Original Article

Enhancing Knowledge of Diabetic Ulcer Prevention through Educational Video

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ABSTRACT

OBJECTIVE: This study aimed to analyze the effect of providing foot exercises educational videos in preventing diabetic ulcers in diabetes mellitus patients.
METHODOLOGY: The study used a quasi-experiment design with a one-pretest-posttest design. The sample was selected using a consecutive sampling technique with 35 patients with diabetes mellitus in one of the health centres in western Indonesia, precisely at Tangerang Regency, from March to April 2024. The research used univariate and bivariate methods, using the Wilcoxon test for data analysis.
RESULTS: The results showed that providing foot exercise education videos to patients with diabetes mellitus can increase knowledge in preventing diabetic ulcers with statistical results of P=0.001 (P<0.05). Providing educational videos is efficacious in improving patients' understanding of diabetes mellitus and preventing diabetic ulcers.
CONCLUSION: To prevent diabetic ulcers, nurses must implement appropriate patient interventions. Research indicates that providing educational videos on foot exercises enhances diabetic patients' knowledge of ulcer prevention. Since many individuals with type 2 diabetes mellitus face complications from diabetic ulcers, effective management strategies, including foot exercises, are essential to reduce risks such as prolonged hospital stays and to improve overall quality of life. Consequently, this study suggests incorporating foot exercise education as a critical nursing intervention for preventing diabetic ulcers in diabetic patients.

KEYWORDS: Educational, Video, Foot, Exercise, Ulcer, Diabetes mellitus

INTRODUCTION

In 2021, the global incidence of diabetes mellitus reached around 537 million adults (20-79 years), of which there were around 6.7 million deaths that occurred due to diabetes mellitus. It is estimated that around 44% of adults (240 million) do not know that they have diabetes, and this usually occurs in people with low income in middle- and lower-income countries[1]. Meanwhile, in 2021, diabetes mellitus patients in Indonesia reached 19,465 cases, with 236,711 deaths[1]. Banten Province is one of the provinces in Indonesia that has experienced an increase in diabetes, with a prevalence of 2.43% from 2013 to 2018, and in 2020, the incidence of diabetes mellitus reached 197,909 cases in Tangerang Regency alone, there were 69,500 people with diabetes mellitus in 2022, and Curug District contributed the highest number of people with diabetes, around 1,545 people[2]. This incident generates various problems that cause complications.
Diabetes mellitus is a chronic problem that requires proper treatment because if the treatment given is not appropriate, it can cause complications. Complications that are often found in people with diabetes are diabetic retinopathy, cardiovascular disease, diabetic nephropathy, and diabetic neuropathy[3]. Diabetic foot wounds or diabetic ulcers are the most common complication that occurs due to problems with peripheral neuropathy and peripheral arteries, where around 15% of people with diabetes will experience this complication[4]. The prevalence of diabetic ulcers in Indonesia alone reaches 26%, far exceeding the global prevalence, which is only around 6.3%[5], in addition to several studies mentioning the high mortality rate of patients with diabetic foot ulcers. These patients generally have a history of diabetic foot ulcer and amputation supported by statistical data primarily due to trauma (45.0%) and infection (29.4%). Infection causes include previous cellulitis, infected fissures, or infected calluses[6,7].
The high incidence of diabetic foot ulcers is due to a lack of knowledge about preventing and practicing foot care[8]. Therefore, knowledge about diabetic foot ulcer prevention strategies needs to be given, including physical activity or foot exercises[9]. Foot exercises are one of the steps that can be taken to prevent diabetic ulcers because foot exercises themselves help improve blood circulation so that nerve function increases. The risk of diabetic ulcer complications can be prevented. Recommended diabetic foot exercises are carried out three to five times a week for 30-60 minutes; with regular implementation of foot exercises, the patient's quality of life will improve while the prevalence of diabetic ulcers can decrease[10]. According to research, foot

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doi: 10.22442/jlumhs.2025.01256

care education through educational videos with easy-to-understand language can increase patient knowledge in preventing diabetic foot ulcers[11]; research revealed that educational videos effectively improve families' role in preventing diabetic ulcer complications[12].

Based on survey data showing the increasing incidence of diabetes mellitus and diabetic foot ulcers, which are the most risk of complications in patients with diabetes mellitus, researchers are interested in researching "how is the effect of educational videos on foot care on knowledge of prevention of diabetic ulcers in patients with diabetes mellitus in one public health centre".

METHODOLOGY

Study Design

This quantitative research used a quasi-experimental design with a one-group pre-test, post-test design approach.

Sample and Setting

Sampling in this study used consecutive sampling, with the population of patients with diabetes mellitus in one of the health centres in western Indonesia, precisely at Tangerang Regency, from March to April 2024. Thirty-five diabetes mellitus patients met predetermined inclusion and exclusion criteria as the sample of this study. The inclusion criteria of respondents in this study were those aged 18 years and above who were diagnosed with diabetes mellitus and respondents who had a smartphone that could access WhatsApp and YouTube applications. The exclusion criteria in this study were respondents who have physical and mental retardation.

Tools

The tool used for data collection is the diabetic ulcer prevention knowledge questionnaire. The questionnaire was created and underwent a content validation test from Sucitawati (2021). The questionnaire includes several questions regarding knowledge of diabetic ulcer prevention, where the statement of each question is given assessment criteria using a dichotomous scale with the answer options "True" or "False" on knowledge of diabetic ulcers. This research questionnaire has been tested for validity and reliability with the results of a Cronbach alpha value of 0.94, so this questionnaire is reliable for use in this study. Moreover, it also used an assessment sheet for the Educational Video of Foot Exercises and influencing factors made by the researcher.

Intervention

Data collection began with making a research proposal, conducting an ethical review process, and creating a six-minute educational video on preventing and caring for feet. Two experts have reviewed this video to determine its feasibility. Then, a research permit was submitted to the relevant agencies and research sites. After obtaining a research permit, researchers collected data in March and April 2024. The data obtained were 35 respondents who met the inclusion and exclusion criteria. In collecting data, researchers paid attention to the principles of research ethics so that all respondents involved in the study were given informed consent. Questionnaires were distributed in the data collection process using Google Forms (pre-post-test) and educational video links through the WhatsApp application. The data collection mechanism was carried out by previously giving a pre-test, followed by providing foot exercise education through videos two times (1 time per week). After the first week's meeting, the researcher conducted a follow-up to ensure that the respondents had watched the educational video regularly. At the meeting in the second week, after guaranteeing the video footage had been watched approximately two times, the researcher provided a post-test.

Data Analysis

The collected data were analyzed using bivariate analysis to analyze sociodemographic data and bivariate analysis with the Wilcoxon test because the data in this study were not normally distributed. This analysis determines the difference between the provision of educational videos and the level of knowledge about diabetic ulcers.

Ethical Consideration

This research was conducted with research ethics in mind. The ethical principles researchers pay attention to are beneficence, respect for human dignity, and justice [13]. This research has also undergone an ethical review process from the UPH Faculty of Medicine Ethics Committee, with an Ethics Number from LPMM UPH: 109/K-LKJ/ETIK/II/2024.

RESULTS

The study was conducted on 35 patients with diabetes mellitus who met the inclusion and exclusion criteria.

Based on **Table I**, it is shown that the age of most respondents is 46-55 years, namely the early elderly period, as many as 19 people (54.3%). Based on the length of time suffering from diabetes, the dominant results of respondents suffering from ≤5 years were 29 people (82.9%). Based on the last education, it was found that the dominant respondents had the same previous education between junior and senior high school education, namely 12 people each (34.3%), and, based on gender, it was found that the majority of respondents were female, namely 22 people (62.9%).

Based on **Table II** Knowledge level Before providing educational videos, it was found that most respondents' knowledge level was in the lower category, namely, as many as 20 people (57.1%). Then, results after providing educational videos showed that the respondents' knowledge level was in the excellent category, namely as many as 35 people (100%).

Based on **Table III**, the study's results of 35 respondents, based on the median value, showed increased respondents' knowledge before and after

the education provision; this is confirmed by the results of the Wilcoxon test with a value of p = 0.001 or p-value <0.05, so, statistically, it can be concluded that there is a significant difference in knowledge level between before and after giving foot exercise education videos to patients with diabetes mellitus.

Table I: Age, Duration of Diabetes, Last Education, and Gender Characteristics of Respondents

Demographics	n	%	Mean	SD
Gender				
Male	13	37.1	1.63	0.490
Female	22	62.9		
Total	35	100%		
Age				
Late Teenagers	2	5.7	3.8	0.994
Late Adulthood	8	22.9	3	
Early Elderly	19	54.3		
Late Elderly	5	14.3		
Seniors	1	2.9		
Total	35	100%		
Last Education:				
Elementary School	3	8.6	3.71	0.926
Junior High School	12	34.3		
Senior High School	12	34.3		
College	8	22.9		
Total	35	100%		
Duration of Suffering				
≤ 5 Years	29	82.9	1.40	0.497
>5 Years	6	17.1		
Total	35	100%		

Table II: Knowledge Level Before and After Providing Educational Videos to Respondents

Category	Pre-Test		Post-test	
	N	%	n	%
Good	6	17.1	35	100
Enough	9	25.7		
Less	20	57.1		
Total	**35**	**100%**	**35**	**100%**

Table III: Differences in the Provision of Foot Exercise Educational Videos on Knowledge of Diabetic Ulcer Prevention in Diabetes Mellitus Patients

	Median (IQR)	*p-value*
Knowledge before providing educational videos (pre-test)	55 (70-45)	0.001
Knowledge after providing educational videos (post-test)	90 (95-85)	

DISCUSSION

Age, Duration of Diabetes, Last Education, and Gender Characteristics of Respondents

This study found that most respondents were 46-55 years old, which aligns with research that said most respondents were 46-55 years old[1] because age is often associated with an increased prevalence of diabetes, especially when aged > 40 years. However, the results of this study contradict the statement from the Ministry of Health, which explains that the age group over 55 years or in the range of 55-64 years has the highest prevalence of diabetes[15]. This statement aligns with research that shows that most respondents are aged 56-65 [16]. However, other research said that, in developed countries, most of those at high risk of developing diabetes mellitus are the age group over 65 years, while in developing countries, the age group in the range of 46-64 years is at high risk of diabetes mellitus[17]. This statement is supported by research which found that most respondents aged 41-64 have diabetes[18]. Age also affects brain growth and how a person obtains information. However, in this study, most respondents had a low level of knowledge despite their age. Increasing age affects a person's experience based on information and activities. As a person gets older, the body's work will also decrease, and the body can experience insulin resistance, which causes uncontrolled blood sugar levels.

In this study, it was found that most respondents had diabetes for less than equal to five years. In-line Research found that most respondents had diabetes for less than five years[19]. Moreover, research conducted also said that those with diabetes are in the range of one to three years[18]. A study states that respondents who have only had diabetes for approximately one year tend to have good knowledge about diabetes and the symptoms of their ulcers compared to respondents who have had diabetes for longer[20]. However, research says different things; this study shows that the knowledge of respondents will increase the longer the respondents experience diabetes, so it can be said that the longer a person has diabetes, the knowledge of foot care will also increase[21]. However, in other research, it was found that there was no significant correlation between a person's knowledge based on the length of suffering and efforts to prevent diabetic ulcers [18].

In this study, most respondents had the final education level at junior high school and high school with the same number of respondents. The level of education is related to a person's level of knowledge; a low level of education can lead to a lack of health knowledge, reducing a person's involvement in disease prevention and management programs[22]; this is to say that the higher the education, the more the ability of a person to obtain better information about diabetes disease management increases[18]. However, it states that someone with low education does not

necessarily have low knowledge because people's abilities cannot be generalized[23]; this is supported by research conducted where increasing one's understanding comes from formal education and informal education, such as health information obtained from health workers or mass media, print media, electronic media, and social media[18].

Most respondents in this study were female compared to male. This research precisely aligns with another study where most respondents were female[16]. The result found that women are at higher risk of developing diabetes mellitus due to increased body mass index, higher risk of obesity, and hormonal factors such as monthly and post-menopausal cycles[22]. However, this contradicts the statement that, in several developing countries, one of which is Indonesia, there are still many areas with traditions that limit women from accessing education and receiving lower wages than men; this inequality has an impact on women's health[24].

Knowledge Level Before and after Providing Educational Videos to Respondents

The results of this study show that, before providing educational videos, most respondents needed a better level of knowledge. In line with the research, it was found that the average knowledge of patients before being given foot care education activities still needed to be improved in the intervention group[25]. This study found that, after providing educational videos, most respondents were at a good level of knowledge. In line with other studies conducted by categorizing the results of knowledge assessment into poor and good knowledge, it was found that, after the intervention, there was an increase in knowledge, namely in the good knowledge category[26]. In this study, there was a difference in the average level of knowledge. This study's results align with other studies that show differences in respondents' knowledge after intervention[27,28]. Several factors, including the level of education, caused the low pre-test score. In this study, the elementary school education level occupied the most significant number, but this is different from previous studies, which say the higher a person's education, the better a person's knowledge in preventing diseases, including type 2 diabetes mellitus[28]. The study also mentioned the difference in pre-test and post-test scores in the control and intervention groups, where the average post-test results were, respectively.

In contrast, the pre-test results showed lower values[28]. The results showed that the intervention group obtained a higher average score than the control group. The underlying factor is that information presented through video is more interesting, not only limited to images but also audio. Audio-visual media is excellent for learning because it involves more senses; this shows that providing health education through video media is more effective in increasing the knowledge of patients with type 2 diabetes mellitus than using leaflet media.

Differences in the Provision of Educational Videos on the Level of Knowledge

This study shows a significant difference between before and after the provision of educational videos, most experiencing an increase in value and one with a fixed value. The results of this study align with those who state that there are differences in respondents' knowledge before and after the intervention of providing educational videos. This study was obtained in line with research conducted regarding the effect of health education on the prevention of ulcers in patients with diabetes mellitus, where the results obtained in the intervention group increased knowledge from the pre-test to the post-test[23,29].

Another study also used audio-visual media techniques or educational videos; the results showed differences in knowledge after being given educational videos. There was an effect of health education through educational videos on knowledge. In line with the research, there was a significant increase before and after this intervention, influenced by age factors classified as elderly[30,31]. When someone is over 40 years old, it is more difficult to accept the development of science because the thought process and understanding that is owned decreases to accept new things. In addition, researchers also revealed that video is very effective in influencing knowledge improvement because this media is easier to understand in explaining complex concepts through moving images that give a more accurate impression accompanied by a sound explanation; this also aligns with research that provided interventions to respondents using leaflets and educational videos.

The results obtained by educational video interventions are more effective in increasing respondents' knowledge. It was proven that, after an educational video intervention, the overall results experienced an increase in good scores. The researcher mentioned that there were changes before and after the intervention because the video used visual and audio-visual aspects so that it seemed more exciting and not dull when respondents watched and saw the educational video because there were images that made it easier for respondents to understand the material so that knowledge could increase. In addition, video media also increases curiosity and concentration on the material displayed.

The above statement states that devices with advanced technology in everyday life continue to increase demand[32]. According to the researcher, the strength of this research is that it uses educational video media using YouTube facilities, which are currently commonly used by people in obtaining information; this is what the researcher believes is a medium that supports research so that respondents experience increased knowledge because the delivery of material is more exciting and it is easier to understand the material presented. It can stimulate the brain because the delivery of material is more complex. Knowledge can be obtained from information

seen, heard, or provided by informants so that this information can increase respondents' knowledge. In addition, using WhatsApp can make it easier for researchers to monitor respondents when carrying out interventions. However, this study also has limitations related to inviting research respondents because it was conducted online so that respondents could leave the study at any time, and the limited number of samples met the analysis requirements with multivariate analysis.

CONCLUSION

Preventing diabetic ulcers requires nurses to be concerned about providing appropriate patient interventions. Based on the research findings, it is revealed that the provision of foot exercise educational videos as an intervention helps increase the knowledge of patients with diabetes mellitus in the prevention of diabetic ulcers because most patients with type 2 diabetes mellitus experience diabetic ulcer complications; therefore, to prevent the incidence of diabetic ulcers it requires appropriate interventions in their management such as doing foot exercises, to reduce the risk of complications that can occur, such as the length of hospitalization days, and can improve the patient's quality of life. Therefore, the results of this study recommend that foot exercise intervention be used as one of the nursing interventions in the prevention of diabetic ulcers in patients with diabetes mellitus.

Ethical permission: Universitas Pelita Harapan, Tangerang, Indonesia, ERC letter No. 109/K-LKJ/ ETIK/II/2024.

Conflict of Interest: No conflicts of interest, as stated by authors.

Financial Disclosure / Grant Approval: The researcher would like to thank LPPM Universitas Pelita Harapan for funding the research process and publication of this research.

Data Sharing Statement: The corresponding author can provide the data proving the findings of this study on request. Privacy or ethical restrictions bound us from sharing the data publicly.

AUTHOR CONTRIBUTION

Manurung CD: Writing an original draft, data collection and analysis.
Makassau IB: Writing an original draft, data collection and analysis.
Budiatmoko FR: Writing an original draft and data collection
Rumambi MF: Methodology, validation, analysis, writing, review and editing manuscript, and supervision.
Iradewi: Drafting and revising the work for important intellectual content

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