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The Effect of the Foot Care Education Program on Knowledge and Self-Efficacy Among Family of Diabetes Mellitus Patients in PKU Muhammadiyah Gamping Yogyakarta Indonesia

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Diabetic Foot Ulcer (DFU) is one of diabetes mellitus (DM) complication that leads to amputation. It can be prevented through appropriate foot care that requires family support and helps. Family's knowledge and efficacy are factors that support the patient's foot care behavior. The purpose of this study was to examine the effect of the foot care education program on knowledge and self-efficacy of the family who cares the diabetes mellitus patient. This was the quasi experimental study with one group pre and post test. The respondents were the family as a care giver of diabetes mellitus patient who was hospitalized in PKU Muhammadiyah Gamping Yogyakarta Hospital. Twenty-six respondents participated in this study were selected through convenience sampling technique. The intervention that consist of education, demonstration, practice, and discussion was given individually to the family in the patient's room within 30–60 minutes depending on the respondent's need. The booklet and foot care package were given freely to the family. The data were collected by using family foot care knowledge questionnaire and family foot care efficacy questionnaire. Paired *t*-test was used to analyze the data. The result of the study showed that the respondents have the average age of 41 years and have been caring the patients for average 3 years. The respondents were the patient's spouse and child (38,5% respectively) and never received foot care education (84,5%). The family's knowledge and efficacy were significantly different after the intervention ($p = 0{,}000$ respectively). Foot care education program effectively improve the knowledge and efficacy of family as the care giver of patients with diabetes mellitus. Nurses should actively involve the family in diabetes foot care. Further research can examine the ability of patients and family in diabetes foot care practice and long term effect of an intervention.

Keywords: Foot Care, Education, Knowledge, Efficacy, Family, Diabetes Mellitus.

1. INTRODUCTION

The common and represent a major cause of morbidity and mortality in patient with diabetes is diabetic foot ulcer (DFU) and amputation as the consequences of diabetic neuropathy and/or peripheral arterial disease.[1] The recent study revealed that the global prevalence of DFU was 6,3%, whereas the prevalence of DFU in Asia was 5,5%.[2] Consequently, DFU becomes one of the global burdens that require a multidisciplinary team and comprehensive management. Schreml and Berneburg emphasize the prevention of DFU as the best management option.[3] Unfortunately, there were obstacles to primary prevention effort in clinical practice such as fail to examine the feet of patients with diabetes and infrequently assess for risk factors.[4] Therefore, the role of the family as the patient's caregiver is critical.

Family members play important role in diabetes management including DFU prevention.[5] Family can actively support and care patient with diabetes. In order to do that, family needs an adequate knowledge and skill, good attitude, good understanding about the strategies to alter family routines, and has positively coping with the emotional problems[6] as well as self-efficacy. Specifically, family members should have good knowledge related to diabetic foot care; so they can support and help the patient to prevent DFU through proper diabetic foot care. Unfortunately, several studies found that the family's knowledge related to diabetes management including foot care is still substandard.[7–10] The family's lack of knowledge become one of the barrier to patient's self-management including diabetic foot care.[7]

Several studies found that self-efficacy influences patient's self-care behavior and diabetes management as well as diabetes foot care.[11–14] In addition, family's self-efficacy also influences patient's diabetes healthy behavior. Where the family members have good self-efficacy in performing suggested health behaviors, the patient improves his/her self-efficacy and healthy behavior.[15]

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Preventions of DFU not only consist of proper diabetic foot care, evaluation for loss of protective sensation, and evaluation for peripheral arterial disease, but also the patient and family education.[1] The intervention that increase the foot care knowledge and foot care practices can prevent and improve DFU.[16] However, such interventions mainly focus on the patient's knowledge and self-efficacy. The objectives of this study was to examine the effect of the foot care education program on knowledge and self-efficacy of the family who cares the diabetes mellitus patient.

2. EXPERIMENTAL DETAILS

This was quasi experimental study involved one experimental group with pre- and post test design. Inclusion criteria of the sample of this study were family as a care giver of diabetic patients who was hospitalized in PKU Muhammadiyah Gamping Yogyakarta Hospital, Indonesia with the minimum age of 18 years, living with the patient and caring the patients for at least 1 year, be able to read and has no hearing problems. Twenty-six respondents were selected for the study by using convenience sampling technique.

Each respondent in this study received foot care education program. The program consisted of one meeting individual education program in the patient's room. Therefore both the patient and family received the education. The duration of education was 30–60 minutes depending on the family and patient's need. The education methods used active discussion and practice. Each family received diabetic foot care video, diabetic foot care booklet and foot care package consisted of lotion, towel, mirror, and nail clipper. Both video and booklet were content validated by diabetic educator certified expert. During the practice session, the family was guided and observed directly by the researcher to perform diabetic foot care to the patient.

The Diabetic Foot Care Knowledge Questionnaire (DFCKQ) which was developed by the researchers was used in this study to measure the family's knowledge related to diabetic foot care. The DFCKQ consisted of 26-item multiple choice questions with one correct answer. The correct answer was scored as 1 and the wrong answer was scored as 0. The possible score was ranged from 0–26, with the higher score indicating better diabetic foot care knowledge.

The Family Foot Care Confidence Scale (FFCCS) was used to measure family's self-efficacy to help the patient perform diabetic foot care. This questionnaire was modified from the Foot Care Confidence Scale (FCCS).[17] The FFCCS consist of 12-item questions with 4-point Likert scale (very not confidence = 0, not confidence = 1, confidence = 2, very confidence = 3). The possible score was ranged from 0 to 36, with the higher score indicating better family confidence to support and help the patient to perform diabetic foot care.

The data in this study were analyzed by using paired *t*-test to examine the effect of the diabetic foot care education program on family's knowledge and self-efficacy before and after the intervention with the significance value of $p < 0{,}05$. The data were tested for the normality before the analysis. The normality test by using Saphiro Wilk test showed that $p > 0{,}05$ which was considered as normal data.

This study was conducted in a way consistent with protecting the human rights of all the participants. This study obtained approval from the Ethic Commission of Faculty of Medicine and Health Sciences Universitas Muhammadiyah Yogyakarta with the number 065/EP-FKIK-UMY/II/2015. The participants received all relevant information before being asked for verbal or written consent in the informed consent. They had right to refuse or withdraw from the study without any penalty. There is no charge for every participant who agreed to participate in this study.

3. RESULTS AND DISCUSSION

3.1. The Demographic Characteristic of the Respondents

The result of this study showed that the average age of the respondents was 41 years with the duration of caring the diabetic patient for more than 2,5 years. Most of the family was the patient's spouse and child (38,5% respectively) with the level of education was graduated from senior high school. More than 80% of the family never received diabetic foot care education even though more than 60% of the family accompanied the patient during check up in the hospital. Detail information related to respondents' demographic characteristic available in Tables I and II.

In this study, we found that the average age of the family was about 41 years. This age was classified as middle adult age. At this age, there are several tasks that must be completed such as accepting and adjusting to physical changes and caring the family member who has health problem.[18] At this age, someone has greater responsibility for his/her family and society, in this study, especially in caring the family member who has diabetes mellitus. He/she can support, facilitate, help, and other activities to support the patient achieve better health behavior.

More than 60% of the respondents were female. It showed that mostly the caregiver was female. This result is supported by the National Alliance for Caregiving and AARP[19] and APA.[20] They estimated that more than 60% of caregivers are female. Socially and culturally, female has the responsibility to care the family members including those who need help and support for their health problems. The female caregivers spend more time to care compare to the male caregiver. This is probably because male hold more traditional gender role.[21]

More than two third of the respondent in this study were patient's spouse and children. Those are the person who has the closest relationship with the patient; therefore they care the patient during hospitalization. Patients usually prefer their spouse or children as their care giver. A large number of spouse and children are serving as caregivers for sick family member.[20] The role of the spouse as caregiver usually related to gender. Female caregivers are likely to assist with more difficult tasks such as toileting and bathing whereas male caregivers are more likely to assist with finances or arrange for other care.[22] Furthermore, children learn the care giving process and procedure through observation.[21] Family caregivers operate as extensions of health care systems performing complex medical and therapeutic tasks and ensuring care recipient adherence to therapeutic regimens.[20] The good family support provided to diabetic patients in this study could be attributed to the culture. In Yogyakarta, Indonesia, family members live together mostly in the extended family, they

Table I. Age and duration of caring of family ($N = 26$).

Characteristics	Mean	SD
Age (min = 19 year, max = 60 year)	40,96	11,72
Duration of caring the patient (min = 1 year, max = 10 year)	2,69	2,89

Table II. Demographic characteristic of family ($N = 26$).

Characteristics	Frequency	Percentage
Gender		
Male	10	38,5
Female	16	61,5
Education level		
No schooling to junior high school	11	42,3
High school	10	38,5
College/university	5	19,2
Occupation		
Retired/homemaker	15	57,7
Governmental and nongovernmental staff	11	42,3
Relationship with the patient		
Spouse	10	38,5
Child	10	38,5
Other	6	23,1
Experience with previous diabetic foot care education		
Yes	4	15,4
No	22	85,6
Accompany the patient during check up		
Yes	16	61,5
No	10	38,5

help and support each other especially when any family member who is sick. In term of diabetic foot care, the caregiver can provide support and help to check and care the feet, cut the nails, select the correct shoes, and wound care if there is any wound.

The result of this study also found that although more than 60% of the family accompanied the patient during the check up, more than 85% of the family never received diabetic foot care education. This probably because the education that was given by health care providers during patient's check up not specific to diabetic foot care. This is might because most of the health care providers focus on the patient's clinical condition such as the gylcemic control rather than the overall health behavior. The previous study showed that mainly the health education focuses on the glycemic control such as education on weight, physical activity, smoking status and depression.[23] Moreover, the family participation on diabetic education still low although the family concerned the health issues faced by their diabetic family member.[24]

Quite similar tp another previous study, out of 110 patients with DM, one-third of them never received diabetic foot care education. Another one-third respondent received education and had access to information for over the previous 10 years and most of the education had been given only one time.[25] This fact shows that both diabetic patients and their family as their caregiver rarely received diabetic foot care education. Therefore, although the effectiveness of diabetes foot care program was already proven,[26] the implementation of diabetic foot care education at the regular basis in ambulatory care is still lack and need more investigation.

3.2. Family's Knowledge

The result of the study found that the mean of the family knowledge score was 16,61 (SD = 0,55, Min = 13, Max = 22) before the intervention and 21,35 (SD = 0,49, Min = 16, Max = 25) after the intervention. There was significant different on family's knowledge score before and after the intervention ($p < 0,05$).

The study showed that the diabetic foot care education program significantly increases the family's knowledge. The strategies used in this study were the individual education in the patient's room. The family and the patient were facilitated to discuss their inquiries related to diabetic foot care with the researcher. They also directly practice diabetic foot care by using the diabetic foot care package given to the family and patients. Interactive patient education process can increase knowledge and practice of the family because they can easily gain information and discuss their misunderstanding compared to one-way education process without discussion and practice.

Table III. Comparison of the family's knowledge scores before and after the diabetic foot care education program ($N = 26$).

Variable	Mean	SD	Mean difference	SD	t	p-value
Knowledge pre-test	16,6	0,55	−4,7	3.19	−7,5	0,00
Knowledge post-test	21,3	0,49				

Literature review study included 12 randomized clinical trials that assessed the impact of patient education interventions ranging from a 10–20 min educational session to multiple sessions concluded that patient education interventions may improve patients' understanding of foot complications and adherence to certain health behaviors.[27] Effective foot care interventions that include foot care knowledge and foot care practices can improve and prevent lower extremity complication associated with diabetes mellitus especially type 2.[16] Routine diabetic foot care is important skills needed by the family to help the patient prevent DFU.

Related to media in education program, the intervention in this study used booklet and video about diabetic foot care. The booklet consisted of written information about the basic knowledge related to diabetes mellitus and its complication and instructors about diabetic foot care. This booklet can be read by the family and the patient anytime they need. The booklet used simple language and pictures which made it easy to understand and be implemented. The education media plays the significant role in increasing knowledge. The research from Glycemic Reduction Approaches in Diabetes (GRADE) Study found that booklet can be effectively improving the knowledge.[28] That study, further, recommends the use of proper education media during education session. Additionally, this study also used video. The video consists of the brief explanation about DM, the reasons why the patient and family should care about foot care, and the procedure of diabetic foot care. The video can be copied in Smartphone, tablet, computer thus can be watched anytime. The use of video facilitated the respondent to directly observe the diabetic foot care procedure that must be performed by the patient, therefore they can help to facilitate, support, remind, and inform the diabetic patients to do diabetic foot care correctly as recommended. Several studies found that the use of video in patient education can increase short term knowledge.[29–31]

3.3. Family's Self Efficacy

Before the intervention, the mean of family's self efficacy score was 22,19 (SD = 0,84, Min = 13, Max = 29) whereas after the intervention the mean score was 28,23 (SD = 0,55, Min = 23, Max = 33). There was significant different of family's self efficacy before and after the diabetic foot care education program ($p < 0,05$).

It can be concluded from the study that the family's self efficacy in diabetic foot care was significantly increase. After the intervention, the family becomes more confident to help and support the patient to perform foot care. This result can be influenced

Table IV. Comparison of the family's self-efficacy scores before and after the diabetic foot care education program ($N = 26$).

Variable	Mean	SD	Mean difference	SD	t	p-value
Self-efficacy pre-test	22,19	0,84	−6,04	0,03	−10,17	0,00
Self-efficacy post-test	28,23	0,55				

by the diabetic foot care education program in this study that acts as sources of self-efficacy through mastery experience and verbal persuasion. In this study, the family received health education and diabetic foot care practice. Demonstration and practice give experience and real pictures to the family members related to the patient's foot care procedure. Any problem and difficulty related to the procedures were discussed and solved. Therefore they can help the patient to do diabetic foot care correctly. The successfully to accomplish required behavior can increase self-efficacy.[32] The family who successfully perform diabetic foot care gain more self-efficacy. During the education and practice session, the family also received positive reinforcement and verbal persuasion. Verbal persuasion and positive reinforcement can be a source to increase self-efficacy to perform advised and required healthy behavior.[32]

Several researches proved that education program can significantly increase not only knowledge; but also self-efficacy[33, 34] and foot care behavior.[35] The family's self-efficacy plays the significant role in diabetic patient's self-management behavior to improve overall health outcomes. The study found that family's self-efficacy indirectly correlate with patient's metabolic control and health management behavior.[36] Through family's self-efficacy, the family can inform, remind, support, help, and facilitate the patient to accomplish the required health management behavior. When the family has high self-efficacy, the family can provide more support compared to those with low self-efficacy. Support from the family can influence patient's health management behavior,[37–40] thus the patient can achieve health management behavior easier.

4. CONCLUSIONS

Diabetic foot care education program significantly increase the family's knowledge and self-efficacy. Nurses and health care providers should actively involve the family member in diabetic foot care education intervention. The family with diabetic patients should not only accompany the patients during the routine check up; but also actively engaged in the patient's education to support the patient's health management behavior.

This study noted some limitations. This study involved only one group, therefore the researcher could not examine the comparison between another group (control group). Another limitation was related to the sampling technique. The respondents of this study were selected through convenience sampling, therefore the possible selected bias was noted. Further research is needed to test the practice ability of the patients and family in diabetes foot care and the long term effect of the intervention and consider the limitation of this study.

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