Human Behavior, Development and Society
ISSN 2651-1762, Vol 21 No 2, June 2020

Effects of a Health Education Program on Eye Care Behaviors of Selected Students in Saraburi Province Who Wear Contact Lenses

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Date Received: 17 September 2019 Revised: 20 February 2020 Accepted: 16 March 2020

Abstract

This quasi-experimental research aimed to study the effects of a Health Education Program on eye care behavior of 30 students who wear contact lenses and were selected by using purposive sampling. The educational program consisted of education, guidance, and support to create an environment that promoted self-care. Data were collected using a questionnaire for eye health care behavior, and analyzed by a *t*-test. The research found that students' eye care behavior improved after being exposed to the educational program ($t = -8.15$, $p < .05$). Therefore, instruction concerning proper eye care and performing continuous follow-up helped to enhance proper eye care behavior. This especially included seeking prompt assistance from an ophthalmologist when eye abnormalities were experienced, removing contact lenses before showering or swimming, using the hands to gently rub and clean the lenses, reading or writing in a well-lit place with materials about 300 mm away from the eyes, and eating foods that were high in vitamin A or carotene to nourish the eyes. These behaviors helped to prevent eye problems associated with wearing contact lenses.

Keywords: *Health education, eye care behaviors, contact lenses*

Introduction

At present, many individuals experience eye problems such as short-sightedness (myopia), long-sightedness (hyperopia), or astigmatism. These problems result in the reduction of vision efficiency as well as cause obstacles in life. Medical developments can be implemented to solve such eye problems; methods include wearing glasses or contact lenses, and lens replacement surgery.

Contact lenses were created to solve visual problems that would help wearers improve their visual acuity. Some benefits of contact lenses include correcting eye disorders such as myopia, hyperopia, astigmatism, elderly vision (presbyopia), myopic control orthokeratology, and aphakia, as well as treating eye diseases. Nowadays, in addition to having contact lenses that are used to correct eye problems, fashion contact lenses are also used for beauty purposes (Supiyaphun & Jongkajornpong, 2018).

Contact lenses are widely used throughout the world. According to a survey done in the United States from a group of people over the age of 18, there were 40.9 million individuals using contact lenses (Cope et al., 2015). Since the invention of contact lenses, their popularity and usage–particularly amongst teenagers in Thailand–has grown significantly. They use them to enhance beauty rather than for solving visual problems. In addition, they are influenced by foreign actors from Korea, Japan, and other places who make the trend of wearing contact lenses more popular. Contact lenses have become very popular among teenagers and adults. Using contact lenses gives more flexibility than using glasses. They can give a wide-angle image view, and are also inexpensive. However, there are disadvantages related to maintaining cleanliness, ease of wearing, and product durability. Recent studies have shown that people who wear contact lenses have a moderate level of knowledge, especially on the advisability of using contact lenses beyond the appropriate time, but they lack awareness of the need for regular eye examinations (Homsombat, 2015).

Literature Review

In Thailand, wearing contact lens is popular among both high school and university students. This represents a developing trend, for in the past, contact lenses were worn only by university students,

especially in Bangkok. The literature indicates that the age of teenagers who wear contact lenses is decreasing. Pavasupee (2016) collected data from high school and university contact lenses wearers. The average age of starting to wear contact lenses was 16.8 years old, while the youngest was 13, and the oldest was 20 years old.

Wearing contact lenses will be a rising trend in the future. Correct instruction on how to use contact lenses safely, and complications arising from wearing such lenses, is not always taught (Pavasupree, 2016). There are risks of infection if the wearer has the wrong method of maintaining cleanliness or storing lenses. Pavasupree's (2016) survey found that more than 99% of contact lenses wearers practiced unhygienic behaviors that made them vulnerable to infection, and exposed them to other risks in using contact lenses. One in three contact lenses wearers reported having red-eyes or painful experiences that caused them to visit the doctor. Moreover, many people may be at risk from severe eye infections on account of wearing bad contact lenses and using improper care behaviors (Cope et al., 2015). The study of Pavasupee's (2016) cross-sectional study examined care and usage practices, as well as complications arising among teenage students (*N* = 140) who wore contact lenses. It was found that 76.4% of students had complications after wearing contact lenses; the majority of these were burning eyes (45.9%), dry eyes (32.7%), itchy eyes (13.1%), and corneal ulcers (1.9%). Eye health care issues have been studied elsewhere, too. In the United States, it was found that problems occurring among teenagers were that they did not go to see the doctor for regular eye examinations after wearing contact lenses, they slept while still wearing contact lenses, and they even wore contact lenses while swimming. These behaviors caused conjunctivitis and eye pain until treated by an ophthalmologist (Cope et al., 2017).

Results reported from the Department of Ophthalmology, Faculty of Medicine Ramathibodi Hospital, Mahidol University, among 435 patients indicated that 18.6% of those who received treatment were contact lens wearers. Of these, 34% of users wore contact lens incorrectly, and 67% did not remove their lenses while sleeping at night. In addition, contact lens users were more prone to having corneal infections that may spread and lead to corneal replacement surgery (Food and Drug Administration, 2011).

It is evident from review of the literature that wearing contact lenses may solve vision problems, or it may contribute to beauty. But incorrect or inappropriate usage may be harmful to users, leading to cornea infections, conjunctivitis, and other problems that may be severe to the point of going blind. Likewise, many contact lens wearers are teenagers. The research team saw the importance of promoting proper eye care behavior among school-age contact lens wearers. So a Health Education Program was created using the Orem Self-Care Theory framework to encourage contact lenses wearers to practice better self-care behaviors.

Orem's Self-Care Theory (2001) is a widely accepted theory in nursing science. It states that each individual has the potential to act deliberately to fulfil a goal, along with the ability to learn about themselves, to plan and record self-care activities, and to foster a relevant environment that cannot be separated from social interactions. Nursing is a health aid consisting of purposeful and deliberate action to help people who are unable to take care of themselves in order to maintain life and a healthy state, and to cure disease or help patients adapt to the effects of disease. Orem's Self-Care Theory is a grand-level nursing theory that has an important concept to be applied in this research. It is a theory that leads to the creation of a nursing model referred to as the relationship between the patients and the nature of nursing. The nursing system involves delivering services that change according to the ability and the needs of the patient's self-care. It has an educational component (Orem, 2001).

This study was created under the concept of an Educative Support Nursing System. The steps adopted in this study were guiding, supporting, managing the environment, and teaching in order to give knowledge. Then people who use contact lenses will able to take care of their eyes properly. Clients with health problems or people at risk of developing impaired health conditions are unable to modify their behavior and their lifestyle patterns. Therefore, nurses must assist in solving their shortcomings by means of guidance, teaching, support, and encouraging patients to maintain good health, well-being, and the quality of life (Wongsri & Chintapanyakun, 2018). This concept can be

applied through health education programs. Such programs involve a learning experience that has been appropriately designed to encourage individuals to change their health behaviors voluntarily, to increase their ability to control disease-causing factors, to live healthy lifestyles and to make independent decisions in order to improve their health and the environment.

Objective, Hypothesis, and Conceptual Framework

Objective

To compare the eye care behaviors of students who wear contact lenses before and after receiving the Eye Care Health Education Program.

Hypothesis

The eye care behavior of students who wear contact lenses was better after receiving the Eye Care Health Education Program than before receiving the program.

Conceptual Framework

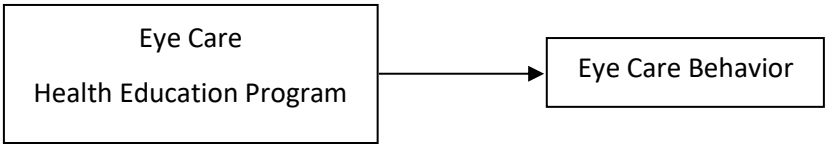

Figure 1. Conceptual Framework of Eye Care Health Education Program

An Eye Care Health Education Program was created as a support and education system based on Orem's Self-Care Theory (Orem, 2001) and related research. The program was as follows:

1. Guiding the sample group by building relationships with them. Communicating and guiding them together regarding how to take care of their eyes.
2. Supporting them physically and mentally by encouraging students to have confidence in caring for their own eye health without causing complications. Demonstration and reverse demonstration for students so they could be confident in performing eye care, and using various contact lenses accessories properly.
3. Preparing suitable eye care accessories for properly wearing contact lenses, and suggesting appropriate places for storing them.
4. Teaching by providing information followed by discussion, and providing illustrations through videos about choosing contact lenses, caring for and cleaning contact lenses, eye care complications from using contact lenses, and how to conduct oneself when wearing contact lenses.
5. Demonstration and reverse demonstration for the correct usage of the contact lenses and cleaning the accessories that are needed to use contact lenses.

Methodology

Design

This study used a quasi-experimental approach to investigate the effects of receiving a structured eye health care education program on the eye health care behaviors of students after using contact lenses. A one-group pre-test–post-test research design was used.

Population and Sampling

The variables studied included:

1. The population were high school students in Saraburi Province who wore contact lenses.
2. The sample group came from Muak Lek Witthaya High School students who wore contact lenses (*N* = 30).
3. The sample group was selected by purposive sampling with the following features:

Inclusion Criteria

1. Aged between 15–18 years.
2. Use of contact lenses for visual acuity and/or cosmetic purposes at least once per week.
3. Obtained consent to participate in the research project, from both the sample group and their parents.
4. No hearing problems.
5. Had a personal mobile phone.

Exclusion Criteria

1. Undergoing treatment for eye disorders.
2. Intellectual disability.

Research Tools

The research tool for collecting data was based on an eye health care behavioral questionnaire developed by Sitthajarn (2009). This questionnaire was named 'The eye health care behavior of students using contact lenses in Bangkok.' It was created in harmony with Rosenstock's health beliefs, along with those of Backer and Maiman, together with information gleaned from the literature review. It consisted of 20 questions. Respondents' answers were recorded on a five-level scale: practice regularly, practice frequently, practice moderately, practice once in a while, and never practice. Each question received a score of 1–5, and the total scores were between 20–100 points. An overall high score meant that the eye care behavior was good.

The questionnaire was examined for content validity, content coverage, and the appropriate usage of language. These assessments were completed by three experts: two by nursing instructors, and one by an ophthalmic nursing specialist. Then the Content Validity Index of the revised questionnaire was calculated, and it was 1.0.

A reliability test was completed on the questionnaire after it had been verified by the reviewers, and it was modified to suit the content and language of the students chosen. The results from this were used to analyze the questionnaire's reliability by using Cronbach's Alpha Coefficient formula (Cronbach's Alpha Coefficient = .73).

Data Collection

In this research, data was collected from 30 students who use contact lenses and were studying at high school level in the Muaklek Wittaya High School. With the coordination of the school, the researchers requested permission to use the location from the school director, and requested signed consent from the parents of the students in the sample group.

Step 1

The research team surveyed the names of students who wore contact lenses. Then using purposive sampling, they selected students who met the sample group criteria. From the list.

Step 2

The research team visited the sample group, asked for personal information, and evaluated eye health care behaviors using the eye health care behavior questionnaire before the experiment (pre-test).

Step 3

The research team conducted an eye examination and assessed the appropriate use of contact lens accessories, such as lens container and lens cleaner solution in the sample group. They also made some adjustments so that accessories were appropriate, and gave the right contact lens accessories for individual use.

The health education proper eye care topics for contact lens wearers included knowledge about contact lenses, types of lenses used, contact lens accessories, correct usage of contact lenses, proper hand washing, proper behavior while wearing contact lenses, wearing time, keeping the accessories

clean, using the correct solution, maintaining cleanliness in personal hygiene, potential complications, observation of abnormalities after using contact lenses, and general eye care. The teaching was done in groups.

Demonstration and reverse demonstration of eye care–together with the practice of looking after the accessories and storing contact lenses–was done for each individual. Assessments of self-efficacy and attitude of eye care readiness were completed. In addition, detecting problems and practicing the solutions to these problems was also undertaken.

Eye care manuals were given out to the sample group so that they could review their eye health at home.

Step 4

The eye health care practice of individuals was followed by inquiring and advising clients via the phone once a week for 60 days, for a total of eight times. Each time, the researchers looked for problems and solutions for each individual so that they would be able to practice eye health care properly. The sample group continued to practice this for 90 days.

Step 5

After receiving the health education program for a period of 90 days, the research team met with a sample group to assess their eye care behavior by conducting the eye care behavior questionnaire (post-test).

Data Analysis

Descriptive statistics were used to analyze the personal data of the sample group. These included frequency distribution and percentage, along with calculation of the mean and standard deviation of the sample group's eye health care behavior scores before and after the experiment. Then, the mean scores of eye health care behavior before and after the experiment were compared with a paired *t*-test statistic at the statistically significant level of .05.

Results

The demographic data gathered are shown in Table 1. The majority in the sample group were females (93.3%). Two-thirds were in grade 12. Most of these were wearing contact lenses more than eight hours per day. The types of contact lenses used were optical and fashion lenses (36.7% each). Almost half of the survey group used contact lenses mainly for correcting eye disorders.

Table 1. Demographic Data of the Sample Group

Characteristic		Number of Students	Percentage
Gender	Male	2	6.7
	Female	28	93.3
Grade Level	Grade 10	5	16.7
	Grade 11	5	16.7
	Grade 12	20	66.6
Duration Wearing	1–2 hours/day	3	10.0
Contact Lenses per Day	3–4 hours/day	2	6.7
	4–5 hours/day	5	16.7
	6–7 hours/day	6	20.0
	8 hours/day	3	10.0
	> 8 hours/day	11	36.6
Type of Contact Lenses	Optical lenses	11	36.7
	Color lenses	11	36.7
	Both	8	26.6
Reason of Using Contact	Eye sight problem	14	46.7
Lenses	Good looking	9	30.0
	Both	7	23.3

Characteristic		Number of Students	Percentage
Frequency of Using Contact Lenses	1–2 days/week	4	13.3
	3–4 days/week	3	10.0
	5–6 days/week	6	20.0
	Every day	7	23.3
	Uncertain	10	33.3
Experience Using Contact Lenses	< 1 year	13	43.3
	1 year	8	27.0
	2 years	4	13.3
	3 years	4	13.3
	4 years	1	3.3
Experience Facing Eye Problems	Not experienced	28	93.3
	Experienced	2	6.7
Type of Eye Problems	Corneal ulcer	1	3.3
	Conjunctivitis	1	3.3

The frequency of wearing contact lenses was uncertain among a third of the group. Most of the students (43.3%) in the sample group had a time frame of using contact lenses less than a year. Most students (93.3%) never experienced any occurrence of abnormalities from wearing contact lenses. Only two students experienced problems, and these were caused by eye infections leading to corneal ulcers.

From Table 2 it is observed that the average eye care behavior of students who wore contact lenses after the experiment improved ($p < .05$) as a consequence of following the Health Education Program of eye care.

Table 2. Comparison of Eye Care Behavior Regarding Before and After the Experiment

Comparison	Mean	*SD*	*t*- value
Before the experiment	85.33	7.01	-8.15*
After the experiment	91.10	7.98	

*$p < .05$

The behavior of each student is shown graphically in Figure 1. The majority of students showed better eye care behavior scores at the completion of the experiment than at its commencement.

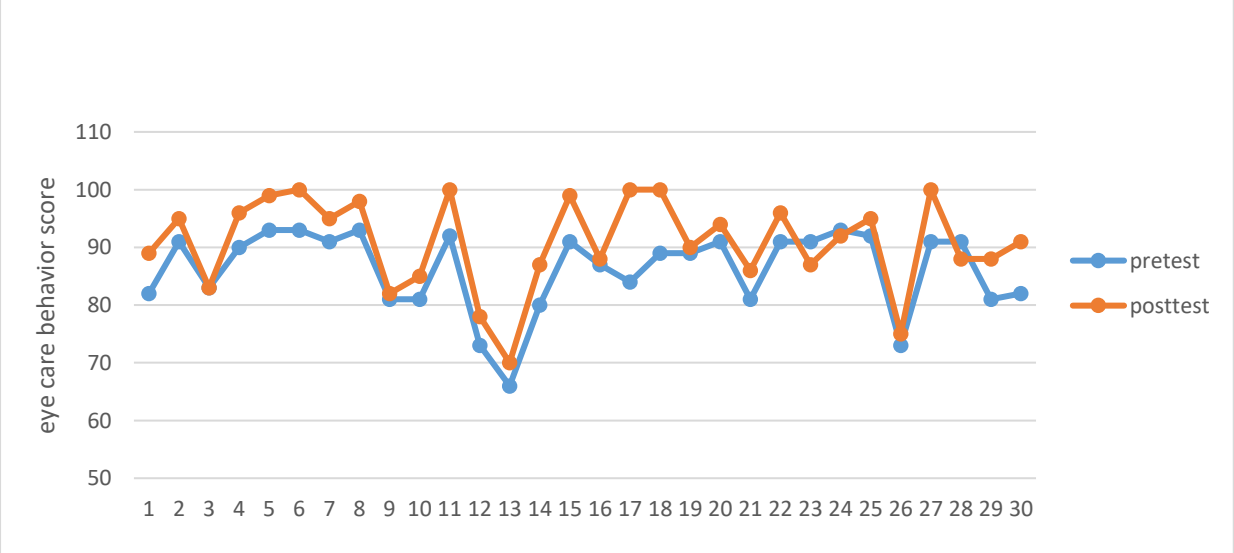

Figure 1. Comparison of Pre-test and Post-test Eye Care Behavior Scores for Individual Students

Discussion

The eye care behavior of students who wore contact lenses and received a Health Education Program improved after they undertook the program, which was as hypothesized. Their behavior scores were at a very good level. The behaviors displayed were: Seeking prompt evaluation by an ophthalmologist when there were abnormalities with the eyes, removing the contact lens before showering, removing the contact lenses before swimming, using the hands to gently rub and clean the lenses, reading or writing in a well-lit place (about 300 mm away from the eyes), and eating foods that were high in vitamin A or carotene to nourish the eyes. The results of this experiment were consistent with Tepsuriyanont and Chaichanawirote's study (2017), in which they found that factors affecting corneal inflammation were knowledge about preventive measures, attitudes about preventive behavior, recognition of corneal inflammatory preventive behavior, having and accessing resources related to the prevention of corneal inflammation, having social support in the prevention of corneal inflammation, and adopting preventive behavior following corneal inflammation.

The eye care Health Education Program also included acquiring systematic knowledge about contact lenses, specifics of eye care while using contact lenses, the prevention of complications, the exchange of opinions, attitudes, preparation, and evaluation of accessories suitability, and following up the results for continuing health care. Having the correct eye care behaviors will help to reduce complications that can occur to the eyes caused by wearing contact lenses. For example, the removal of contact lenses while swimming can help to reduce eye inflammation, because wearing contact lenses while swimming increases the occurrence of *Acanthamoeba* keratitis due to the coagulation of contact lenses' silicone hydrogel with *Acanthamoeba*, an organism which is present in the pool. However, if an individual is looking for clarity of vision while swimming, then wearing disposable contact lenses is a solution. After every use of contact lenses, they must be cleaned by gently rubbing the contact lenses, because wearing contact lenses will cause the proteins, fats, and bacteria to stick to them. If the lenses are not gently rubbed by hand, these substances will remain and accumulate, causing inflammation and infection of the cornea.

Wearing contact lenses for a long time and wearing them while sleeping are important factors in the development corneal infection. Bacteria keratitis occurs due to the prolonged contact of lenses with the eyes, causing corneal anoxia without any symptoms, which causes corneal ulcers and subsequent infections. Therefore, the duration of wearing contact lenses should not be longer than eight hours. Changing contact lenses at specified intervals is important in reducing accumulation of residues and germs (Pavasupree, 2016).

This research focused on providing health education about the severity of eye diseases, the benefits of performing eye care, and the risk of experiencing eye complications to achieve awareness and the practice of correct eye care behavior. Delivering health education was found to help those who used contact lenses to have appropriate knowledge to practice correct preventive principles, to recognize when their behavior was not practiced correctly, to control occurrence of eye complications themselves, and observe the abnormalities of complications.

This type of result was in accordance with the study of Khamvicha and colleagues (2014) who developed self-care behavior protocols for people with high blood pressure. Their scheme provided knowledge and encouraged exchanging knowledge among groups. This resulted in a perceived self-care ability to control and prevent disease at a higher level, and was also consistent with other studies on health education in patients with other diseases. For example, Trakulldist and Ronnahongsa (2016) studied the benefits of health education services for diabetic patients at Uttaradit Hospital, Thailand. They found that benefits flowed from health education services provided by nurses and an interdisciplinary team. These services were in the form of behavioral development through learning activities using various techniques, whether in counseling, motivating people individually and in groups, helping clients to learn from others when faced with illness, and adjusting their lifestyles and health management.

Papomma (2016) also studied the benefits of health education on acquisition of knowledge and the attitudes and practices of diabetic patients in the community towards reducing blood sugar levels.

It was found that providing health education at the primary health services level had a direct impact on client practices, but knowledge and attitudes were not related. It follows that health education programs should be developed suitable for the context of each area, and those who provide health education must be people with true knowledge.

Conclusions and Implications

The wearing of contact lenses is very common today. While they offer benefits, incorrect health care practices may cause many complications. For example, the occurrence of infection in the eye, conjunctivitis, ulcers in the eyes, and eye pain may result in decreased vision and require time to cure, hence wasting medical resources. Therefore, those who wear contact lenses must have knowledge and self-care ability leading to correct and continuous eye care behavior. In the current study, it was found that the sample group cooperated well and participated in health education learning activities, trying to follow through according to the advice given. This excellent result may have been because the sample group gained knowledge from the Health Education Program, actively exchanged knowledge with the researchers, and were motivated to see the benefits of practical learning, thus causing them to be confident in taking care of themselves. The concept of nursing is to promote, prevent, treat, and restore. Therefore, nurses play an important role in promoting knowledge so that contact lens wearers can practice using accessories and look after their eyes correctly. They also have a role in preventing complications among contact lens wearers by following up and monitoring potential hazards.

This study can be used as a guideline for promoting the health of people who wear contact lenses. The role of nurses is not just within the hospital, but they also have an important role in proactive health promotion by providing knowledge to prevent the occurrence of disease in normal and at-risk people. They help to prevent the occurrence of complications from existing diseases, and to prevent relapse from illnesses for people in the community. The school environment is a place where proactive health promotion is relevant, but there is still a need for cooperation of individuals in the community. Cooperative parties might include parents, other individuals, and the teachers in the school in order to change health behaviors, to reduce risk factors and unhealthy impacts, and to encourage correct health behavior. This study showed that a health education program in eye care improved healthy eye care behavior. Nurses could use this program as a model for health promotion in order to prevent complications from wearing contact lenses.

In Thailand, contact lenses are not widely worn in the country side, while in Bangkok, there are many users. Thus, public health organizations in Thailand do not have strict policies to promote heath for contact lens wearers. Correct instructions on how to use contact lenses safely is not general knowledge provided in schools or hospitals either. Users usually looked for information about contact lenses, such as how to wear and care for them, from the Internet or from retailers. Since some of them are not medical professionals, they may give incorrect information. For this reason, nurses or medical professionals can apply a health education program to promote health among contact lens users. This is especially relevant for public health nurses, who give health promotion information to persons in the community and to students in schools. Moreover, a campaign is needed to encourage users to buy contact lenses from hospitals, medication clinics, or drug stores in order to get the right information.

Limitations and Recommendations

This study was conducted on adolescents who were studying in high school in a rural community. The value of using contact lenses was not very extensively understood and the population size was limited. Contact lenses and their accessories, including eye care equipment and research resources, were also limited. Therefore, it would be advantageous to investigate a wider population dealing with a broader age range of adolescents and including adolescents in urban areas.

Suggestions for further research are several: Apply the technology for providing health care knowledge for Thai teenagers including studying the sufficiency of resources for the eye care after using contact lenses; develop a health promotion model for using contact lenses by supporting and

encouraging teenagers' parents; and involve school educational personnel in participating in multidisciplinary health programs.

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