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Web-Based Diabetic Ulcer Screening Class

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Abstract

People with diabetes mellitus (DM) are at risk of developing ulcers. Simpang Kawat Health Center in Jambi City experiences an increase in the number of DM patients every year. Prevention efforts can be done through screening. In line with the times, screening can be done easily and quickly without visiting health services, namely through a web-based application. Participants in this activity were 15 elderly posyandu cadres in the Simpang Kawat Health Center Work Area. Participants were given training in diabetic ulcer screening and access to the provided smart screening application. There was an increase in participant knowledge after being given training (p value = 0.000). Training can increase participants' knowledge in conducting web-based diabetic ulcer screening.

Keywords: Diabetic ulcer; Screening; Web_based

1. INTRODUCTION

Symptoms of neuropathy are reduced sensation in the feet and are related to wounds on the feet and part of complications of diabetes mellitus (DM). Various changes are caused by neuropathy which are characterized by changes in pressure on the soles of the feet that are prone to ulcers. Susceptible to infection causes rapid spread of infection. In addition, reduced blood flow complicates management of diabetic feet (International Diebetes Federation, 2019).

The prevalence of diabetic ulcers in the world is 6.3% as proven by a meta-analysis study. The prevalence in North America is 13%, then Oceania is 3% and in Africa is 7.2%, greater than Asia which is 5.5%. Then in Europe it is 1.5%, in Belgium it is 16.6% followed by Canada at 14.8%, the USA at 13% and India at 11.6%. In Indonesia it occurs around 15% with a mortality rate reaching 17-23%. As much as 14.8% of deaths occur after amputation. Every year one million diabetic ulcer sufferers undergo amputation (15-30%) and every five years it is 39-80% (Kemenkes RI, 2019).

Ulcers and amputations are feared by DM patients. A good strategy is needed to improve the knowledge of nurses and DM patients. In addition, regular ulcer screening

is a preventive measure that can be done.

There are many benefits to be gained from the development of digital technology. Anyone can access various information and is not hampered by space and time. This will make it easier for users to increase their knowledge, one of which is related to health. Gadgets can be a tool to detect health status.

Jambi City consists of 20 Community Health Centers and almost all of them have data on DM sufferers that increase every year. Simpang Kawat Community Health Center is the community health center with the 3rd highest number of DM sufferers in Jambi City and has a program in the form of routine elderly exercise. In addition, it is known that most of the elderly suffer from DM. This is an important reason to conduct diabetic ulcer screening.

This community service activity is a continuation of the Beginner Community Service Program (PMP) funded by the Ministry of Education, Culture, Research, and Higher Education in 2024. The evaluation results show that there are still few DM sufferers who undergo diabetic ulcer screening, even though health workers and some Posyandu cadres have been given training. This is because screening is only carried out on DM sufferers who visit the Health Center and some Posyandus. The formation of a web-based diabetic ulcer screening skill class for cadres in all elderly Posyandus is expected to assist health workers in collecting data on diabetic ulcer incidents and be attended by all DM sufferers.

Several research results and community service of the proposing team can be used as the basis for this activity. The research results include risk factors for diabetic feet in people with diabetes mellitus (Astuti et al., 2020), diabetic peripheral neuropathy in adults with type 2 diabetes mellitus (Astuti, et al., 2023). Meanwhile, the results of community service include early detection and treatment of diabetic ulcers (Merdekawati, et al., 2023), smart screening of diabetic ulcers (Merdekawati, et al., 2024) and the application of smart screening of diabetic ulcers in diabetic ulcer classes (Merdekawati, et al., 2024).

The Smart Diabetic Ulcer Screening app is an application that tracks symptoms of diabetic ulcer risk. The app includes information about the patient's identity, history, and current therapies. It also assesses symptoms such as peripheral neuropathy, Peripheral Artery Disease (PAD), and deformities.

Based on the background above, it is known that the implementation of diabetic ulcer screening is not optimal and only a small number of elderly people undergo screening because the implementation is carried out on DM patients who participate in elderly gymnastics activities only. Therefore, the proposing team is interested in forming a web-based diabetic ulcer screening proficiency class through training and mentoring activities for elderly posyandu cadres.

2. METHOD

In detail, the description of the approach methods offered is as follows:

a. Preparation

The activity begins with data collection on the number of DM patients with permits from Simpang Kawat Health Center. Next, prepare the equipment to be used. Before carrying out the activity, the community service team conducted informed consent with the participants and continued with a pretest to assess the participants' knowledge regarding diabetic ulcer screening. The instrument used is a standard operational procedure sheet containing steps for screening diabetic ulcers, including a history of DM, checking blood glucose levels, therapy, neuropathy via monofilament examination, Peripheral Artery Disease (PAD) with ankle brachial index (ABI) examination, and deformities. This assessment item is detailed into 12 statements in Likert format.

b. Implementation

Provide training to posyandu cadres with demonstration methods and diabetic ulcer screening simulations using web-based applications.

c. Evaluation

Evaluation is carried out to determine the success of the activity through knowledge analysis via a posttest. The results are then analyzed using a paired t-test.

d. Writing the Report

The report contains the results of the evaluation based on the analysis carried out.

3. RESULTS

The forms of activities carried out as an effort to increase participants' knowledge, in detail as follows:

Table 1 Implementation of activities that increase participant knowledge

No	Nama	Kegiatan	Materi
1	Ns. Ani Astuti, M.Kep, Sp.KMB	Training	Diabetic ulcer risk screening
2	Ns. Diah Merdekawati, M.Kep	Demonstration	Use of smart diabetic ulcer screening application

The implementation of the activity began with a presentation of the material accompanied by a discussion and Q&A. The activity was attended by 15 Posyandu Cadres. The implementation of the training activity on web-based diabetic ulcer risk screening is presented through figures 1 to 5.

Figure 1. Community Service Team and Participants

Figure 2 and 3 Demonstration of Diabetic Ulcer Screening and Use of Smart Screening

Active participants in participating in activities can be seen in pictures 4 and 5.

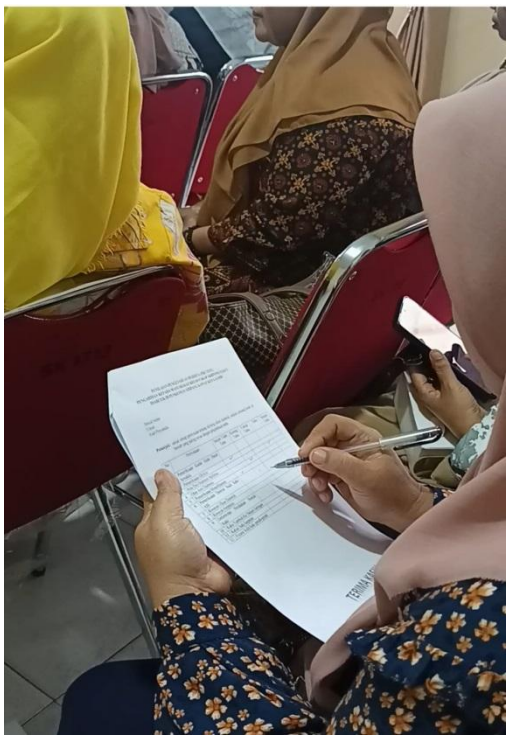


Figure 4 & 5 Filling in the Pre-Test and Post-Test for Diabetic Ulcer Screening

The results of the analysis of differences in participant knowledge regarding diabetic ulcer risk screening are described in the table below:

Table 2. Percentage of Participants' Knowledge about Diabetic Ulcer Screening

Statement	Percentage (%)				
	Do Not Understand	Slightly UNderstand	Moderately Understand	Understand	Completely Understand
Timely Blood Sugar Level Check	0	6.7	0	93.3	0
HBA1c test	20	66.7	0	13.3	0
Diet pattern	20	53.3	0	26.7	0
Anti-Diabetic Drugs	6.6	60	6.7	26.7	0
Monofilament test	40	46.7	6.7	6.7	0
Ankle Brachial Index test	13.3	73.4	13.3	0	0
History of diabetic ulcers	13.3	73.4	13.3	0	0
History of amputation	13.3	40	20	26.7	
Deformity	13.3	66.7	20	0	0
Ingrown Nail	13.3	66.7	20	0	0
Callus/ calloused feet	20	40	6.7	26.7	6.7
Cracked skin on the feet	13.3	40	13.3	26.7	6.7

The table above shows that the majority of respondents understand about blood sugar level checks, namely 93.3%, but the majority of respondents were not understand of monofilament checks, namely 40%.

Table 3 Average Knowledge of Participants

Knowledge	Mean	Std. Deviasi	n	*p-value*
Pre test	28.67	6.064	15	0,000
Post test	46.20			

The table above shows that there is an increase in the average value of knowledge, which is 17.53. The results of the analysis also show that training can affect participant knowledge (p-value = 0.000).

4. DISCUSSION

There was an increase in participant knowledge after being given training. Through the results of the analysis of participant knowledge before being given training, it is known that 40% of participants are not understand about monofilament examinations. The majority of participants understand about blood sugar level examinations (93.3%).

Diabetic ulcers have a major impact on social and economic conditions, because they have the potential for amputation, disability and require large costs for treatment and complications (Yunir, 2015). Ulcer sufferers must provide 5 times higher health costs (Nam, et al. 2017), reduce quality of life (Gonzalez, et al., 2010) and are at high risk of death. In 5 years the mortality rate is 2.5 times higher and more than 70% experience amputation (Armstrong et al., 2017).

It is estimated that 15% of people with DM will experience at least one wound. The incidence of Diabetic Foot Ulcer (DFU) ranges from 2.5%-10.7% and 40-80% experience infection (Yunir, 2015). On average, two-thirds of DFU can heal with an average time of six months and the risk of recurrence is around 60% a year (Pearson, et al., 2014). Treatment and prevention of DFU require patients to be directly involved in care (Dorresteijn et al., 2014). Patients are given education to improve knowledge, compliance with care and participation in daily foot care (Schaper et al., 2020).

Digital health technologies and devices that can be connected to telemedicine are poised to become part of modern healthcare (Park et al., 2023). Remote assessment of DFU patients is difficult due to the inability to assess peripheral vascular status or the unavailability of appropriate technology. For example, the Society for Vascular Surgery (SVS) foot wound, ischemia, and infection (Wifi) risk stratification system for major limb amputations requires in-person expert assessment (Mills et al., 1982). The drawback of digital biomarkers is that they can only predict the complexity of DFUs and sort out those who can be treated but not those at higher risk (Mishra et al., 2024).

The process evaluation showed that participants were highly enthusiastic about the activity from start to finish. This was demonstrated by their willingness to complete the questionnaire before and after the activity and to participate in a simulation of diabetic ulcer risk screening. Participants also stated that they would continue screening for people with diabetes mellitus, both at the clinic and during the integrated Posyandu for the elderly.

5. CONCLUSION

There was an increase in participants' knowledge in conducting web-based diabetic ulcer screening. This application can be continued in the examination of DM sufferers who visit the community health center or Posyandu and can make it easier for community health center management to report the risk figures for diabetic ulcers.

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