Outcome of Self-Efficacy Enhancement Program on Knowledge and Confidence of Foot Ulcers Prevention Behavior in the Diabetic Elderly of the Puranawat Temple Elderly Club, Bangkok

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Abstract

Objectives: To study and compare knowledge of foot ulcer prevention before and after program implementation and to compare foot ulcers prevention behavior before program implementation and confidence of foot ulcers prevention behavior after program implementation in the diabetic elderly of the Puranawat Temple Elderly Club, Bangkok.

Method: The research was quasi experimental research with one group pre-post-test design. The purposively selected samples were thirty Diabetic elderly of the Puranawat Temple Elderly Club, Bangkok. The research tool was the modified program of the Self-Efficacy Theory of Bandura. Data were collected from questionnaire for the period of 3 days. Data were analyzed by percentage, mean, standard deviation and paired t-test.

Results: Before and after program implementation, the diabetic elderly had good and very good level of knowledge about foot ulcers prevention respectively. After program implementation, the knowledge about foot ulcer prevention of the samples were statistical significantly higher than before the program ($p < 0.01$).

Results of the compare the foot ulcers prevention behavior before program implementation. The samples had average level of behavior before program implementation. After program implementation, they had high level of confidence which was higher than the level of behavior before program implementation with statistical significance ($p \leq 0.01$) in overall and in each aspect. The aspect with the highest confidence was foot examination and the aspect with the least confidence was foot cleaning.

Conclusion: The Self-Efficacy Enhancement Program on knowledge and confidence of foot ulcers prevention behavior in the diabetic elderly of the Puranawat Temple Elderly Club showed significant improvement of knowledge and confidence in the diabetic elderly. The program was designed for health teams, village health volunteers and other interested groups to enhance foot care self-efficacy and help the diabetic elderly in communities to prevent foot ulcers and leg amputation.

Keywords: Foot ulcers prevention, Diabetic elderly, Self-Efficacy Enhancement Program

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ผลของโปรแกรมการส่งเสริมสมรรถนะตนเองต่อความรู้และความมั่นใจในพฤติกรรมการป้องกันการเกิดแผลที่เท้า ผู้สูงอายุเบาหวานในชมรมผู้สูงอายุวัดปุรณาวาส กรุงเทพมหานคร

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาและเปรียบเทียบความรู้เกี่ยวกับการป้องกันการเกิดแผลที่เท้า ก่อนและหลังเข้าร่วมโปรแกรม ฯ และเปรียบเทียบพฤติกรรมการป้องกันการเกิดแผลที่เท้า ก่อนเข้าร่วมโปรแกรม ฯ กับความมั่นใจในพฤติกรรมการป้องกันการเกิดแผลที่เท้าหลังเข้าร่วมโปรแกรม ฯ ผู้สูงอายุเบาหวานในชมรมผู้สูงอายุวัดปุรณาวาส กรุงเทพมหานคร

วิธีการศึกษา: รูปแบบวิจัย: กึ่งทดลอง กลุ่มเดียว วัดผลก่อนและหลังการทดลอง กลุ่มตัวอย่าง คือ ผู้สูงอายุเบาหวานในชมรมผู้สูงอายุวัดปุรณาวาส กรุงเทพมหานคร ซึ่งสุ่มเลือกแบบเจาะจง จำนวน 30 คน เครื่องมือวิจัยคือโปรแกรมการประยุกต์ใช้ทฤษฎีการรับรู้สมรรถนะตนเองของแบนดูรา เก็บรวบรวมข้อมูลด้วยแบบสอบถาม ดำเนินการวิจัยจำนวน 3 วัน วิเคราะห์ข้อมูลด้วยค่าร้อยละ ค่าเฉลี่ย ค่าเบี่ยงเบนมาตรฐาน และ paired t-test

ผลการวิจัย: ผู้สูงอายุเบาหวาน มีความรู้เกี่ยวกับการป้องกันการเกิดแผลที่เท้าในระดับดี หลังเข้าร่วมโปรแกรม มีความรู้การป้องกันการเกิดแผลที่เท้าในระดับดีมาก และดีกว่าก่อนเข้าร่วมโปรแกรมอย่างมีนัยสำคัญทางสถิติ ($p \leq 0.01$)

ผลการเปรียบเทียบพฤติกรรมการป้องกันการเกิดแผลที่เท้าก่อนเข้าร่วมโปรแกรมกับความมั่นใจในพฤติกรรมการป้องกันการเกิดแผลที่เท้าหลังเข้าร่วมโปรแกรม ผลการวิจัยพบว่ากลุ่มตัวอย่างก่อนเข้าร่วม โปรแกรมมีพฤติกรรมการป้องกันการเกิดแผลที่เท้าในระดับปานกลาง หลังเข้าร่วมโปรแกรมมีความมั่นใจในพฤติกรรมการป้องกันการเกิดแผลที่เท้าในระดับมากและมากกว่าก่อนเข้าร่วมโปรแกรมอย่างมีนัยสำคัญทางสถิติ ($p < 0.01$) ทั้งในภาพรวมและรายด้าน และด้านที่มีความมั่นใจสูงสุด คือ ด้านการสำรวจเท้า ด้านที่มีความมั่นใจต่ำสุด คือ ด้านการดูแลรักษาความสะอาดเท้า

สรุป: โปรแกรมการส่งเสริมสมรรถนะตนเองต่อความรู้และความมั่นใจในการป้องกันการเกิดแผลที่เท้า ผู้สูงอายุเบาหวานในชมรมผู้สูงอายุวัดปุรณาวาส พบว่าผู้สูงอายุเบาหวานมีความรู้และความมั่นใจมากขึ้น และโปรแกรมฯ ออกแบบสำหรับทีมสุขภาพ อาสาสมัครสาธารณสุขประจำหมู่บ้าน และผู้สนใจอื่นๆ ที่จะนำไปใช้แนะนำผู้สูงอายุเบาหวานแหล่งอื่นๆ ในการส่งเสริมสมรรถนะตนเองในการดูแลเท้าและป้องกันการเกิดแผลที่เท้าและการถูกตัดขา

คำสำคัญ: การป้องกันการเกิดแผลที่เท้า, ผู้สูงอายุเบาหวาน, โปรแกรมการส่งเสริมสมรรถนะตนเอง

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Introduction

At present, the non-communicable diseases (NCDs) among Thai people are increasing with continuous upward trend. The four common NCDs are diabetes mellitus, coronary heart disease, cerebrovascular disease and chronic obstructive pulmonary disease[1]. Diabetes, one of the most common NCDs, has complications which decrease patients' quality of life. The complications include several organs such as peripheral neuropathy, diabetic retinopathy, cardiovascular disease, chronic kidney disease, diabetic foot, etc.[2] Data from International Diabetes Federation (IDF) in 2017 showed that there were 425 million people globally who had diabetes. There were 98 million diabetic people in the 65 years and over group and 327 million diabetic people in the 20-64 years group. It is estimated that by 2045 there will be 629 million people with diabetes worldwide with the majority of them are the elderly aged 65 and over. The continuous upward trend in Thailand during 2016 to 2018 showed that there were 840,489, 876,970 and 941,226 diabetic patients respectively[3]. It was also found that only 30 % of the diabetic elderly were able to control their blood sugar to an appropriate level. This caused a huge loss in the cost of healthcare in Thailand on which the country had to spend; for example, 47,596 million baht was spent annually for diabetes alone[1].

Poor blood sugar control in the diabetic elderly could result in complications, especially diabetic foot. This consequently leads to loss of limbs since prolonged hyperglycemia affects large and small arteries. There are damages of peripheral nervous system and peripheral arteries of legs and feet which cause abnormal sensation of extremities. Wound healing is delayed due to decreased blood supply. And if the wound is severely infected, the patient may need to have a foot or leg amputated. The data from IDF revealed that the diabetic elderly had 25 times risk of limb amputation and 70 % of the amputation was caused by diabetes[4]. Therefore, diabetic foot complication is a serious health condition and the health teams should work together to help the elderly with diabetes to be able to take proper care of their feet. There was evidence that 85 % of leg loss from diabetes could be preventable if the patients' feet were examined and properly taken care of at the initial stage. Therefore, proper foot care behavior could reduce and delay complications and risks of leg and foot amputations[4-5], particularly in the disadvantaged elderly group. In Bangkok, there were many elderly who live near the temples. The elderly in the Puranawat Temple Elderly Club live near the Puranawat Temple which is the undeveloped area in the north perimeter of Bangkok. They have less opportunity[6-9] for income[7-8], education[6-7], and health service accessibility[7-9]. The health care teams could help promote foot care behavior to prevent complication of amputation. At present, there are 150 elderly in the Puranawat Temple Elderly Club which 51 of them have diabetes. Most of them have mild symptoms but are vulnerable to have diabetic foot. Proper foot care should be enhanced early because if diabetes lasts for more than 5 years without proper treatment and foot care, it can lead to diabetic foot and serious complications. A 5-year retrospective review of literatures related to the prevention of foot ulcers in the diabetic elderly (2013-2017) found that the Self-Efficacy Theory of Bandura[10] was applied to the diabetic elderly to enhance self-efficacy in foot care and resulted in better foot care behavior of foot ulcer prevention after program implementation. The examples included the research of Janpech P, Puncha-Glingasorn P, Srinoi W[11], Iamsomboon T, Kengganpanich T, Kengganpanich K, Benjakul S[12] and Phanphuech P[13]. This indicated that the application of the Self-Efficacy Theory of Bandura[10] was effective for use in experiments. The researchers are interested in the outcome of Self-Efficacy Enhancement program on knowledge and confidence of foot ulcers prevention behavior in the diabetic elderly of the Puranawat Temple Elderly Club, Bangkok.

Objectives

1. To study and compare knowledge of foot ulcer prevention before and after program implementation in the diabetic elderly.

2. To compare foot ulcers prevention behavior before program implementation with the confidence of foot ulcers prevention behavior after program implementation in the diabetic elderly.

Methods

Research design: quasi-experimental, one-group, pre- and post-test.

Study population: 51 from 150 elderly of the Puranawat Temple Elderly Club, Bangkok who had history of diabetes mellitus in 2020.

Study samples: The selection criteria were the followings: age 60 years and older, regardless of gender, diagnosed by a doctor as having type 1 and/or type 2 diabetes, good consciousness, not dependent, could provide information on their own, voluntarily and willing to participate in research project. The sample size was calculated by G* power 3.01 Program, the level of statistic power of test = .80, effect size = 0.5 and significant confidence =< 0.5. The calculated samples of 27 were added with 10% of the samples to compensate for sample loss to be 30 total samples[14]. The sampling method was purposive sampling.

Research tools:

1. Experiment tool: The Self-Efficacy Enhancement Program on knowledge and confidence of foot ulcers prevention behavior in the diabetic elderly of the Puranawat Temple Elderly Club, Bangkok was modified by the researchers from the Self-Efficacy Theory[10] and from literature review of related research. It consisted of 4 aspects: 1) Creating successful experiences through lecture of knowledge on prevention of foot ulcers in diabetes 2) Presentation of model with the Diabetes Guide and Foot Care Guide to prevent foot ulcers constructed by the researchers, 3 sets of video media and group demonstration with return-demonstration 3) motivational talk and 4) emotional stimulation.

2. Monitoring tools consisted of:

2.1 Experiment time plan was set for 3 days with 3 hours per day. The experiment site was the Puranawat Temple Elderly Club, Bangkok.

2.2 The models used to create experiences to enhance self-efficacy in knowledge and confidence of foot ulcers prevention behavior after program implementation included media guides and 3 sets of Video.

- The media guides were the Diabetes Guide[15] and Foot Care Guide which were developed by the researchers from review of related research. They were the teaching materials which contained knowledge, picture and details for home study after program implementation.

- The 3 sets of Video consisted of Video media set 1 (Diabetes)[16], Video media set 2 (Caring for the foot of the elderly with diabetes)[17] and Video media set 3 (Caring for the foot of the elderly with diabetes)[18]. The video media demonstrated real pictures of diabetic elderly who had foot problems and might need amputation. The foot care and treatment were the visual from hospital setting.

3. Data collection tool was the questionnaire constructed by the researchers and consisted of 4 parts. Part 1 was general data of the samples with multiple choice answers and filling in the blanks. Part 2 contained questions of knowledge related to causes, signs and risks of foot ulcers and limb amputation from diabetes. There were 16 questions which each question had answer choices to choose from, right (1 point) or wrong (0 point). Part 3 was the questionnaire for foot ulcers prevention behavior constructed by the researchers. It consisted of 3 rating scales as: 3 for routine practice, 2 for some practice and 1 for least practice. There were 24 questions of 4 aspects. 1) 6 questions for foot cleaning, 2) 5 questions for foot examination, 3) 8 questions for foot care to prevent foot ulcers and 4) 5 questions for blood circulation stimulation of foot. Part 4 was the questionnaire for confidence

of foot ulcers prevention behavior. It consisted of 3 rating scales as: 3 for routine practice, 2 for some practice and 1 for least practice. There were 24 questions of 4 aspects. 1) 6 questions for foot cleaning, 2) 5 questions for foot examination, 3) 8 questions for foot care to prevent foot ulcers and 4) 5 questions for blood circulation stimulation of foot.

Quality of research tools

1. Content validity. The questionnaires for knowledge of foot ulcers prevention, foot ulcers prevention behavior and confidence of foot ulcers prevention behavior were assessed for content validity by an expert in Adult Nursing and two nurse practitioners who worked for diabetic foot care. The researchers corrected the questionnaires as the experts' suggestion and determined the Content Validity Index (CVI) from the questions with Indicators of Compromise (IOC) >= 0.66.

2. Reliability The researchers conducted the tryout of the corrected questionnaires in 20 Diabetic elderly in the community of Wat Thaiyawas, Nakornchaisri District, Nakornprathom which was adjacent to Wat Puranawat. The questionnaire for knowledge of foot ulcers prevention was tested by Kuder-Richardson Formula 20 (KR-20) and showed reliability of 0.92. The questionnaire for foot ulcers prevention behavior and the confidence to prevent foot ulcers behavior were tested with Cronbach's alpha coefficient and showed reliability of 0.89 and 0.90 respectively.

Interpretation of the scores

1. Score levels of knowledge on foot ulcers prevention were determined for 3 levels as: very good was a score of 14.00-16.00 (80-100 %), good was a score of 12.00-13.99 (70.00-79.99%), average was a score of 10.00-11.99 (60.00-69.99%), low was a score of 8.00-9.99 (50.00-59.99%) and very low was a score lower than 8.00 (50% and below).

2. Score levels of foot ulcers prevention behavior and confidence of foot ulcers prevention behavior were determined for 3 levels as: Good was a score of 2.51-3.00, average was a score of 1.51-2.50 and low was a score of 1.00-1.50.

Program implementation and data collection

There were 3 activities, taking a total time of 9 hours, with details as the followings:

Activity 1 Day 1 (3 hours): Creating successful experiences by lecture of knowledge of foot ulcer prevention in diabetes with the media of the Diabetes Guide and Foot Care Guide to prevent foot ulcers.

Activity 2 Day 2 (3 hours): 1. Presentation of models from the videos of foot care in diabetes. The samples watched 3 sets of video presentation: Video media set 1 (Diabetes)[16], Video media set 2 (Caring for the foot of the elderly with diabetes)[17] and Video media set 3 (Caring for the foot of the elderly with diabetes)[18]. 2. After each video presentation, the researchers repeatedly described and highlighted the causes of foot ulcers and amputation.

Activity 3 Day 3 (3 hours): 1. Presentation of models in groups of 10 samples through demonstration and return-demonstration regarding foot cleaning, foot examination, foot care to prevent foot ulcer and blood circulation stimulation of foot.

2. Reviewing knowledge of diabetes and foot care to prevent diabetic foot ulcers by randomly asking each sample the questions that most of them answered incorrectly and repeating explanations.

3. Reflection by having the samples share their opinions from the questions that they answered incorrectly. The researchers explained answers and reviewed the topics again. During the process, the emotional support was used to increase confidence in foot care practice.

4. Lecture and reviewing knowledge of diabetes and foot care practice skills with summary of important points. The Diabetes Guide and Foot Care Guide to prevent foot ulcers were used as reference materials with focus on topics that the samples answered the questions incorrectly.

5. During the lecture, the researchers used motivational talk words and emotional stimulation

to raise the samples' awareness of the importance and necessity of diabetes knowledge and confidence that they could change their behavior in taking care of their feet when they had diabetes.

Statistics for data analysis

1. General information was analyzed by percentage.

2. Data and comparison of knowledge of the samples regarding foot ulcer prevention, before and after program intervention, were analyzed by mean, standard deviation (SD) and paired t-test.

3. Compare of foot ulcers prevention behavior before program implementation with the confidence of foot ulcers prevention behavior after program implementation were analyzed by mean, standard deviation (SD) and paired t-test.

Protecting the samples' rights

This research was approved with a certificate of ethics, code COA.1-051/2021 by Suan Sunandha Rajabhat University and the researchers conducted the research with protection of confidentiality and impact of the participants throughout the research process.

Results

General information of the 30 diabetic elderly showed that there were 14 samples (46.62%) who were 66-70 years old. There were 23 female samples (76.59%), 16 samples (53.30%) were married/ living with spouse, 18 samples (60.00%) finished primary school education, 11 samples (36.63%) had income of 1,000-3,000 Baht/month and 20 samples (66.70%) had 5-9 years duration of diabetes. During the past 2 years, there were 27 samples (89.90%) who never had foot ulcers and 19 samples (63.27%) who never received diabetes knowledge from the health teams before.

Before and after program implementation, the diabetic elderly had good and very good level of knowledge about foot ulcers prevention respectively. After program implementation, the knowledge about foot ulcer prevention of the samples were statistical significantly higher than before the program ($p < 0.01$) as Table 1.

Results of behavior and confidence: The samples had average level of foot ulcers prevention behavior before program implementation. After program implementation, they had high level of confidence of foot ulcers prevention behavior which was higher than the behavior before program implementation with statistical significance ($p \leq 0.01$) as Table 2.

After program implementation, the samples had higher level of confidence of foot ulcers prevention behavior before program implementation with statistical significance ($p \leq 0.01$) in all items of foot ulcer prevention behavior. The highest level of confidence was found in foot examination. The lowest level of confidence was found in foot cleaning as Table 3.

Table 1:

Levels of knowledge and comparison of knowledge in foot ulcer prevention of the diabetic elderly before and after program implementation (n=30)

Items	Total score	$\bar{X}$	SD	Level	paired t-test
Knowledge in foot ulcer prevention					
After program implementation	16	13.66	1.66	Very good	5.01**
Before program implementation	16	11.20	2.34	Good	

**Difference with statistical significance ($p \leq 0.01$)

Table 2:

Comparison of foot ulcers prevention behavior before program implementation and the confidence after program implementation of the diabetic elderly (n=30)

Items	Total score	$\bar{X}$	SD	Level	paired t-test
Confidence after program implementation	3	2.69	0.27	High	6.70**
Behavior before program implementation	3	2.04	0.41	Average	

**Difference with statistical significance ($p \leq 0.01$)

Table 3:

Comparison of foot ulcers prevention behavior before program implementation and the confidence after program implementation, classified by aspects of foot ulcers prevention behavior (n=30)

Aspects	Total Score	$\bar{X}$	SD	Level	Paired t-test
1. Foot cleaning					
- Confidence after program implementation	3	2.59	0.45	High	3.64**
- Behavior before program implementation	3	2.18	0.49	Average	
2. Foot examination					
- Confidence after program implementation	3	2.77	0.31	High	4.48**
- Behavior before program implementation	3	2.17	0.56	Average	
3. Foot care to prevent foot ulcers					
- Confidence after program implementation	3	2.69	0.31	High	6.38**
- Behavior before program implementation	3	1.96	0.49	Average	
4. Stimulation of blood circulation of foot					
- Confidence after program implementation	3	2.73	0.33	High	6.83**
- Behavior before program implementation	3	1.89	0.57	Average	

**Difference with statistical significance ($p \leq 0.01$)

Discussion

In general, the research results showed that the diabetic elderly had good level of knowledge in foot ulcer prevention behavior before program implementation. After program implementation, the knowledge was very good and was higher than the knowledge before program implementation with statistical significance ($p \leq 0.01$). This was consistent with the research of Janpech P, Puncha-Glingasorn P, Srinoi W[11] which found that people with diabetes had good level of knowledge in foot care before participating in the experimental program. After the experiment, the mean knowledge was very good and significantly higher than the knowledge before the experiment ($p \leq 0.01$). However, it was not consistent with the research of Chusak T, Sasang N, Chaleoykitti S[19], Sasee T, Benja Muktabhant B, Uttamavatin P[20], Prachanno W, Ratree Aramsin R, Gadudom P[21] and Srimaksook K[22] which found that the diabetic patients had average knowledge of foot care. It could be implied that

most diabetic elderly had average knowledge in foot ulcer prevention. According to the statistics from the International Diabetes Federation, elderly people with diabetes were 25 times more at risk of amputation than those without diabetes. Foot ulcers were associated with people with uncontrolled diabetes or improper self-care behaviors[4-5].

The comparison of foot ulcers prevention behavior and confidence of foot ulcers prevention behavior showed that after program implementation, the diabetic elderly had more confident to prevent foot ulcers than the behavior before program implementation with statistical significance ($p \leq 0.01$). It was consistent with our hypothesis and with the modified program of the Self-Efficacy Theory of Bandura[10] to promote behavior of foot care for foot ulcer prevention in the diabetic elderly. The Self Efficacy Theory of Bandura explained that the people who were in needs and had high self-confidence to perform with expected results would tend to practice or were confident to practice. The theory suggested that a successful experience had to be built through lecture and model presentation from the real patients or from the media in order to build practice confidence. This research program included lecture on the knowledge of foot ulcer prevention, 2 media guides, the Diabetes Guide and Foot Care Guide, and 3 sets of video media. The video media were the models of real pictures of the diabetic elderly, who had foot problems with risk of amputation, and the management of diabetes in the hospital. The samples also participated in demonstration and return demonstration to enhance their practical skills. The skills of foot ulcer prevention included foot cleaning, foot examination, foot care to prevent foot ulcers and stimulation of blood circulation of foot. The Diabetes Guide and Foot Care Guide were handed out to the samples to review their knowledge at home. The program resulted in increase of confidence of the diabetic elderly in foot ulcer prevention. The research results were consistent with the research of many people who applied the concept of applying Bandura's self-efficacy theory to prevent foot ulcers among diabetic elderly and diabetic patients in different area. After the experiment had knowledge and behavior to prevent foot ulcers higher than before[11-13]. It shows that the application of Bandura's self-efficacy theory can be applied to prevent foot ulcers in other groups of diabetic elderly.

Conclusion

The Self-Efficacy Enhancement Program on knowledge and confidence of foot ulcers prevention behavior in the diabetic elderly of the Puranawat Temple Elderly Club showed significant improvement of knowledge and confidence in the diabetic elderly. The program was designed for health teams, village health volunteers and other interested groups to enhance foot care self-efficacy and help the diabetic elderly in communities to prevent foot ulcers and leg amputation.

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