

ผลของโปรแกรมการดูแลสุขภาพตาต่อระดับความสามารถในการคัดกรองและพฤติกรรมการดูแลสุขภาพตาของครูในระดับประถมศึกษาในจังหวัดสงขลา

Effects of an Eye Care Program on Eye Screening Ability and Eye Care of Primary School Teachers in Songkhla Province

บทความวิจัย
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เพชรน้อย สิงท์ช่างชัย RN, Ph.D. (ประ瘴กรศาสตร์คุณภูบันทึก)* สาวี เอสันวะรณรงค์ RN, Ph.D. (พยาบาล)* สุมาลี หอศิริธรรม RN**
Phechnoy Singchungchai RN, Ph.D.* Salee Chalermwanpong Ph.D. (Nursing)* Sumalee Horsiritham RN**

บทคัดย่อ:

การวิจัยกึ่งทดลองนี้มีวัตถุประสงค์เพื่อศึกษาผลของโปรแกรมการดูแลสุขภาพตาต่อระดับความสามารถในการคัดกรองและพฤติกรรมการดูแลสุขภาพตาของครูในระดับประถมศึกษา กลุ่มตัวอย่างประกอบด้วยครู จำนวน 100 คน ใช้การสุ่มอย่างง่ายในการเลือกเข้ากลุ่มทดลองและกลุ่มควบคุม กลุ่มทดลองครู จำนวน 50 ราย ได้ผ่านรับการพัฒนาโปรแกรมดูแลสุขภาพตาเป็นเวลา 6 เดือน และมีการติดตามการใช้โปรแกรมดูแลสุขภาพตา 10 เดือน ส่วนกลุ่มควบคุมเป็นครู จำนวน 50 ราย ไม่ได้เข้ามามีส่วนร่วมในโปรแกรมดังกล่าว ใช้วิธีคำนวณขนาดตัวอย่างคำนวณด้วย power analysis method เครื่องมือวิจัยประกอบด้วยอุปกรณ์สำหรับคัดกรองตา แบบบันทึกความสามารถในการเห็น และสื่อการสอนด้วยคอมพิวเตอร์ช่วยสอนที่ผ่านการตรวจสอบประสิทธิภาพตามเกณฑ์ มีค่าเท่ากับ 81/83.3(คำนวณจากค่าเฉลี่ยคะแนนก่อนและหลังเข้ารับการพัฒนาจากโปรแกรม) ตรวจสอบคุณภาพเครื่องมือด้วยวิธีหาความตรงตามเนื้อหาจากผู้ทรงคุณวุฒิ 3 ราย ประกอบด้วยจักษุแพทย์ และพยาบาลเวชปฏิบัติด้านตา 2 ราย การวิจัยนี้ผ่านการพิจารณาจากกรรมการจิรยธรรมของคณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลา ประเทศไทย วิเคราะห์ข้อมูลด้วยความถี่ ร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน ค่าสถิติแคปปา และสถิติที่แบบอิสระ

เมื่อทดสอบความสอดคล้องการวัดความความสามารถการคัดกรองสายตาระหว่างพยาบาลเวชปฏิบัติด้านตา กับครู พบว่า ครูมีระดับความสามารถในการคัดกรองสายตา 낮กว่า ระดับสูง (ค่าสถิติแคปปาเท่ากับ 0.80) ค่าเฉลี่ยคะแนนพฤติกรรมการดูแลสุขภาพตาของครูในการดูแลสุขภาพตา กลุ่มทดลองสูงกว่าครูในกลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05

คำสำคัญ: โปรแกรมการดูแลสุขภาพตา, การคัดกรองสายตา, ครูประถมศึกษา

Abstract:

The aim of this quasi-experimental research was to study the effects of an eye care program on the eye screening ability and eye care behaviors of primary school teacher. The sample groups consisted of 100 teachers. Simple random sampling was used to select the control and experimental groups. The experimental group (50 teachers) received eye care education for 6 months and a follow-up session 10 months. The control group (50 teachers) did not participate in the eye care program. Group sizes were calculated using power analysis. Research instruments consisted of eye screening equipment, an eye care record form, and a computer-assisted instruction (CAI) program on eye care. The effective criteria of the program's content was

* รองศาสตราจารย์ คณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์

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evaluated as 81/83.33 (mean test scores before and after studying the program). The test was validated by three experts: an ophthalmologist and two nurse practitioners. The Kuder-Richardson coefficient was 0.81. This study was approved by the Human Research Ethics Committee of the Faculty of Nursing, Prince of Songkla University, Thailand. The data were analyzed by frequency, percentage, mean, standard deviation, kappa statistics and independent t-test.

When testing the concordance between the results of eye screenings done by nurse practitioners and those by the teachers, it was found that the teachers were able to perform eye screening correctly very high (kappa value, 0.80). The mean scores of the teachers' eye care behaviors in the experimental group were higher than those of the control group ($P < 0.05$).

keywords: eye care program, eye screening, primary school teacher

Introduction

WHO has improved eye care, with the goal of eliminating avoidable blindness by the year 2020¹. Presently more than 45 million are blind and 135 million are visually disabled. Ninety percent of the blind live in Asia and Africa. The eye health problem in developing and underdeveloped countries is refractive error. WHO estimates that more than 35 million people need vision care². A study on of 1,298 primary school students found that 12.8 of the students were sighted and 50 of the their eyesight corrected with glasses.³ Moreover, 25⁴ students 7.87 were found to have strabismus, 11.42 amblyopia⁴. Eye screening is but lack eye specialists⁵. In Thailand, the rate of blindness is 0.3, and that of vision is 0.8. The causes of vision disability include cataract and refractive error, respectively⁶. Presently, Thailand has 826 ophthalmologists for population of about 6 million but ophthalmologist⁷ and. For these reasons, there is a need to create personnel who can help with eye screening before damage occurs. Nurses play an important role in health promotion⁸ children's eye health; however, there is a lack of nurses to and empower people to have good health. Nurses leaders in developing teachers to practice eye screening in children. This help mitigate the lack of eye-care

personnel because teachers are the nearest resource with potential to be trained in fundamental eye health care for school children. Eye health education and screening may help address the unmet need for refractive correction⁹

Having a vision screening program for teachers to use can have an impact on vision development in primary school students. Teachers should therefore develop skill in preventing vision problems in school children. Furthermore, also reduce the costs of damage resulting from eye treatment. Nevertheless, studies on vision problem prevention and creation or development of for school children and most of the have been survey studies and retrospective studies¹⁰

The Research team believes that teachers have potential to primary school children's eye health. This can be by nurses developing lessons for an Eye Care Program for teachers and students. Teachers should be trained so that they understand the basics of eye screening. The research team also expects the Eye Care Program to be as a qualitative study on school children's health development and increased access to health care services for school children, teachers' eye care and prevention of vision problems in school children. In the future, teachers substitute health

personnel whose number still insufficient in Thailand. Schools be a starting point access to service provided by non-health personnel and school children be able to get access to eye care service more easily than going to government health care centers. This result in more health care service in line with the government school health promotion policy.

Purposes of the study

1. To test concordance between the results of eye screening done by nurse practitioners and that done by the teachers.
2. To determine the effects of using an Eye Care Program on the level of eye care of teachers in schools in Songkhla province.
3. To evaluate teachers' satisfaction in using an Eye Care Program and the level of eye care of teachers in schools in Songkhla province.

Definitions of terms

Eye Care Program refers to a program consisting of knowledge and practice in eye care by eye screening and using the provided CAI program.¹¹

Eye Care refers to knowledge and understanding about eye care four topics: eye screening, accident prevention, environmental arrangement in schools to reduce the risk eye accidents, and how to care for children accidents school

Scope of the study

This study was conducted to test the Eye Care Program developed by the research team after collecting data from teachers in the experimental group. The schools using the Eye Care Program were one primary school in an urban area and one in a rural area. The control group two primary schools that did not use the Eye Care Program: one an urban area and the other a rural area. This study was approved by the Human Research Ethics Committee of the Faculty of Nursing, Prince of Songkla University.

Methods

This quasi-experimental research the effects of an eye care program on eye screening of primary school teachers. The sample groups consisted of 100 teachers. Simple random sampling was used to select the control group first and then the experimental group. The experimental group (50 teachers receive eye care for 6 months and follow-up session). The control group (50 teachers) did not receive eye care. The sample size was calculated power analysis at effective size of .50 and the power level was 0.95 at level of 0.05¹². The research instruments consisted of eye screening equipment, an eye care record form, a Computer Assisted Instruction (CAI) program on eye care. The test was by three experts an ophthalmologist and two nurse practitioners. The KuderRichardson coefficient was 0.81. This study was performed from October 2007 to September 2009. The data were analyzed in frequency, percentage, mean, standard deviation, appa statistics, paired t-test and independent test.

Instruments

Three sets of instruments were used:

1. Three Snellen charts were used for eye screening. One was used in an urban primary school one in a rural primary school and one was used by the research team.
2. Notebooks were used to record the results of eye screening.
3. Two CAI programs on eye care were developed by the research team: one program lessons on eye care by eye screening suitable for adults and the other was lessons on eye care by eye massage suitable for school children.
4. An evaluation form to assess teachers' knowledge and ability in eye care consisting of topics on accident prevention for school children, vision screening for students, environmental arrangement in

school to reduce eye accident risk and methods of caring for children when they have an eye accident. The evaluation form consisted of 10 items and scores are given.

5. An evaluation form to assess satisfaction with the CAI Eye Care Program CAI media, CAI eye care lessons, equipment support, and usefulness of the Eye Care Program.

Steps in writing CAI lessons

There were eight steps in developing the CAI lessons Eye Care Program for teachers and students as follows:

Step 1: Preparation was to set the goals for the contents of the lessons for teachers and students.

Step 2: Designing the instruction the ideas and design preliminary lessons.

Step 3: Writing a flowchart the procedure of the Eye Care Program.

Step 4: Creating storyboards transferring the ideas into pictures and sound as well as designing graphics related to the lessons

Step 5: Writing the program lessons the storyboards to CAI lessons by a programmer.

Step 6: Producing supporting materials.

Step 7: Trying out the lessons and revising the lessons three experts: one expert in teaching media, one in health teaching and learning, and one ophthalmologist.

Step 8: Evaluating the effectiveness of the Eye Care Program in terms of the lessons and the design of the CAI program divided into:

8.1 Evaluating the effectiveness the fonts, color and picture.

8.2 Evaluating the effectiveness regarding learning the effectiveness of the contents using a multiple choice test for each sub-unit of the lessons. score was called the effectiveness of the sub-process

and in each sub-unit it was called E1. After that the effectiveness of learning after studying using the CAI program on eye care for teachers was tested using a pre-test and a post-test which was called E2.

The results of the test for the effectiveness of the Eye Care Program revealed that E1 which was the effectiveness of the process referring to continuous evaluation for the learners. The scores were how well the students did eye care activities by eye screening after using the program. E2 was tested by having the students do the test on eye care the average effectiveness was between 81/83.33. It was found that the CAI program on eye care had effectiveness in accordance with the criteria 80/80¹¹ The research team interviewed five teachers and found that the CAI program on eye care had advantages teachers could divide the lessons according to time they to the lessons the teachers could practice eye screening on their friends following the steps shown in program. This enabled them to practice and understand the lessons better than learning in a regular class. After testing the program, the research team revised and improved it by correcting mistyped words and improving pictures that were not clear enough. The quality of the instruments regarding the teaching media on eye care and the true or false test to evaluate the ability in eye care were tested for their content validity by three experienced two ophthalmologists and a nurse practitioner. Kuder Richardson 21 (KR21) was 0.81.

Data analysis

The general data were analyzed in percentages concordance between the screening done by the nurse practitioners and done by the teachers was tested kappa statistics the scores for the eye care the control group and the experimental group were compared using an independent t-test.

Results

Among the teachers in the experimental and control group, there were more females than males. In the experimental group there were 36.0 more females than males, and in the control group there were 30.0 more females than males. The results of eye screening students by the teachers who had been trained to use the Sellen chart for eye screening showed

that 94.0 of the experimental group had normal vision while 6.0 had abnormal vision and needed to be referred to an ophthalmologist. After the experiment, the meanscores of the teachers' eye care behaviors in the experimental ($=8.43$, $SD=.78$) were higher than those the control group ($=5.24$, $SD=.97$). When tested, it was found that the difference was statistically significant at 0.05 as shown in **Table 1**.

Table 1 Comparison mean and standard deviation of the scores for the teachers' eye care in the experimental and control group

Contents of Eye Care Program	Control Group		Interpretation	Experimental Group		Interpretation	p-value
	\bar{x}	SD		\bar{x}	SD		
1. Accident prevention in school children	6.00	.87	Moderate	8.45	.65	High	-9.01*
2. Eye screening	4.34	1.23	Low	8.34	.89	High	-13.23*
3. Environmental arrangement to reduce eye accident risk	5.80	.99	Low	8.56	.35	High	-11.35*
4. Ways in caring for children having an eye accident	4.58	.69	Low	8.04	.59	High	-12.38*
Total	5.24	.97	Low	8.43	.78	High	-11.56*

P<.05*

When evaluating the teachers' satisfaction with the Eye Care Program in terms of the eye care ability of the teachers in primary schools in Songkhla

Province, it was found that 96 of the teachers satisfied with the Eye Care Program(**Table 2**)

Table 2 Percentages showing the teachers in the experimental group

Experimental Group	teachers	
	n	%
satisfied	46	92
unsatisfied	4	4

Discussion

The results of vision measurement on the primary school students by their teachers who have been trained in eye screening for abnormal vision using a Snell's chart revealed that in the experimental group, 94 percent of the experimental group had normal vision while ⁶ percent had abnormal vision that needed to be corrected with glasses, and should see an ophthalmologist. The result of this study was similar to a study conducted by Udomsiri et. Al. ¹³ on eye health of 3,191 primary school students in Khonkaen, Saraburi, Yala, Ratchburi, Roi-et and Phayao where 6.5 percent of them had abnormal vision. However, this study was a little different from a study by Castanes ¹⁴ on abnormal vision of pre-schoolers and found that 5–10 percents of them had a vision problem. Nevertheless, the result of this study was very different from that of a study by Pik-Pin Goh, Yahya Abquariyah, Gopal P. Pokharel and Leon B. Ellwein ⁹ on normal and abnormal vision in 4,634 school children aged 7–15 years old in Malaysia which found that 17.1 percent of them had abnormal vision and deteriorating vision on both eyes.

It can be seen that many countries have given importance to eye screening in school children so that children's vision can be diagnosed and corrected at the early stage, i.e. before they are 8 years old. This can help prevent permanent eye impairment from amblyopia if their eyes are examined and treated properly ^{15–16}. Therefore, it is necessary for children to have their eyes examined and corrected when they are still young because impaired vision is an obstacle to their learning and development physically, mentally, socially and emotionally which can promote their learning development and their growing into good quality and potential persons for themselves, families, communities, and the country ¹⁷. Eye

screening for all primary school students using the Snellen chart can be carried out with cooperation from families, schools, the social medicine work group and the out-patient department of hospitals.

When comparing the mean scores of the teachers' eye care between the experimental and control groups, it was found that the mean scores of the experimental group were higher than those of the control group. When tested statistically, it was found that the scores of the teachers' eye care between the experimental and the control groups were significantly different at 0.05. It can be said that the CAI Eye Care Program consists of stimulating components and conditions according to Thorndike's S-R Bond theory which links stimulus with response. This relates to the psychological principle ¹¹ which is a law of effect that links stimulus with responses. These two things can be linked if stimulus can be created into knowledge and understanding in the contents that teachers and students learn and provide them with satisfaction. The CAI Eye Care Program could present many forms of stimulus such as a picture of eye screening, eye examination equipment, and text about eye care presented sentence by sentence coming from different directions on the same screen. They can also be animations and flash text. These are the abilities in addition to the lessons in the text program. When there are stimuli for learners, learners can learn and understand the lessons better than when there are no stimuli. In the CAI lessons, the presentation begins with the contents about eye care by eye screening and detailed eye examination. It can be seen that this CAI program is a teaching medium with the principle of Law and Effect and Law of Exercise. When learners learn, a link between the stimulus and response takes place and the learners will practice continuously. After learners have learned the detailed lessons, it is

necessary for them to practice repeatedly so that they can put what they have learned into practice skillfully and quickly. Another feature of the CAI program is that it can be used as a medium for the contents that need to be practice repeatedly for many times since we can create a program that provide learners with practice in a skill which is a special purpose. This program consists of review lessons, learning objectives and evaluation criteria that can give feedback to learners as soon as the learner finishes the lesson. Thus computers are suitable for use to practice skills. Moreover, learners can learn by themselves so that they are ready in terms of learning experience. Thus, the principle of Law of Readiness can make learners show certain behavior. When they have a chance to act, they are satisfied. But if they have no chance to act, knowledge in eye care would not take place. If they are not physically ready but are forced to do something, there would be no learning taking place. The CAI Eye Care Program can change the learning of eye care continuously because there are stimuli as said in the Law of Effect.¹¹ In the case that learners are not ready in terms of basic knowledge, teachers can create supplementary programs for specific topics or for individual learners. It can be seen that the teachers and students are satisfied with the CAI lessons. The teachers can also use the program to teach students so that they are ready. This research chose to use a direct line program because it has advantages for learners who learn by themselves. At present, CAI programs are the best teaching tool that provides feedback to learners faster than other media. Moreover, they present learners with suitable learning frames as they have been programmed. The feedback can be in the form of text, picture, and animation as well as in colors and sound. Immediate feedback can make the lessons more attractive¹¹. CAI programs do not force learners to learn. The research team reinforced and

empowered the learners so that they maintain their learning behavior continuously by coaching continuously according to the role of nurses and the program can provide teachers with knowledge and practice in eye care as well⁸

Suggestion

Because Thailand lacks eye care personnel or ophthalmologists, teachers have potential in helping with eye care for children by conducting eye screening for them to measure their vision ability whether or not their vision is normal before it is too late. This is one way to increase access to services for school children. Thus, health organizations and schools can join hands in planning to increase the number of human resources to carry out eye care for school children and pre-school children at least twice a year. Research should be conducted to find suitable eye care methods for children of all ages in school and parents should be invited to participate in the learning in order to obtain highest benefits.

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References

1. World Health Organization. **Global initiative for the elimination of avoidable blindness: Vision 2020 The right to Sight, launched in the Western Pacific.** Geneva: WHO;1999.
2. World health organization. **Vision 2020 The right To Sight, The global initiative for the elimination of avoidable blindness.** Geneva: WHO; 2004

3. Williams WR, Latif AH, Hannington L, Watkins DR. Hyperopia and educational attainment in a primary school cohort. *Arch Dis Child* 2005; 90(2):150-3.
4. Bogdanici C, Lupascu C, Ciobanu C, Preutesi A, Postolache C. Visual screening to discover ophthalmologic disorders in children *Ophthalmology* 2003; 58(3):45-51.
5. Lee P, Jackson C.A, Relles DA . Estimating Eye Care Provider Supply and Workforce Requirements. *Ophthalmology* 1995. 102 (12), 1964-72.
6. Baasanhuu,J. Tireless advocate forblindness prevention .Public *Ophthalmology*. 2004:14 (1): 47-8.
7. Ithiporn K.Fact sheet.Phycisian manpower. The Royal College of Ophthalmologist of Thailand.Bangkok: Thailand; 2009.
8. Gott M,O'Brien M.The role of the nurse in health promotion. *Health Prom Int*.1990 ; 5 (2): 137-43.
9. Pik-Pin Goh, Yahya A, Gopal P. Pokharel L B. Ellwein. Refraction Error and Visual Impairment in School-Age Children in Gombak District, Malaysia. *Ophthalmology* 2005 ; 4: 678-85.
10. Banerjee S, Morgan RJ, Rees SA, Latif AH. Height screening at school: ineffective without high standards and adequate resources. *Arch Dis Child* 2003:88(6): 477-81
11. Gagne R, Robert M .**The conditions of learning and theory of instruction.** 4th edition. New York: Holt, Rinehart, and Winston;1985.
12. Polit, D.F., & Hungler, B.P. **Nursing research principles and methods.** Philadelphia : Lippincott;1999.
13. Udomsiri Panrat, Phongphak Chusri, Seri Busayadiloktulong, Thaworn Rangsichamrat, Phatthanaphong Kulayanon, Kwanchai Wongkittirak, Arun Chaiwatthanodom, Watthani Yenchit. Study on Primary School Students' Eye Health. *Thai Journal of Public Health Ophthalmology*.2003; 2: 71-96.
14. Castanes MS..The underutilization of vision screening for amblyopia, optical anomalies and strabismus) among preschool age children. *Binocul Vis Strabismus Q*. Winter 2003:18(4) : 217-32.
15. Sakchai W. Using Tropicamide in Measuring Abnormal Vision in Children. *Thammasat Thai Journal of Ophthalmology* 2006; 1: 11-8.
16. Sakchai W and Natthapol W. Practical Points in Pediatrics Refraction. *Thammasat Thai Journal of Ophthalmology* 2006; 1: 29-34.
17. Office of Health Service System Development, Department of Health Service Promotion, Ministry of Health. **Manual for Eye Screening for Students**, Nonthaburi; 2004