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The Effect of the Innovative Healthcare Program "My Color Health" on Knowledge, Behavior, and Perception of Disease Severity in Patients with Diabetes and Hypertension

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ABSTRACT

A motivational program as a form of mutual aid could offer great benefits to promote healthy eating among patients with diabetes and hypertension. The purpose of this study is to examine the average, knowledge, practice recommendations, and patients' perceptions of the severity of their diseases before and after receiving the My Color Health Innovation. This quasi-experimental research used a one-group pretest-posttest design that aimed to examine the effects of the innovation "My Color Health" on knowledge, behavior, and the perception of disease severity in patients with diabetes and hypertension. This study used the concept of the 7-Color Ball. The sample consisted of 20 elderly people and was selected through purposive sampling. The research instruments consisted of the innovation "My Color Health" knowledge test behavior, and perception of the severity of diabetes and hypertension questionnaires. The questionnaire in Google Forms was used to collect data. The data were analyzed using descriptive statistics and paired t-tests. The results revealed that after using "My Color Health", the differences in the mean scores of knowledges, behavior, and perception of disease severity for diabetes and hypertension were statistically significant ($P<0.05$). This research shows that the innovation of "My Color Health" can increase knowledge, behavior, and perception of the severity of diabetes and hypertension. It can be used as a guideline for the care of patients with uncontrolled diabetes and hypertension.

Keyword: My color health; 7-Color Ball; Diabetes; Hypertension; Health Innovation

INTRODUCTION

The issue of non-communicable diseases (NCDs) is a significant and growing health trend worldwide. In 2020, about 70% of global mortality was attributed to NCDs and growing health trend worldwide. NCDs also caused 16 million premature deaths, of which four-fifths occurred in low-and middle-income countries, including Thailand (World Health Organization, 2022). Age-adjusted prevalence of diabetes increased from 7.7% in 2004 to 7.8% in 2009 and 9.9% in 2014 (8.9% among men and 10.8% among women). Proportions of undiagnosed diabetes were slightly decreased but remained high in 2014 (51.2% for men and 41.3% for women) (Aekplakorn *et al.,* 2018).

The simultaneous effects of hypertension and diabetes mostly occur in patients with complications of the disease, which can be divided into 2 groups: acute complications, including coma from hyperglycemia and hypoglycemia; and chronic complications, such as complications of the eyes, kidneys, nervous system, and feet from diabetes. Most patients who develop complications do so due to their inability to control their behavior. In addition, the factors related to the behavior of these patients with an uncontrollable disease are caused by a lack of awareness of their own abilities. Lack of awareness of the complications of the disease and lack of awareness about behavior modification (Homchui, Wanaratvijid & Pratoomsoot, 2020).

Literature found that the guidelines for promoting eating behavior control in diabetic patients in the past were mostly educational and practical programs by encouraging patients to have self-management by control themselves in their diet

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and promote self-efficacy or build social support in controlling food intake. Moreover, some studies were creating a model for knowledge on food control, visual media, or mixed media (Reynolds, 2020).

Health Belief Model is one of the most approaches adapted for the health care service particularly for people living with diabetes and blood pressure and this model focuses on behavior modification. The model informs the theory that people who experience fear about the disease will be aware of the threat. Therefore, they will follow the advice to prevent disease and deal with the problem carefully. The benefits they will receive if the patient has knowledge of food and the severity of the complications will lead to proper eating and self-care behaviors (Soynahk, Kompayak & Punthasee, 2018). In addition, a recent study confirmed that self-care education can be used as an alternative intervention that decreases blood sugar levels and HbA1c values in patients with type 2 diabetes (Bakara, 2022).

In addition to the aforementioned pattern, a 7-color ball was used for screening and grading the severity of the disease. By comparing the 7-color of life to classify patients into 7 groups, consisting of the normal group (white), the risk group (light green), the sick group, level 0 (dark green), level 1 (yellow), level 2 (orange), level 3 (red), and complications (black) (Chamroon, & Phatisena, 2017). With the situation of the corona virus outbreak, teaching or giving advice may be more difficult because they must maintain a distance to prevent the spread of infection. The creation of innovative teaching materials suitable for the situation that can be easily accessed from anywhere at any time is a suitable medium for service recipients.

The use of modern technology as a teaching medium is therefore a convenient and safe teaching format in the present situation and the health implications of the COVID-19 pandemic are far-reaching, especially for NCDs (Hussein, Al-Shenqiti, & Ramadan, 2022). Line applications are another communication channel that is popular today. Therefore, the researchers have produced My Color Health innovation using the application Line Official Account (LINE OA) as a medium to educate about the behavior and severity of the disease for diabetic and hypertensive patients. Diabetic and hypertension patients have knowledge of and perceptions of the severity of diabetes and hypertension until they are able to control blood sugar levels and high blood pressure levels, reducing the complications of diabetes and hypertension. The objectives of this research are to compare the mean knowledge, self-care behavior, and perception of disease severity in diabetic and hypertensive patients before and after using the My Color Health innovation.

Hypothesis

1. After using the My Color Health innovation for teaching diabetic patients and hypertension patients, the mean score of knowledge of eating in diabetic and hypertension patients will be higher than before using the innovation.

2. After using the My Color Health innovation for teaching diabetic and hypertension patients, the mean score of self-care behavior will be higher than before using the innovation.

3. After using the My Color Health innovation for teaching diabetic patients and hypertension patients, the mean score of perception of the severity of diabetes and blood pressure will be higher than before using the innovation.

METHODOLOGY

Research Design

This quasi-experimental research used a one group pretest-posttest design that aimed to study the effect of using the health innovation "My Color Health" in the form of an online application on knowledge, behavior, and the perceived severity of diabetes and hypertension.

Sample

The samples were from elderly people with hypertension and diabetes. Using G*Power version 3.1.9.4 for the calculation of the sample size. This study set the confidence level (α) at 0.05, the power of the test at 0.80, and the effect size at 0.79, which were influence sizes from similar studies. The sample size was 12, and for the completeness of the data collection, the organizers increased the sample size to 20, and selected by purposive sampling technique with inclusion criteria as follows:

1. Age between 35-60 years old, both female and male.

2. Those who have been diagnosed with type 2 diabetes and those who have been diagnosed with high blood pressure.

3. No complications

4. Able to use the Application line

Qualifications excluded from the study (Exclusion criteria) are as follows:

1. There were complications from diabetes and high blood pressure during the study.

2. There was a comorbid disease during the research.

Setting

The study was carried out at the Phothawat Community Health Center in Surat Thani, Thailand. This unit has a NCDs clinic and covers free examination, treatment, and follow-up services for diabetic and hypertension patients.

Data Collection

The research instrument consisted of the innovation Application LINE Official Account "My Color Health". In the My Color Health application, there were a series of assessments used to collect all the data and video media, which contain content about choosing the right food, exercise, emotional control, reducing smoking, and reducing alcohol consumption. It created one for each patient in each color according to the group classified by color ball (Table 1).

When the participants were screened by the researcher, they already knew the color from the screening using the classification criteria from fasting blood glucose (FBS) and blood pressure (BP). Sample were able to choose to study the teaching materials that are specific colors of the service recipients by themselves. The content of the media covered food, exercise, emotions, smoking, and alcohol specific to the group of each color. The researcher encouraged the participants to use the innovations continuously for a total of 4 weeks with the with follow-up via telephone by the researcher every week. After 4 weeks, data were collected using a knowledge questionnaire on diabetes and hypertension, a practice questionnaire, and the perception of the severity of diabetes and hypertension via Google Form.

Table 1: Assessment Criteria by the 7-Color Ball

7-color ball	Normal	Risk	Take control pills	Sick group			Complications
Color	○	●	●	●	●	●	●
FBS (mg/dl)	<100	100-125	<125	126-154 or HbA1c > 7	155-162 or HbA1c 7-7.9	≥163 or HbA1c > 8	Complications: STEMI Stroke Septic shock
BP (mmHg)	<120/80	120139/ 80-89	<139/89	140-159/ 90-99	160-179/ 100-109	<180/110	

Validity of the Questionnaires

Content validity was approved by three expert from faculty member in nursing department and professional nurse with skills and knowledge in caring for patients with diabetes and hypertension for evaluation content integrity by allowing each expert to express their opinions. Using a 4-point scale, ranging from strongly disagree (1), disagree (2), agree (3), and strongly agree (4), the researchers then calculated the content validity index: CVI) by using to find the content validity index of the whole set of tools, which must not be lower than 0.80 (Polit & Beck, 2012). The Objective Consistency Index (IOC) was 0.93.

The researchers used all questionnaires to "try out" with a group that resembled a sample of 20 people and then calculated the reliability by Cronbach's alpha coefficient, which reported the reliability of a set of knowledge questionnaires on diabetes and hypertension, a practice questionnaire, and the perception of the severity of diabetes and hypertension as 0.7, 1.00, and 0.8 respectively.

Ethical Consideration

Ethical approval with the number 2022/30 was granted from Boromarajonani College of Nursing, Suratthani, Faculty of Nursing, Praboromarajchanok Institute, Thailand, on August 22, 2022. The researchers ensured that all voluntary participants were obtained using written informed consent.

Data analysis

The Statistic Package for the Social Science (SPSS) program was used to analyze the data. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used. To compare the mean score of knowledge on food, self-care behaviors, and the severity of diabetes and hypertension by using a paired *t*-test statistic with $P \leq 0.05$ as the level of significance.

RESULTS

The sample group consisted of 20 people diabetic and hypertensive patients, 65% female, average age range 53.70 years. One was a primary school, accounting for 50% of the total. Based on the results of screening according to the 7-color ball pattern, it was found that 70% of the sample was in the yellow ball, 20% in the red ball, and 10% in the green ball. Most are classified as sick. The knowledge of eating in diabetic and hypertensive patients was at a high level, accounting for 55 percent. There were guidelines for correct behavior, mostly at a moderate level, representing 65%, and the perception of the severity of the disease was at a high level, accounting for 85 percent. The results revealed that after using the Application LINE Official Account "My Color Health" the mean scores of knowledges, behavior, and perceived severity of diabetes and hypertension had a statistically significant $P< 0.05$ (Table 2).

Table 2: The Mean Scores of Knowledges, Behavior, and Perception of Disease Severity of Diabetes and Hypertension Before and after using "My Color Health"

Topic	Test	Mean	SD	*t*	*P*
Knowledges	Before	13.65	2.62	-1.035	0.25
	After	14.05	3.17		
Behavior	Before	37.25	4.58	-0.620	0.39
	After	37.60	5.44		
Perception of Severity	Before	7.55	1.09	-0.280	0.38
	After	7.65	1.66		

** Level of significant is considered at P≤0.05*

DISCUSSION

The development of innovative nursing teaching media, "My Color Health," can enhance the knowledge and eating habits of diabetic patients. The introduction of modern technology as a channel to reach patients is gaining popularity. The development of learning materials on the self-care of diabetic patients in the form of the LINE application has been applied to communicate health information in various fields. The Line application can be used with mobile phones, then it can be touched by senses such as seeing and hearing sounds from moving images such as videos, which stimulates interest. Therefore, people can learn on their own without the limitation, which is consistent with the research of Phatai, Chanpuem, and Wattanasura (2018), who conducted research on learning media with virtual reality technology about English vocabulary, cute animals. The results showed that the media was easy to read, fast, and meaningful, making it easy for users to understand images created from 3D models. Users can see realistic images. Thus, allowing users to understand the study material has increased.

The results of comparing the scores related to knowledge of diet, in diabetic patients and hypertension patients were reported that after using "My Color Health" innovation was significantly higher than before using ($p < 0.005$), indicating that the use of "My Color Health" innovation to educate patients, helps to encourage patients to have knowledge and understanding the way of eating. The innovation of "My Color Health" as a media helps promote understanding of the content easily and quickly, stimulating the user's interest well, and helping to remember content, information, or stories as images. There are also animations that help promote a better understanding of complex content. In the form of video,

images can transform content from abstract to concrete.

The comparison of the perception of severity in diabetic patients and hypertension patients before and after using the innovation "My Color Health" found that there was a mean score of the perception of severity after using the innovation "My Color Health" was significantly higher than before ($p < 0.005$), which was consistent with the concept of Orem that in order to make a person change their behavior knowledge, perception, health behavior, take care of yourself a person must gain knowledge related information recognize the severity of the disease treatment and prevention and awareness of the benefits of correct behavior with the disease Once this awareness is realized, it will result in a change in behavior that is more correct (Hartweg, & Metcalfe, 2022). Therefore, it can be seen that Eating self-care behavior The sample group had a higher mean score. After using the innovation "My Color Health" compared to before, this study is consistent with the concepts of Chusak, Sasang and Chaleoykitti (2018) regarding health education. By organizing opportunities and learning experiences about systematic health, you enable a person to think and make decisions to behave in the right way in order to achieve sustainable good health.

Using multiple teaching materials together, such as video media, can make sense both picture and sound that promote the participants' learning in order to cause changes in behavior, beliefs, attitudes, and appropriate behaviors in the future. Moreover, mobile technology is the best way to support healthcare provider-to-healthcare provider communication and management of care (Gonçalves-Bradley, *et al.*, 2020).

CONCLUSION

After using the health innovation teaching materials of My Color Health, the data shows that this innovation can increase knowledge, behavior, and perception of the severity of diabetes and hypertension patients. It can be used as a guideline for the care of patients with uncontrolled hypertension and diabetes, encouraging patients to recognize the severity of their illness. It will also help encourage patients to take better care of themselves by controlling their blood sugar and blood pressure levels to achieve the ultimate goal of care. It could be clearly seen that the way of promoting the knowledge and behaviors can be change to many patterns of teaching such as LINE application in this study or integrating to other application channels in which patients can be easy to approach with a quick time consumer.

Conflict of Interest

The authors declare that they have no conflict of interest.

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