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Prevention education, neuropathy screening and foot vasculopathy screening in patients with type 2 diabetes mellitus at Medan Area community health centre

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ABSTRACT

Screening of diabetic foot neuropathy and vasculopathy using monofilament and Ankle-Brachial Index (ABI) devices is a crucial step in the early detection of potential complications in diabetic patients. These screening tools are simple yet effective methods to assess sensory loss and peripheral arterial disease, which are major risk factors for the development of diabetic foot ulcers. Early identification allows for timely interventions that can significantly reduce the risk of severe complications such as infections, gangrene, and lower limb amputations. In addition to regular screening, prevention strategies should be implemented consistently. These include maintaining good glycemic control through routine blood sugar monitoring, adhering to a balanced and regulated diet, and engaging in regular physical activity. One recommended form of exercise is diabetic foot exercise, which helps improve blood circulation in the lower limbs and enhances nerve function, thereby reducing the risk of foot-related complications. Comprehensive foot care education, combined with these preventive measures, plays a vital role in improving the quality of life of individuals with diabetes and minimizing the burden of diabetic foot disease on both patients and the healthcare system.

Keyword: Diabetes Mellitus, Education, Neuropathy Screening, Vasculopathy Screening

ABSTRAK

Diabetes Mellitus (DM) saat ini dialami oleh sekitar 382 juta orang di seluruh dunia, terutama pada kelompok usia 40 hingga 59 tahun, dan jumlah ini diperkirakan akan terus meningkat setiap tahunnya. Peningkatan jumlah penderita DM terutama disebabkan oleh perubahan gaya hidup, seperti pola makan yang tidak sehat, tingkat stres yang tinggi, serta kurangnya aktivitas fisik. Pada penderita DM tipe 2, peningkatan kadar gula darah umumnya disebabkan oleh resistensi insulin. DM juga dikenal sebagai "penyakit seumur hidup" karena tidak dapat disembuhkan sepenuhnya, sehingga penderita terus berisiko mengalami komplikasi yang dapat meningkatkan angka kematian. Salah satu komplikasi yang paling umum dan serius adalah luka kaki diabetik, yang dapat berkembang menjadi gangren dan berujung pada amputasi, sehingga menurunkan kualitas hidup penderita. Untuk mengurangi risiko tersebut, edukasi diberikan kepada para kader kesehatan dan penderita diabetes mengenai perawatan kaki dan langkah-langkah pencegahan luka kaki diabetik. Pencegahan yang efektif membutuhkan perawatan kaki yang baik secara konsisten serta pemeriksaan kesehatan secara rutin. Program edukasi ini ditujukan kepada penderita diabetes dan kader di

lingkungan keluarga serta masyarakat. Tujuan dari kegiatan ini adalah untuk mencegah terjadinya komplikasi luka kaki diabetik, meningkatkan kualitas hidup penderita, serta mendorong kebiasaan rutin memeriksa kadar gula darah..
Keyword: Diabetes Mellitus,Edukasi, Skrining Neuropati, Skrining Vaskulopati,

1. Introduction

Diabetes Mellitus (DM) is a chronic metabolic disease caused by the body's inability to produce the hormone insulin as needed and or by ineffective use of insulin. It is characterised by high blood sugar levels or hyperglycaemia [1]. Currently, there is an increase in the prevalence of DM worldwide. The main factor causing the increase of DM patients is the changes in human lifestyle, including dietary changes, increased stress levels, and sedentary lifestyle [2]. DM is also known as a "lifelong disease" because the disease cannot be cured during the life span of the sufferer. Patients with diabetes mellitus have the risk of complications, one of the complications is diabetic foot wounds which can lead to gangrene and amputation treatment which results in a decrease in the quality of life of the patient [3].

Currently, the activities carried out are providing education and examinations for diabetes mellitus patients which include neuropathy Screening & Foot Vasculopathy for early detection of diabetic foot complications. This activity was carried out at the Medan Area Health Center after establishing previous cooperation with the Head of the Health Center partner.

The problem in partners is the large number of people with diabetes mellitus who are in the scope of work of the public health center, the lack of awareness of the dangers of complications of diabetes mellitus and the lack of knowledge and ability of cadres in preventing diabetes mellitus foot wounds, so that it can lead to gangrene which can lead to a decrease in quality of life and also death.3 This lack of awareness is also felt by partners, as there are still few people with diabetes mellitus who come to the health centre in order to conduct Blood Sugar Level (BSL) control checks and also a lack of patient interest in gymnastics activities organised by the prolanis. With the education we provide, we hope to increase understanding of the management and prevention of complications of diabetes mellitus for cadres and patients so that the routine BSL control and gymnastic activities organised by the health centre increase [4[.

As a solution to this problem, the service team will carry out education to cadres and patients with type 2 diabetes mellitus in the Medan Area health centre working area. In this education we use the lecture method where we teach cadres and patients with diabetes mellitus how to prevent wounds on the feet of people with diabetes mellitus in cadres, it will also be explained about care which includes how to maintain proper foot hygiene, use lotion on dry feet, use of proper footwear, how to use proper nail clippers to avoid wounds on the feet, will also be taught how to control blood sugar levels to be stable so that complications do not occur [5]. In the education we also used several props in the form of videos containing demonstrations of care for diabetic feet and also demonstrations of foot exercises [6]. Along with the demonstrations that we presented, we also tried to invite cadres and also people with diabetes mellitus to do the diabetic foot exercises where the purpose of the foot exercises is to improve blood circulation in the feet so as to avoid injuries. In the cadres, our team of servants also explained how the initial symptoms that occur when affected by diabetes mellitus both with symptoms and without symptoms, understanding in controlling blood sugar levels to remain in a stable state so that complications can be avoided, the most complications are in the form of wounds on the feet [7,8].

2. Methods

This community service activity was conducted by a team from the Faculty of Medicine, Universitas Sumatera Utara, comprising lecturers and medical students, and was directed toward community health cadres and patients with type 2 diabetes mellitus (T2DM) in the Medan Area Health Centre, involving a total of 48 participants.

2.1. . Education on diabetic foot care and wound prevention

The intervention focused on educational outreach regarding diabetic foot care and wound prevention. This session was designed to improve participants' understanding of diabetes, its symptoms, and appropriate management strategies. Educational materials were delivered by a team using interactive presentations and visual aids. Key topics included the pathophysiology of diabetes mellitus, common symptoms, recommended

medical examinations, and the significance of consistent medication adherence—particularly for patients whose condition could no longer be controlled through diet and exercise alone. Special emphasis was placed on the prevention of diabetic foot complications. Participants were instructed on proper foot hygiene practices, including daily washing and drying of the feet, the use of moisturizing lotion on dry skin, and the selection of proper footwear to prevent foot injuries. The educational approach included not only the use of a projector but also posters that were displayed at the education site.

2.2. Comprehensive health assessment and diabetic foot screening

At this stage, community health cadres are educated on the importance of conducting regular glycemic monitoring to prevent complications associated with diabetes mellitus. As part of this community service activity, the team not only delivered educational sessions but also conducted Blood Sugar Level (BSL) tests for both cadres and diabetic individuals present during the sessions. This initiative aims to increase awareness and motivate both groups to recognize the serious risks posed by uncontrolled blood glucose levels.

The educational approach employed during the field activity included multimedia presentations using a projector, as well as the display of informative posters at the education site. Additionally, brochures were distributed containing practical guidance on proper foot care, dietary management, physical activity, and the necessity of routine glycemic monitoring.

2.3. Structured exercise and diabetic foot training sessions

At this stage, the service team provides guidance to both community health cadres and individuals with diabetes mellitus on the recommended duration of daily exercise, along with practical demonstrations of foot exercises conducted with the participants. Each session incorporated diabetic foot exercises lasting approximately 10 minutes, aimed at improving circulation and foot health. In this activity, a video demonstrating how to perform foot exercises was shown, with the expectation that it could be practiced by individuals with diabetes or community health cadres..

3. Results and Discussion

3.1 Education on diabetic foot care and wound prevention

In this activity, community health volunteers (cadres) and individuals with diabetes mellitus received education about the disease, including its symptoms, necessary medical examinations, and the importance of taking medication regularly—especially when diabetes has been diagnosed and can no longer be managed through diet and exercise alone (Figure 1). Both cadres and diabetic patients were also educated about the potential complications of diabetes, particularly the risk of wounds and ulcers that frequently occur in individuals with poorly controlled blood glucose levels. Topics included the use of appropriate footwear and the importance of maintaining regular foot hygiene to reduce the risk of foot ulcers and subsequent complications such as gangrene. Additionally, education was provided to help diabetic patients gain a comprehensive understanding of the underlying causes of diabetes mellitus, with the aim of encouraging lifestyle changes to better manage their condition. At this stage, the service team provides education on proper foot hygiene, including the application of moisturizing lotion to dry skin and the use of appropriate footwear to prevent foot injuries.

Educational sessions also covered the comprehensive management of type 2 diabetes mellitus, emphasizing the importance of dietary regulation, regular physical activity, adherence to prescribed medication regimens, and consistent glycemic monitoring. Information was provided on the potential complications associated with poor glycemic control and the importance of early intervention. The ultimate goal of this initiative is to empower patients to independently manage their condition, particularly in preventing complications through lifestyle modifications and routine blood sugar monitoring.

Figure 1. Health expert delivering education on diabetes mellitus and preventive strategies for diabetic foot complications

3.2 Comprehensive health assessment and diabetic foot screening

The health monitoring conducted during this activity included blood pressure measurement (Figure 2), blood glucose testing (Figure 3), and screening for diabetic foot neuropathy and vasculopathy using monofilament and Ankle-Brachial Index (ABI) devices. The educational intervention implemented during this community service initiative successfully increased awareness among community health cadres and individuals with diabetes mellitus regarding the importance of regular health monitoring related to diabetes risk. Participants showed active engagement throughout the sessions, with many expressing a willingness to apply the knowledge gained (Figure 4).

Figure 2. The team performs a physical examination on patients with diabetes mellitus, which includes checking their blood pressure.

Figure 3. Examination of blood sugar levels in patients with diabetes mellitus.

Figure 4. Screening of diabetic foot neuropathy and vasculopathy with monofilament and ankle Brachial Index (ABI) devices.

Overall, the integration of educational sessions with practical health screenings and accessible media proved effective in enhancing both knowledge and motivation among the cadres and diabetic individuals. This approach highlights the value of community-based health education in improving diabetes self-management and preventing long-term complications.

3.3 Structured exercise and diabetic foot training

At this stage, community health cadres and individuals with diabetes mellitus received training and demonstrations on diabetic foot exercises aimed at improving peripheral circulation and maintaining foot function (Figure 5 and Figure 6). The team also provided education on the recommended duration of daily foot exercises and conducted live demonstrations. These exercises are designed to enhance peripheral blood flow, strengthen the muscles and joints of the lower limbs, and prevent deformities and complications associated with diabetic neuropathy.

Figure 5. Demonstration of recommended physical movements for diabetes management.

Figure 6. Foot exercises for the prevention of diabetic foot complications.

This community-based intervention is designed to enhance the self-management capabilities of individuals with type 2 diabetes, particularly those receiving care at the Medan Public Health Center and its surrounding regions. By promoting the maintenance of normoglycemia, the program aims to mitigate the risk of diabetes-

related complications, including peripheral neuropathy, muscular atrophy, and foot infections. The overarching goal is to support individuals with diabetes in sustaining an improved quality of life.

Furthermore, community health cadres are encouraged to actively engage and motivate diabetic patients to incorporate regular diabetic foot exercises into their routines. These exercises may be performed during scheduled sessions at the health center held every second Thursday of the month or independently at home. This preventive regimen is intended to reduce the incidence of diabetic foot ulcers and gangrene, conditions known to substantially impair the quality of life in individuals living with diabetes mellitus.

4. Conclusions

This community service program provided an integrated approach to improving diabetes management among patients with type 2 diabetes mellitus at the Medan Area Community Health Centre. Key activities included screening for diabetic foot neuropathy and vasculopathy using monofilament and ABI tools, along with education on glycemic control, foot care, proper footwear, and diabetic foot exercises. Health cadres were also empowered to support patient compliance and encourage routine exercise. These efforts are expected to enhance patient self-management, prevent diabetic foot complications, and improve overall quality of life.

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