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The Implementation of Health Education about Diabetic Foot Care among Patiens with Diabetes Mellitus to Improve Patients Knowledge: A Literature *Review*

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Abstract

Diabetes Mellitus (DM) is a chronic disease that occurs due to metabolic disorders and is characterized by blood sugar levels that exceed normal limits. Complications of DM if not treated immediately can cause peripheral neurophaty, namely loss of sensation in the feet. Peripheral neuropathy prevention measures by performing foot care that can be provided through health education by nurses. The purpose of this literature review is to get an overview of the implementation of health education in an effort to increase knowledge of DM foot care in an empirical study of the last 10 years. The article search method uses for databases through Scient Direct, ProQuest, E-Resources National Library and Google Scholar (2011-2021) using Indonesian and English according to the inclusion criteria. Study design using cross sectional design and systematica/literature review. The results of a literature review of 7 articles consist of 3 articles of knowledge type and 4 articles of health education which stated that Ha or the alternative hypothesis was accepted. The conclusion from this literature review is that the implementation of health education about DM foot care can increase patient knowledge. It is recommended that nurses can maintain the implementation of health education to increase patient knowledge.

Keywords: Diabetes Mellitus, Health Education, Knowledge, Foot Care Diabetes Mellitus.

Introduction

Diabetes mellitus is a chronic (chronic) disease that occurs due to metabolic disorders characterized by blood sugar levels that exceed normal limits (Kemenkes RI, 2020). Diabetes mellitus is a metabolic disorder disease characterized by increased blood glucose levels (hyperglycemia) due to defects in insulin secretion, insulin action, or both in the body (Smeltzer, Bare, Hinkle, & Cheever, 2011).

Diabetes mellitus is classified based on the cause into four, namely diabetes mellitus type 1, diabetes mellitus type 2, gestational diabetes, and other types of diabetes. Type 1 diabetes mellitus is caused by an increase in blood sugar levels due to damage to pancreatic beta cells, causing no insulin production at all. While the cause of type 2 diabetes mellitus is due to an increase in blood sugar due to a decrease in low insulin secretion by the pancreas gland. Gestational diabetes occurs during pregnancy, and other types of diabetes are caused by damage, injury, impaired function of pancreatic beta cells

(Kemenkes RI, 2020). According to Wijayaningsih (2013), diabetes mellitus can occur at various ages which is characterized by early symptoms, namely hyperglycemia (high blood sugar levels), glycosuria (increased sugar in the urine), polyuria (increased urine volume), polydipsia (increased thirst), general weakness, and weight loss.

In the 19th Diabetes Atlas published by the International Diabetes Federation Organization 2019, globally it is estimated that there will be an increase in the number of diabetes mellitus patients that there are 463 million people aged 20-79 years in the world suffering from diabetes in 2019 or equivalent to a prevalence rate of 9 .3% of the total population of the same age. This figure is predicted to continue to increase until it reaches 578 million in 2030 and 700 million in 2045 (*International Diabetes Federation*, 2019).

According to 2018 Basic Health Research, the prevalence of diabetes mellitus in Indonesia is generally based on gender category, which is higher in women 1.78% compared to men, which is 1.21%. In addition, based on the age range as age increases, the most diabetes mellitus patients are aged 55-64 years. Meanwhile, in the area of residence, urban areas are higher than those living in rural areas, namely 2% compared 1% (Kemenkes RI, 2020).

Patients with diabetes mellitus if not treated immediately can be at high risk of experiencing several complications involving the body's systems. Acute complications of diabetes mellitus are hyperglycemia, hypoglycemia and diabetic ketoacidosis. While the chronic complications of diabetes mellitus are the cardiovascular system, peripheral system, and diabetic nephropathy (LeMone, Burke, & Bauldoff, 2017). The management of diabetes mellitus patients has five components, namely, nutrition, exercise, monitoring, pharmacological therapy, and education (Smeltzer, Bare, Hinkle, & Cheever, 2011). Health education is an important part of managing patients with diabetes mellitus. Through education, patients with diabetes mellitus know about their disease and are able to take care of themselves (Soegondo & Soewondo, 2018).

One of the common complications of diabetes mellitus is diabetic nephropathy or diabetic foot problems. Diabetic foot is a disorder of the lower leg resulting from uncontrolled diabetes mellitus. Diabetic foot disorders can be caused by blood vessel disorders, nerve disorders, and infections (Soegondo & Soewondo, 2018). Signs and symptoms of diabetic foot are generally found on the plantar foot, loss or reduction of pain (numbness), the skin of the foot feels dry, there is moderate or a lot of exudate, wounds that are usually deep and perforated, foot deformities, and walking that is not balanced (Maryunani, 2013).

According to Soegondo & Soewondo (2018), the cause of diabetic feet that develop into gangrenous ulcers is caused because the feet are not cared for properly and correctly. Wounds caused by wearing narrow shoes can put you at high risk of experiencing foot problems because of reduced sense of feeling in the feet, decreased blood circulation from the heart to the legs, and susceptibility to infection. The prevalence of diabetic foot annually more than one million people with diabetes lose one leg as a complication of diabetes. This means that every 30 seconds, one lower leg is lost due to diabetes. The prevalence of diabetic foot in Indonesia according to the World Health Organization (WHO) in 2018, reported that gangrenous ulcers in patients with diabetes mellitus range from 17% - 32%, while those with amputations are 15-30%. Diabetic feet still receive less attention in their treatment so that there are basic concepts that are not quite right in

the treatment of diabetic feet. As a result, many diabetes mellitus patients have to have their legs amputated.

The initial management of diabetes mellitus feet is to do foot examinations and daily foot care. Daily foot checks are carried out by checking the top or back, soles, sides of the feet, and between the toes. Daily foot care is carried out by cleaning the feet every day (Soegondo & Soewondo, 2018). However, the complexity of the current examination methods to detect these abnormalities means that not all diabetes mellitus patients know about how to care for their feet. Diabetes mellitus patients need to be given health education about diabetes mellitus foot care in order to increase patient knowledge about foot care and take good care of their feet (Maryunani, 2013).

Research conducted by Sari et al., (2020), by title Foot Self-Care behavior and its Predictors in Diabetic Patients in Indonesia It was found that if the patient's knowledge of diabetes mellitus foot care is not done properly it will have bad consequences, as evidenced by the results of the standard average knowledge score of 47.4 indicating a poor overall level of foot care knowledge, therefore foot care health education diabetes mellitus is needed as an additional alternative measure in effective foot care and preventing more serious complications, namely leg amputation.

This data is reinforced by the World Health Organization (WHO) which states that leg amputation occurs 10 times more often in diabetic patients who have less knowledge about self-care, especially foot care, which is an obstacle for patients to take care of their feet. Therefore, education is very important so that long-term complications can be prevented (Perkeni, 2015). So it can be concluded that there is a significant relationship between knowledge and the incidence of foot amputation due to lack of knowledge in foot care in patients with diabetes mellitus so that health education needs to be given to minimize amputation by taking good foot care. The formulation of the problem in this literature review is How to Implement Health Education on Diabetes Mellitus Foot Care to Increase Patient Knowledge based on empirical studies in the last ten years. The purpose of this literature review is to get an overview of the implementation of health education about diabetes mellitus foot care to increase patient knowledge based on empirical studies in the last ten years.

Research Methodology

The Literature Search Strategy uses the PICOS framework: Population/problem, the population or problem to be analyzed. Intervention, an act of management of cases that will be presented individually or in groups. Comparison, other management used as a comparison. Outcome, results or outcomes obtained in a case study. Study design, the research model used for review. Search for articles using keywords or keywords (AND, OR NOT or AND NOT) which are used to broaden or specify searches so that it makes it easier to determine which articles to use. The keywords used in this literature review are “Foot Diabetes Mellitus” AND “Foot Care” AND “Health Education”.

The data used in this case study is secondary data obtained not from direct observation, but obtained from the results of research that has been conducted by previous researchers. Secondary data sources are relevant articles using four databases, namely Scient Direct, ProQuest, National Library of Indonesia E-Resources, and Google Scholar. Inclusion and Exclusion Criteria with PICOS format. Population/problem inclusion criteria, namely national and international articles from different databases and are interrelated with research variables, namely health

education, Intervention: Health education on foot care for diabetes mellitus. Comparation: There was no comparison intervention, Outcome: There was an influence of health education on foot care with diabetes mellitus on the patient's level of knowledge. Study design: Cross-sectional, pre-quasy experimental, descriptive, and systematic/literature review, Year of Publication; Articles published in 2011-2020 and languages using English and Indonesian

Search Results and Study Selection: Based on the results of a Literature review search through four publications namely Science Direct, ProQuest, National Library of Indonesia E-Resources, and Google Scholar using the keywords "Diabetic Mellitus Feet" AND "Foot Care" AND "Health Education", in the author's search found 260 articles that matched these keywords and then the articles were selected, as many as 55 articles were excluded because they were published under 2011 and below. The feasibility assessment of 205 articles, published articles and articles that were not suitable found that there was no eligibility for inclusion and exclusion, so that 7 articles were reviewed

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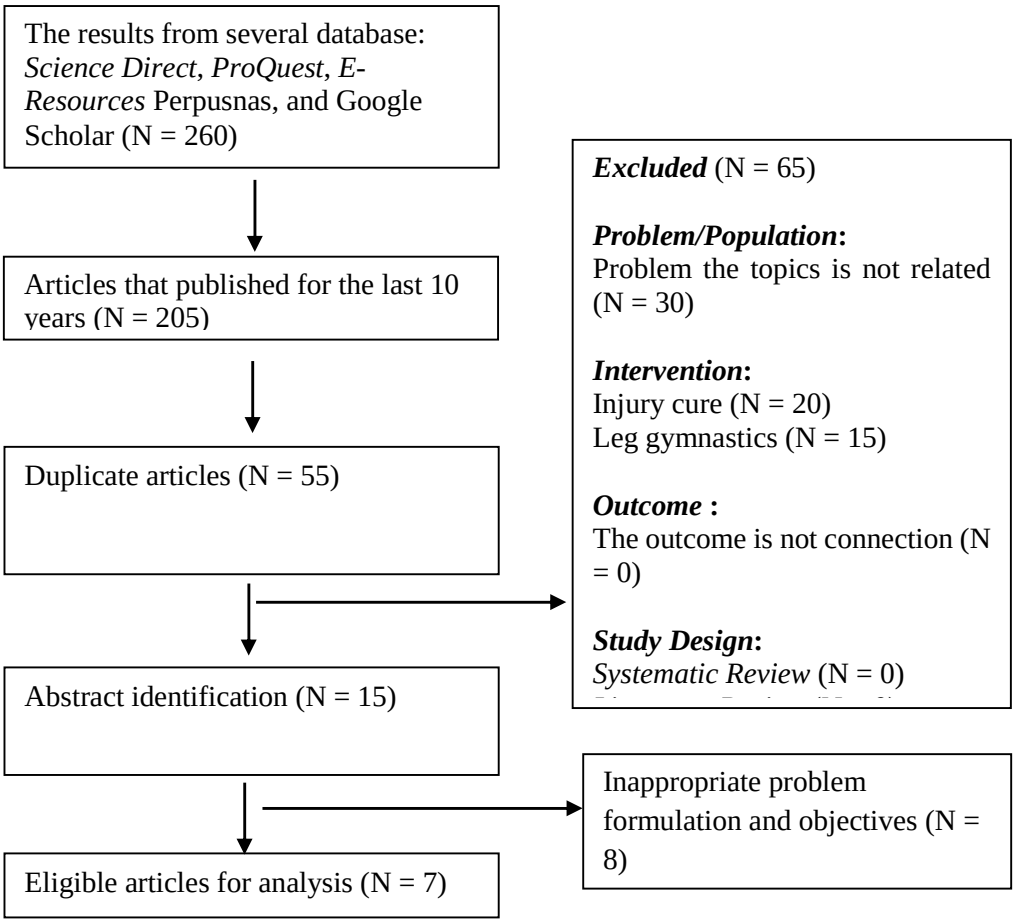
Scheme 1. The Articles Review Flow



List of article search results: this literature review is synthesized using the narrative method by grouping extracted data that are similar and in accordance with the results measured to answer the objective. Articles that match the inclusion criteria are then collected and a summary of the articles is made including the name of the researcher, year of publication, title, method, and case results as well as the database

Results

Table 1. The list of 7 Articles

No	Writer	Year	Vol	Title	Methods (Design, Subjects, Variable, Instrument, Analisis)	Result	*Database*
1.	Fajeriani, N., Diani, N., & Choiruna, H. P	2019	Vol 4 No 1		**D:** *Pre-experimental design* **S:** *Simple random sampling* **V:** Knowledge Enhancing, Foot Care **I:** Post-test **A:** *Univariat*	The results showed that there was an increase in health education on knowledge in patients with diabetes mellitus. The increase in knowledge process is indicated by the results of the post-test on respondents consisting of increased knowledge. Increased knowledge is categorized as good by 76.7% and 23.3% is not good.	Google Scholar
2.	Setyaningsih, R., & Maliya, A	2018	Vol 11 No 2	Education Increases Knowledge of Foot Care in Diabetes Mellitus Patients in Cempaka Family The Effect of Health Education on Diabetic Foot Care with Demonstration Methods on the Ability to Care for the Feet in Patients with	**D:** *Pre-experimental design* **S:** *Purposive sampling* **V:** Health Education, Caring for Feet **I:** Questionnaire and Observation **A:** *Paried T Test*	The results showed that there was a change after being given foot care health education using the demonstration method, the research before health education was carried out the average knowledge was 12.7 and after being given health education it became 15.6 an increase of 3.6 or more. There is a significant influence between health education using the demonstration method on diabetic foot care. With an increase of 3,466 from before the demonstration and after the demonstration.	National library (Neliti)

No	Writer	Year	Vol	Title	Methods (Design, Subjects, Variable, Instrument, Analisis)	Result	*Database*
				Diabetes Mellitus			
3.	Diani, N., Waluyo, A., & Sukmarini, L	2013	Vol 16 No 2	Knowledge of Clients about Type 2 Diabetes Mellitus Affects Clients' Ability to Take Care of Feet	**D:** *Cross-sectional design* **S:** *Probability sampling* **V:** Knowledge, Caring for Feet **I:** questionnaire **A:** *Univariat*	The results of this study indicate that there is a significant relationship between knowledge in performing foot care on clients with type 2 diabetes mellitus and if the value (p = 0.04; α = 0.05) and the knowledge factor has an opportunity of 2.38 times to practice care foot.	National library (Neliti)
4.	Fajriyah, N., Aktifah, N., & Mugiyanto, E	2020	Vol 18 No 1	Education Packages and Early Detection Improving Diabetic Foot Care Behavior at District Health Centers Pekalongan	**D:** *Quasy experimental design* **S:** *Accidental sampling* **V:** Education, Foot Care **I:** Pre-test dan Post-test **A:** *Wilcoxon Signed Rank Test*	The results of the study found an increase in diabetes mellitus patients who had achieved. The conclusion from the results of this study showed that there was an effect of the diabetic foot care education package p = 0.001 (p <0.005) on the behavior and knowledge of patient foot care that early detection in patients with diabetes mellitus feet can reduce the risk of complications of diabetic feet and health education also increases care behavior good leg.	National library (Neliti)
5.	Husnul Fata, U., Wulandari, N., & Trijayanti	2020	Vol 12 No 1	Knowledge and Attitudes about Diabetic Foot Care in Diabetes Mellitus Patients	**D:** *Descriptive design* **S:** *Purposive sampling* **V:** Knowledge, Foot Care **I:** questionnaire **A:** *Frequency Distribution*	The results of this study showed that the majority of respondents, namely as many as 15 respondents (75%) had knowledge about foot care in a fairly good category which could influence effective skills and attitudes in treating diabetes mellitus feet. This needs to be improved in order to increase knowledge and high attitudes and can help overcome confusion, increase self-confidence for better self-management.	National library (Neliti)
6.	Ahmed S, dkk	2019	Vol 13 No 4	*Knowledge and Practice of Diabetic*	**D:** *Cross-sectional design* **S:** *Formula sampling*	The results of this study indicate that there is significant awareness and knowledge, it is found that the p value <0.05 is	*Science Direct*

No	Writer	Year	Vol	Title	Methods (Design, Subjects, Variable, Instrument, Analisis)	Result	*Database*
				Foot Care in Sudan	**V:** *Knowledge, Diabetic Foot Care* **I:** *Questionnaires and Interview* **A:** *Computerized analysis*	accepted, which means that there is stability between before and after the provision of health education on diabetes mellitus foot care and information about complications of the diabetic foot.	
7.	Pourkazemi A, dkk	2020	Vol 20 No 1	*Diabetic Foot Care: Knowledge and Practice*	**D:** *Cross-sectional design* **S:** *Consecutive sampling* **V:** *Diabetic Foot Care, Knowledge* **I:** *Questionnaires* **A:** *Wilxocon, , Mann-Whitney, and Kruskal-Willis*	The results of the study found that most of the respondents knew about the implementation of foot care, with 86.3% having good knowledge regarding knowledge and things that must be considered in carrying out diabetes mellitus foot care. Therefore, adequate knowledge about diabetic foot care is very important in controlling diabetes mellitus feet and changing lifestyle patterns.	*ProQuest*

The results research published from 2013 – 2020. Most research published in 2020 uses a cross-sectional design. The sampling technique generally used purposive sampling, with the largest number of instruments using questionnaires and univariate data analysis. The research was compiled in a literature review of 7 articles, 3 articles included in the type of knowledge and 4 articles included in the type of health education, in general, namely the implementation of health education aims to increase knowledge about foot care in patients with diabetes mellitus. The results of the articles above were compiled in the form of a literature review, there were 7 articles that stated Ha or the alternative hypothesis was accepted. With the influence of health education on increasing knowledge about foot care for diabetes mellitus, it was found that there was an increase in knowledge about foot care for diabetes mellitus and this proved significant for increasing knowledge in the article.

Discussion

Diabetes mellitus is a metabolic disorder disease characterized by increased blood glucose levels (hyperglycemia) due to defects in insulin secretion, insulin action, or both in the body (Susan C. Smeltzer, 2011). Medical management of diabetes mellitus is grouped into five pillars, one of the five pillars is education or health education. Education with the aim of promoting healthy living, namely prevention efforts and is a very important part of managing diabetes mellitus holistically. The education provided consists of initial educational materials and advanced education materials, covering diabetes

mellitus, prevention of complications, and foot care in diabetes mellitus (Soelistijo *et al*., 2015).

Based on the 7 articles that have been reviewed, the results found by the author are several causes related to a lack of knowledge in diabetes mellitus foot care, namely maladaptive or inappropriate behavior, non-adherence in wound prevention, foot examination, hygiene, and lack of foot care (Fajriyah *et al*., 2020), as well as lack of maintaining cleanliness, lack of medication, inappropriate activities, and overload on the feet. Lack of information about the dangers of diabetic foot ulcers leads to low knowledge, attitudes and foot care actions for DM patients. Thus, the impact of diabetic foot ulcers includes a decrease in the patient's quality of life and an increase in health costs (Husnul Fata *et al*., 2020). Results of research conducted by Fajeriani *et al*., (2019) it was found that the results of increasing the knowledge process increased as indicated by the post-test results of 76.7% after being given health education related to diabetes mellitus foot care. Assessment of increased knowledge according to Arikunto S (2014) that is based on the percentage value which is categorized as good if the knowledge value is ≥76 – 100%, it is categorized as sufficient if the knowledge value is 61 – 75%, and it is categorized as poor if the knowledge value is ≤60%.

Results of research conducted by Setyaningsih & Maliya, (2018) The results showed that there was a significant influence between health education using the demonstration method on diabetic foot care. With an increase of 3,466 from before the demonstration and after the demonstration. According to Soelistijo *et al*., (2015).There are several health education methods that can be used to implement learning strategies including lectures, seminars, questions and answers, discussions, simulations, brainstorming, and demonstrations in the implementation of health education about diabetes mellitus foot care.

The results of research conducted by (Diani et al., 2013) The results showed that type 2 diabetes mellitus patients who had received counseling about diabetes mellitus foot care had better knowledge and foot care compared to type 2 diabetes mellitus patients who had never received counseling, it was found that the knowledge factor had 2.38 times the opportunity to practice foot care. Kholid (2012) said that experience is a source of knowledge by repeating the knowledge gained in solving problems encountered in the past.

The results of research conducted by Fajriyah *et al*., (2020) the results obtained by increasing knowledge by carrying out health education can improve the behavior of early detection and good foot care. Health education according to Notoatmodjo (2012) is a form of intervention or persuasion efforts aimed at forms of behavior, so that these forms of behavior can be conducive to health. In other words, health education strives for individual, group or community behavior to have a positive influence on maintaining and improving health.

The results of research conducted by (Husnul Fata et al., 2020), the results obtained by 75% of respondents have knowledge about foot care in a fairly good category which can influence effective skills and attitudes in diabetes mellitus foot care, this needs to be improved to increase knowledge and can help overcome confusion for better self-management. Notoatmodjo (2012) mentions the factors that influence knowledge including education, information, and the media, where a person will tend to get information both from other people and from the mass media that supports health so as to improve the quality of life.

The results of research conducted by Ahmed *et al*., (2019) The results showed that there was significant and stable awareness and knowledge before giving health education and after being given health education & the results of research by Pourkazemi et al., (2020) obtained results of 86.3% of respondents having good knowledge in carrying out foot care. According to Notoatmodjo (2012), knowledge is the result of human sensing which includes the result of knowing, and occurs after someone senses a certain object. Sensing occurs because of the five human senses, namely the senses of sight, hearing, smell, taste, and touch. Most of human knowledge is obtained through the eyes as well as the ears.

Almost all of the research articles concluded that the implementation of health education on foot care for diabetes mellitus is very effective for increasing knowledge and skills in foot care and daily foot examinations. So, there is a significant influence related to knowledge of foot care health education in diabetes mellitus patients to improve a good quality of life.

Conclusions

Based on an analysis of the seven articles obtained in this literature review, it can be concluded that health education in diabetes mellitus patients is very effective in increasing knowledge related to foot care, both in prevention and daily foot examination. Various methods in health education that can be used to implement include lectures, seminars, questions and answers, discussions, simulations, brainstorming, and demonstrations in the implementation of health education about diabetes mellitus foot care.

Problems and actions that should not be taken on DM feet that can cause diabetic feet to become more serious complications can be resolved because health education is given which directly affects the increase in knowledge, from ignorance to knowing, and can improve the quality of life of patients with diabetes mellitus.

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