or never at all (9.6%). The most common reason for non-compliance in this matter was mainly due to forgetting the expiry date, followed by the lack of clear instructions given, and lastly for monetary reasons. It has been established in the past that there was a tendency among users to replace lens at a later time than the prescriber's recommendation (Coopersmith *et al.*, 1997). Although only 5.6% of respondents reported that they slept with their contact lenses on, this is a practice that should be discouraged as it has been shown that a high incidence of severe keratitis is seen in people who sleep with contact lens in the eyes, compared to those who used contact lenses during working hours only (Morgan *et al.*, 2005). As for cleaning material used, most of the students (94.4%) used lens solutions. Another finding that was worrying was that 5.6% of the respondents were found to be using tap water to clean the lens. The problem of using self-prepared solution was also seen among University of Malaya students (Tajunisah *et al.*, 2008). This is a dangerous practice as it may lead to eye infections caused by *Acanthamoeba*, a protozoa mostly found living in fresh water. In this study, 76% of students reported that they cleaned their contact lens cases, but only half of the students (52.8%) changed their contact lens cases. Our findings showed similarities with the study on South Indian university students, which reported that the lowest compliance score was seen in the maintenance of contact lens accessories (Noushad *et al.*, 2012).

When asked about awareness, 89.6% of the students claimed that they are aware of the proper wear and care of contact lens. However, this high level of awareness was not reflected in their practice of care of contact lens as, only 28% were found to be completely compliant. This may be due to the student's ignorance towards the importance of proper contact lens wear and care. There is also a possibility that the students were too indifferent towards carrying out all the proper steps in contact lens care. Moreover, the respondents may not be completely forthcoming in answering the questionnaire, as they may have claimed to have been aware of the proper wear and care of contact lens when in actual fact they were not.

## **5.0 Conclusion**

The results of this study showed that the awareness of maintenance and complications of contact lens between Science and Art Stream students do not differ much. There was also no association between knowledge of contact lens wear and care and the level of compliance among students of SEGi University. Hence, awareness about contact lens does not affect the practice of contact lens wear and care among SEGi University students. Contact lens wearers in SEGi University, Kota Damansara are not compliant with proper wear and care of contact lens regardless of their academic stream. A more detailed study is required to assess the depth of knowledge, practice and compliance amongst contact lens user in SEGi University.

## **6.0 Acknowledgement**

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