

Survey on Contact Lens Hygiene Behaviors and Knowledge in Rajabhat University Students

การสำรวจความรู้และพฤติกรรมการใช้เลนส์สัมผัสในนักศึกษา
มหาวิทยาลัยราชภัฏสวนสุนันทา



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Abstract

Objectives: To explore levels of contact lens (CL) knowledge and hygiene behaviors, and to identify risk behaviors associated with CL complication in Rajabhat University students.

Methods: We conducted a cross-sectional study recruiting students from Suan Sunandha Rajabhat University, between July and September 2019. Willing students were asked to enter the study and to complete online questionnaires about CL knowledge and behaviors. Chi-square or Fisher's exact test and logistic regression were used to analyze any association between risk behaviors and CL-related complications.

Results: Of 369 students, 255 (69.1%) were current CL wearers and were included into the analysis. Mean age was 18.8 years with female predominance (241 students, 83.9%). A majority of students used monthly soft CL (249 students, 97.6%). Students with good CL hygiene behaviors and good knowledge were 62.2% and 41.3%, respectively. Seventy-nine (31%) students had ever swum with CL and 29 (11.4%) students had experienced CL-related keratitis. There was a significant association between swimming while wearing CL and CL-related keratitis (Odds Ratio 2.7,

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95% CI 1.2-5.9).

Conclusions: We observed insufficient CL hygiene behaviors and knowledge in Rajabhat University students. Swimming with CL was an important risk behavior associated with CL-related keratitis. Educational strategies are required to emphasize the importance of good CL hygiene and raise awareness of CL-related complications among Rajabhat University students.

Keywords: contact lens, hygiene, CL-related keratitis, knowledge

บทคัดย่อ

การสำรวจความรู้และพฤติกรรมการใช้เลนส์สัมผัสในนักศึกษามหาวิทยาลัยราชภัฏสวนสุนันทา

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วัตถุประสงค์: เพื่อศึกษาสุขอนามัยและระดับความรู้เกี่ยวกับการใช้เลนส์สัมผัสในกลุ่มนักศึกษามหาวิทยาลัยราชภัฏและศึกษาความสัมพันธ์ระหว่างพฤติกรรมเสี่ยงในการใช้เลนส์สัมผัสที่สัมพันธ์กับการเกิดภาวะแทรกซ้อนจากการใส่เลนส์สัมผัส

วิธีการวิจัย: ผู้วิจัยได้ทำการสำรวจในนักศึกษามหาวิทยาลัยราชภัฏสวนสุนันทาระหว่าง เดือนกรกฎาคมถึงเดือนกันยายน พ.ศ. 2562 อาสาสมัครผู้เข้าร่วมงานวิจัยจะต้องเป็นผู้ที่ใส่เลนส์สัมผัส และสามารถตอบแบบสอบถามออนไลน์เกี่ยวกับความรู้และสุขอนามัยในการใส่เลนส์สัมผัสได้สมบูรณ์ ข้อมูลที่ได้ถูกวิเคราะห์โดยใช้สถิติเชิงพรรณนา และใช้ Chi-square หรือ Fisher's Exact Test และ logistic regression เพื่อหาความสัมพันธ์ระหว่างพฤติกรรมการใช้เลนส์สัมผัสที่เสี่ยงต่อการเกิดภาวะแทรกซ้อนจากการใส่เลนส์สัมผัส

ผลการวิจัย: จากอาสาสมัครที่ร่วมตอบแบบสอบถามทั้งหมด 369 คน พบว่ามีนักเรียนจำนวน 255 (69.1%) คนที่ปัจจุบันใส่เลนส์สัมผัสอยู่และถูกข้อมูลนำมาวิเคราะห์ นักเรียนมีอายุเฉลี่ย 18.8 ปี ส่วนใหญ่เป็นผู้หญิง (83.9%) 90.5% ของนักเรียนทั้งหมดใส่เลนส์สัมผัสชนิดนิ่มรายเดือน 62.2% ของนักเรียนทั้งหมดมีพฤติกรรมการใช้เลนส์สัมผัสในระดับดี ขณะที่นักเรียนเพียง 41.3% ที่มีความรู้เกี่ยวกับสุขอนามัยของการใช้เลนส์สัมผัสในระดับดี มีนักเรียนจำนวน 79 คน (31%) ที่มีพฤติกรรมการใส่เลนส์สัมผัสขณะว่ายน้ำ และมีนักเรียนจำนวน 29 คน (11.3%) ที่ให้ประวัติเคยเป็นกระจกตาอักเสบจากการใส่เลนส์สัมผัส นอกจากนี้ยังพบว่าการใส่เลนส์สัมผัสขณะว่ายน้ำมีความสัมพันธ์กับประวัติการเป็นกระจกตาอักเสบจากการใส่เลนส์สัมผัสอย่างมีนัยสำคัญที่ $P = 0.01$ (อัตราส่วน Odds = 2.7)

สรุปผลการวิจัย: ผลงานวิจัยชี้ให้เห็นว่า นักศึกษามหาวิทยาลัยราชภัฏยังมีความรู้และสุขอนามัยเกี่ยวกับการใช้เลนส์สัมผัสที่ไม่เพียงพอ และจำเป็นต้องมีการรณรงค์เพื่อให้นักเรียนได้มีความรู้ความเข้าใจที่ถูกต้อง รวมถึงการสร้างความตระหนักถึงภาวะแทรกซ้อนที่สามารถเกิดได้จากพฤติกรรมเสี่ยงในการใช้เลนส์สัมผัส โดยเฉพาะการใส่เลนส์สัมผัสขณะว่ายน้ำซึ่งสัมพันธ์อย่างมีนัยสำคัญกับการเกิดกระจกตาอักเสบจากการใส่เลนส์สัมผัส

คำสำคัญ: เลนส์สัมผัส, พฤติกรรม, ความรู้, นักศึกษามหาวิทยาลัย

Introduction

Nowadays, contact lenses (CL) have become a common modality for refractive error correction among the young population. The objectives of wearing CL in each individual include refractive error correction, cosmesis improvement or other therapeutic reasons.^{1,2} In 2018, based on sales growth, there were approximately 140 million CL wearers worldwide.³ In Japan, there are published studies reporting that the prevalence of CL use was as high as 37.8% among school students.⁴ Considering the rising trend of CL use, the concerns for CL-related complications and associated risk factors should be highly acknowledged.^{5,6} The complications range from mild symptoms of irritation or redness to very severe and vision-threatening corneal infection.⁷ To prevent these complications, every contact lens wearer should have a proper level of CL hygiene behavior and knowledge to counteract with the setback mentioned.^{5,6}

Several published studies have explored CL awareness in different parts of the world.⁸⁻¹¹ It has been demonstrated that adolescent and young adult CL wearers were more likely to develop eye infections and were more likely to have poor contact lens hygiene practices compared to older adult CL wearers.⁶ In 2014, a study in Rome, Italy showed that not many students took good care of their CL. For example, as many as 52.3% of all students continued to wear a CL after it had fallen into the sink.⁸ In 2017, another study in Chengdu, China, the results showed that CL wearers had limited knowledge about CL hygiene and that only 22.22% of all participants said that they visit eye doctors when they feel discomfort.⁹ In 2019, a study in Malaysia revealed that as much as half of all volunteered students had inadequate CL knowledge.¹⁰ On the contrary, the

recent study from Jordan has shown a moderate to high level of compliance about CL caring in volunteered university students.¹¹

In Thailand, the information on CL knowledge and hygiene in the young generation is limited. Countable studies were conducted at Chulalongkorn University, Thammasat University, Burapha University and Vajira Hospital, which studied different populations and provided different results.¹²⁻¹⁵ Since the population coverage is still inadequate, and the results are specific for each population, further studies are required to obtain more information of CL hygiene in Thai university students.

Therefore, in this study, we aimed to investigate Rajabhat University students, who were considered as a population at risk for having CL-related complications. Our results could be an important primer for establishing regulations or policy for preventing severe CL-related complications among young generations in Thai society.

Methods

A cross-sectional study was conducted in Suan Sunandha Rajabhat University, Bangkok, during July to September 2019. The complete protocol was approved from the Ethics Committee of Ramathibodi Hospital, Mahidol University in an accordance with the Declaration of Helsinki. All students were informed and asked for consent before entering the study.

Students were asked to complete the online questionnaire about CL knowledge and hygiene behaviors. The inclusion criteria were current CL wearers within one year and aged of 18-24 years. Any volunteer students who could not submit complete online forms were excluded. The online questionnaires

Table 1 Association between contact lens (CL) behaviors and history of CL-related keratitis

Contact lens behaviors	Categories	No. of students	History of CL-related keratitis		Odds ratio (95% CI)	P-value
			No (%)	Yes (%)		
Purchase lens from flea market or internet	Yes	169	150 (88.76)	19 (11.24)	1.14 (0.50, 2.59)	0.747
	No	79	69 (87.34)	10 (12.66)		
Use big-eye CL	Yes	103	132 (86.84)	20 (13.16)	1.58 (0.69, 3.63)	0.278
	No	152	94 (91.26)	9 (8.74)		
Wearing time per day	> 12 hours	181	156 (86.19)	25 (88.63)	2.80 (0.94, 8.36)	0.064
	≤ 12 hours	74	70 (94.59)	4 (5.41)		
Sleep with CL	Yes	76	66 (86.84)	10 (13.16)	1.28 (0.56, 2.89)	0.559
	No	179	160 (89.39)	19 (10.61)		
Use tap water for rinsing/cleaning lens	Yes	39	32 (82.05)	7 (17.95)	1.93 (0.76, 4.88)	0.166
	No	194	194 (89.81)	22 (10.19)		
Share CL with friends	Yes	12	9 (75)	3 (25)	2.78 (0.71, 10.93)	0.143
	No	243	217 (89.30)	26 (10.70)		
Swim with CL	Yes	79	64 (81.01)	15 (18.99)	2.71 (1.24, 5.94)	0.013*
	No	176	162 (92.05)	14 (7.95)		
Wash hands before touching CL	Yes	203	181 (89.16)	22 (10.84)	0.78 (0.31, 1.94)	0.596
	No	52	45 (86.54)	7 (13.46)		
Change lenses according to the schedule	Yes	165	147 (89.09)	18 (10.91)	0.88 (0.39, 1.95)	0.752
	No	90	79 (87.78)	11 (12.22)		
Change CL solution everyday	Yes	196	174 (88.78)	22 (11.22)	0.94 (0.38, 2.32)	0.892
	No	59	52 (88.14)	7 (11.86)		
Change CL case at least every 3 months	Yes	227	203 (89.43)	24 (10.57)	0.65 (0.14, 3.11)	0.590
	No	13	11 (84.62)	2 (15.38)		

CI = confidence interval, * Statistically significant at P-value < 0.05

were modified from the previous study,¹³ comprising of 3 sections (demographic data, hygiene behaviors and CL knowledge), as shown in Table 1. A participant with good knowledge is determined by a student with more than 80% correct answers in the hygiene knowledge section.

For statistical analysis, the collected data were demonstrated using descriptive statistics. Chi-square or Fisher's exact test and logistic regression were used to analyze any association between risk behaviors and CL-related complications. A P-value of < 0.05 was considered as statistically significant. All analyses

were conducted using STATA version 16.0 (StataCorp; LLC College Station, TX).

Results

Of 369 volunteered students, 255 current CL wearers (69.1%) were included into the analysis. Mean age was 18.8 years (range from 18 to 24 years). There were 213 females (83.5%) and 42 males (16.5%). Almost all students wore soft CL (246 students, 96.4%) and 231 students (90.5%) used monthly disposable type. The objectives of wearing CL were mainly for refraction correction (222 students, 87%) followed by

cosmetic improvement (33 students, 13%). Important factors considered prior to purchasing lenses were the comfort during CL wear (183 students, 71.7%) and CL brand (39 students, 15.3%). Three most common places to buy CL were optical shops (163 students, 63.9%), markets (34 students, 13.3%) and online shops (32 students, 12.5%).

Contact lens hygiene behaviors

We found that up to 76 students (29.8%) wore CL during sleep. Seventy-nine students (30.9%) wore CL while swimming. Thirty-eight students (14.9%) used tap water for rinsing lenses. Only 12 students (4.7%) shared CL with friends. Two hundred twenty-eight (90.5%) changed CL container within 3 months and 196 students (76.8%) changed CL solution every day. Twenty-two students (8.6%) missed changing CL within the advised period. Up to 205 students (80%) regularly washed their hands before wearing CL. One hundred sixty-nine students (66.2%) never visited an ophthalmologist to have an eye check up.

Contact lens knowledge

One hundred seventy-eight students (69.8%) had proper knowledge about overnight use of CL. Two hundred forty-six students (96.4%) knew not to share CL with others. Two hundred thirty students (90.1%) knew that they should not use CL over the advised duration. Two hundred twenty-seven students (89.0%) knew that they should not wear CL during swimming. Two hundred forty-seven students (96.8%) knew that they should not use tap water as a CL cleanser. Two hundred forty-one students (94.5%) knew that they should change CL solution every day. One hundred ninety-four students (76.0%) knew that they should change CL cases every 3 months.

Contact lens-related complications

Twenty-nine students (11.3%) had history of corneal infection. For knowledge of CL-related complications, 222 (87.0%) students knew at least one CL-related complication; 223 (87.4%) students answered dry eye and itchiness, 89 (34.9%), 103 (40.3%), and 73 (28.6%) students answered corneal abrasion, corneal ulceration, and corneal neovascularization, respectively.

When students found out that they had developed CL-related complications, 238 students (93.3%) suddenly removed their CL, 34 students (13.3%) visited an ophthalmologist as soon as possible and 16 students (6.2%) insisted to wear CL through the regular use period.

Association between contact lens hygiene behaviors and contact lens-related keratitis

From the study, we observed and analyzed many interesting CL-related behaviors including purchase of CL from unauthorized sellers, using big-eyed CL, CL wearing time, sleeping with CL, using tap water to clean CL, sharing CL with friends, swimming with CL, handwashing before wearing CL, on-schedule CL change, CL solution changing period and CL case changing period. Then, the history of CL-related keratitis was taken into consideration with the presence of each aforementioned behavioral risk.

Of all analyzed behavior data, swimming with CL was the only CL-related behavior that was related with keratitis with statistical significance. We found that 79 (30.9%) students had history of swimming with CL and 29 (11.4%) students had experienced CL-related keratitis. 15 students (18.99%) who used to swim with CL had a positive history of CL-related keratitis. There

was a significant association between swimming with CL and CL-related keratitis with odds Ratio at 2.71, 95% CI from 1.2 to 5.9 and p-value at 0.013. For CL wearing time of more than 12 hours and sharing CL with friends, there were notable correlations (Odds ratio 2.8 and 2.78, respectively) but was statistically insignificant (p-value 0.64 and 0.142, respectively).

Overall, a student with good behavior is determined by answering more than 80% of the hygiene behavior section questions correctly. The number of students with good behavior was 159 (62.2%). The number of students with good knowledge was 105 (41.3%).

Discussion

Most overseas surveys reported a high proportion of poor lens hygiene among CL users, especially in young population.^{7,9,10} In our study, the mean age of students was 19 years, which is considered young, and this group is prone to have poor CL hygiene. The main purpose of CL use was for refractive error correction, similar to previous studies in Italy⁸ and some studies in Thailand¹²⁻¹⁵, but not in Malaysia (Cosmetic 58% and Comfort 24.6%, respectively) 10 or Chengdu, China (Aesthetic 57.9% and Refractive correction 34.6%, respectively)⁹. The most common purchase place was the optical shop from studies in Chengdu, China, Thammasat University, Burapha University and Vajira Hospital^{9,13-15}, which is a good and safe decision made by our participants. In contrast, a study in a rural area of Malaysia reported as many as half of the participants had purchased CL from unlicensed vendors. This may be the result of improper decision-making since participants were only teenagers who were not as educated as university students.

For CL hygiene behavior, a majority of our

students selected correct answers, which can represent favorable CL hygiene status. However, up to 30% of students wore CL during sleeping and swimming. Malpractice involving wearing CL while swimming was also observed in Malaysia and Thammasat University in a similar ratio (34.3% and 24.5%, respectively).^{10,13} These two behaviors are worth mentioning and emphasized among young CL wearers. Only 61.3% of our students had good CL hygiene behavior (having correct behaviors > 80%). The number was less than the result reported at Chulalongkorn University that found up to 77% of all participants had good practice level (80-100% of total score).¹² The explanation for the difference between level in both studies may be from the difference in baseline characteristics of each group, which accounted for up to 21% of all students (much more than the proportion in our study-0.8%, 2 students from nursing faculty) of which those who were studying in health science fields at Chulalongkorn University (e.g., Medicine, Dentistry).¹²

For the CL-related hygiene knowledge evaluation, questions in this section were correlated to questions in the behavior section. We found that up to 30.1% of students agreed with the idea to wear CL overnight and up to 24% of students disagreed about replacing the container within a 3-month period. Other responses in the knowledge section were favorable since the misunderstanding was observed in less than 10% of students. However, only 41.3% of our participants had good CL knowledge (answering correctly > 80%). This result was worse than those shown in previous studies from Malaysia and from Chulalongkorn University in Thailand, which reported the study group to have high level of knowledge of up to 56.5% and 73.2%, respectively.^{10,12} For example, in our study, 70% of

our students believed that sleeping with CL is safe. But over 95% of participants in the Chulalongkorn University study considered it dangerous. Also, only 70% of our students realized that the CL case should be replaced every 2-3 months. This question was not enlisted in other studies' questionnaires. Regarding knowledge about CL-related complications in our students, dry eye symptoms and itchiness were well recognized by more than 80% of students, while corneal abrasion, corneal ulcer and corneal neovascularization were poorly recognized (less than 40% of students). In 2015, a study was conducted among first year university students of Burapha University, the results showed that participants had inadequate CL-related hygiene knowledge and improper hygiene behavior.¹⁴ Later, a study at Thammasat University revealed that medical students had better knowledge and behavior than non-medical students.¹³ Recently, there was a study that was conducted among medical students and medical residents in Vajira Hospital. The results showed that both groups had good CL-related hygiene knowledge but the hygiene behavior was different between the two groups of students with less proportion of good behavior observed in the medical resident group.¹⁵

We found that 11.3% of students had history of corneal infection. Moreover, as many as 66.2% of students had never visited an ophthalmologist for an evaluation before and after using CL. Similar results were identified from the study in Chengdu, China.⁹ These results highlight that clinic visits for eye check up were neglected by most of CL wearers. Interestingly, we found that swimming with CL had a significant association with CL-related keratitis (OR 2.71; 95% CI 1.24-5.94). No other risk behaviors were found to be significant in our study. Our findings support recent

evidence which stated that CL guidelines should clearly advocate for the avoidance of any water exposure including handling CL with wet hands, rinsing CL or storage cases in tap water, showering while wearing CL and swimming with CL without wearing goggles.¹⁸

This study had some limitations. It was conducted at only one Rajabhat University in Bangkok, hence our results might not represent the overall situation of general university students in Thailand. All participants were voluntarily enrolled which could have a possible bias on the results due to selection bias. Additionally, current CL wearer in this study was defined as students who used CL within one year from the survey period, therefore recall bias could not be ruled out. The questionnaire mostly contained close-ended questions without rating scales, which might not cover all possible answers and did not provided detailed information for subgroup analysis. History of CL-related keratitis was obtained from participants, not from medical records, that could be suffered from diagnostic uncertainty and recall bias. However, this is the first survey in Rajabhat University students and contains a large number of participants compared to previous studies conducted in Thailand. Our study also provides the information for application in youth population with high risk for having CL-related complications.

In conclusion, insufficient CL hygiene behaviors and knowledge were observed in Rajabhat University students. Most students were unaware of CL-related complications and were conscious about eye examinations at both prior to and after wearing CL. Swimming with CL was an important risk behavior associated with CL-related keratitis in our students. Educational strategies to emphasize the importance of good CL behaviors and public policy for CL

wearers should be established together with raising an awareness of CL-related complications to prevent negative consequences from CL wear in young population.¹⁹

Acknowledgement

The authors would like to thank staffs of Suan Sunandha Rajabhat University, Bangkok for the opportunity to perform the study.

Conflict of interest and financial disclosure

None

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