Diabetes mellitus (DM) ranks fourth as a degenerative disease in the top ten causes of death. Diabetes mellitus (DM) is a chronic disease caused by the pancreas not producing enough insulin, which the body uses to regulate blood sugar or glucose levels (Smeltzer & Bave, 2013). The International Diabetes Federation (IDF) organization estimates that the total number of diabetes cases in 2019 will reach 9.3% of the world's total population, or the equivalent of 463 million elderly people. The total number of cases is estimated to increase by 19.9% as the population ages, or 111.2 million elderly. Countries in the Arab-North African and Western Pacific regions are ranked 1st and 2nd with the highest incidence of diabetes in people aged 20 -79 years among 7 world regions, respectively 12.2% and 11.4%. Meanwhile, Southeast Asia, where Indonesia is located, is in third place with a disease rate of 11.3% (Meilani et al., 2022). Diabetes mellitus is increasing from year to year in various regions of the world.

The results of identifying the number of elderly diabetes sufferers in several countries in the world showed that there were 10 countries with the highest number of sufferers of the disease. China, India and the US occupy the first three positions with 116.4 million, 77 million and 31 million people. Indonesia ranks 7th out of 10 countries with the highest number of patients, namely 10.7 million people. Indonesia is the only Southeast Asian country on the list, so Indonesia contributes to the prevalence of diabetes in Southeast Asia (Kementerian Kesehatan RI, 2020). Most cases of diabetes mellitus (DM) occur in elderly people. Indeed, age is one of the factors that influences changes in the body's ability to tolerate glucose (Smeltzer & Bave, 2013). East Java Province is included in the top 10 provinces with the highest incidence of diabetes in Indonesia or 9th with a prevalence of 6.8 million people (Priyoto & Widyaningrum, 2020). The highest incidence of diabetes mellitus, including in Indonesia, is in the elderly, this is due to changes in the body's ability to tolerate glucose.

The results of a preliminary study of elderly people at Integrated Healthcare Center Cempaka Putih Kedung Anyar, Sawahan District, found that around 30% of elderly people suffer from diabetes. Some elderly people already know that diabetes can cause complications, one of which is complications in the feet, but have never received education about foot exercises for diabetes sufferers. This data shows that elderly participants at the Cempaka Putih Kedung Anyar Integrated Healthcare Center, Sawahan District, have never received health education about the benefits of foot exercises for diabetes sufferers. Based on the results of literature studies, foot exercises have many benefits, including; improving blood circulation, increasing leg and foot muscle strength, training joints so they don't become stiff and remain flexible, lowering blood sugar levels, reducing the risk of diabetes complications such as heart disease, stroke, kidney problems and blood vessel disorders. This is expected to improve the quality of life of the elderly.

Management of diabetes patients includes education, diet management, physical activity, and pharmacotherapy. However, what many people pay attention to is how to regulate nutrition (diet) and treatment. Many people still don't know about physical activity that is safe and beneficial for elderly people with diabetes mellitus (Dinata et al., 2022). Leg exercises are suitable for the elderly because they can be done while sitting, or while watching television, and can be done for hours, without experiencing fatigue. By moving the calf muscles (soleus muscles), you can increase blood flow and improve circulation, thereby making more capillary filters open, so that more insulin receptors become more active, thereby affecting the reduction in blood glucose (Ramadhan & Mustafa, 2022). Based on the existing problems, the author is interested in training the elderly at the elderly Integrated Healthcare Center to do leg exercises to make those who have high blood sugar levels normal, those whose sugar levels are normally maintained normal, and those whose sugar levels are low become normal, so that the quality of life of the elderly improves better.

2. METHODS

This community service has received approval from the Institute for Research and Community Service at Nahdlatul Ulama University Surabaya with assignment letter number 714/UNUSA-LPPM/Adm E/V/2023. This community service activity program was carried out at the Cempaka Putih Kedung Anyar Integrated Healthcare Center in Sawahan Village, Sawahan District, Surabaya City, attended by 51 cadres and elderly people out of a total of 83 elderly people. The community service program starts in May and ends in August 2023. To resolve partner problems, the method used follows some steps.

Early Stage

This step contains: (1) Preparatory meeting. A preparatory meeting was held involving all team members and the Head of the elderly Integrated Healthcare Center to discuss strategies and plan for community service programs; (2) Location survey. The location survey was carried out to arrange the layout of equipment and room design to enable easy interaction between the service team and the elderly; and (3) Preparation of facilities and infrastructure, including: (a) Preparation of the location for the activity; (b) Leafleat preparation; (c) Preparation for video of leg exercises; and (d) Tools for checking blood sugar levels.

Implementation Stage

The implementation stage is the main stage in community service activities. The activities carried out at this stage are: (1) Following the opening ceremony led by elderly cadres, including opening, singing the song Indonesia Raya, singing the elderly hymn, and closing with prayer; (2) Check blood sugar levels to determine the blood sugar levels of the elderly as a screening for those who have never had their blood sugar levels checked, and to control elderly people who have been diagnosed with diabetes mellitus. Blood sugar checks are only given to those who are willing to have the test (voluntary/no coercion), after being checked, the results are recorded as pretest data; (3) Carrying out education about diabetes mellitus and its management to increase knowledge of cadres and the elderly at Integrated Healthcare Center Cempaka Putih Kedung Anyar in Sawahan Village. Education is divided into 3 phases, namely: (a) The orientation phase is carried out for 10 minutes. Activities in this phase include; self-introduction, and an explanation of the purpose of the activity and don't forget to thank the participants for their presence in community service activities; (b) The Implementation Phase is the presentation of material for 30 minutes. The education began by asking open questions about whether participants knew about diabetes mellitus and foot exercises for diabetes sufferers. After that, it was continued by delivering material and distributing leaflets containing diabetes mellitus including its treatment and foot exercises which aim to stabilize blood sugar levels/lower blood sugar levels; and (c) Closing Phase: Assessing the level of knowledge of the elderly after being given counselling. Educational materials can be accessed at //drive.google.com/file/d/1BToWp9y99hwdTRpISTna438ckZB1v3vc/view?usp=sharing; and (4) Carrying out a demonstration of leg exercises to cadres and the elderly at Integrated Healthcare Center Cempaka Putih Kedung Anyar in Sawahan Village. The leg exercise movements are taught to refer to the stages previously carried out by (Flora, 2013). Stages of foot exercise training with several steps, such as: (a) Demonstrate leg exercises by standard operational procedures; (b) Demonstrations are carried out by lecturers and students and are attended by the participants; (c) Participants sit in their respective chairs as a means of demonstration; (d) Leg exercises are carried out for 30-45 minutes; and (e) Convey and motivate cadres and the elderly that this exercise should be done every day regularly, it can be done at any time, while watching TV, when relaxing and if done routinely, this exercise can maintain normal stable blood sugar levels.

Post Activity

Post-activity evaluation is carried out. The evaluation carried out in this activity is to explore knowledge before and after the counselling is given; in the form of asking questions about diabetes mellitus, and diabetic foot exercises, the purpose and benefits of the exercises and participants are asked to again document the foot exercises that have been carried out independently.

Monitoring and Evaluation

This step contains: (1) Review the leg exercises that have been carried out; (2) Do foot exercises together on the second week of every month; and (3) Measuring blood sugar levels again at 3 months (posttest data).

3. RESULTS AND DISCUSSION

Community service activities begin with an opening, led by cadres. The opening began with singing the song Indonesia Raya, the Elderly March and ended with a prayer. This activity can be seen in Figure 1.

Figure 1. Opening community service activities

Characteristics of the Elderly

The community service carried out at the Cempaka Putih Kedung Anyar Integrated Healthcare Center in Sawahan Village, Sawahan District, Surabaya City obtained the following results: 51 participants attended (61.44%) out of a total of 83 elderly people. Consisting of: 46 people (90%) women, and men: 5 people (10%), most aged 60-74 years (elderly) (58.8%) as presented in Table 1.

Table 1. Characteristics of respondents based on gender and age

Variable	Frequency (f)	Percentage (%)
Age (year)		
Pre-elderly (<60)	15	29,4
Elderly (60-74)	30	58,8
Old Senior (75 -90)	6	11,8
Total	51	100
Sex		
Male	5	10
Female	46	90
Total	51	100

The core activity of community service after the opening event is to check blood sugar levels (pretest) as seen in Figure 2. After all the elderly have their blood sugar levels checked, the community service team provides health education as seen in Figure 3, and leg exercises such as which can be seen in Figure 4. Outreach materials can be seen at https://drive.google.com/file/d/1BToWp9y99hwdTRpISTna438ckZB1v3vc/view?usp=sharing.



Figure 2. Checking blood sugar levels
Figure 3. Health education about diabetes mellitus and its treatment
Figure 4. Foot exercise training

Description of the Results of Checking Blood Sugar Levels

Table 2. Results of checking blood sugar levels before and after leg exercises in the elderly

Variable	Result	Mean	Median	SD	Min- Max	CI 95%
Blood sugar levels	Pre-test	145.02	110	103, 610	64- 513	115.88-174.16
	Post Tes	117,73	107	43,553	86- 345	105,48-129,97

The average blood sugar level before exercise was 145.02mg/dl, and there was the lowest sugar level value of 64 mg/dl (low) and the highest 513 mg/dl (high), while the results after doing leg exercises were the average blood sugar level value. Blood 117.73, (normal) with the lowest value 83 (normal), the highest 345 (high, but has decreased quite a bit). The results of checking blood sugar levels before and after leg exercises can be seen descriptively in Table 2

Comparison of Sugar Content Test Results Before and After Doing Leg Exercises

Table 3. Comparison of the results of checking blood sugar levels before and after leg exercises in the elderly

Blood sugar levels	Pre Test		Post Test	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Low	4	8	0	0
Normal	26	51	41	80,4
High	21	41	10	19,6
Total	51	100	51	100
Wilcoxon test: p = 0,007				

Table 3 shows that before doing leg exercises, there were 21 people (41%) whose blood sugar levels were in the high category, and after doing leg exercises, almost all (80.4%) elderly people's blood sugar levels became normal. Before doing leg exercises, there were 4 people (8%) whose blood sugar levels were low, but after doing regular leg exercises, they became normal. The Wilcoxon test results obtained p = 0.007, which means that there is a change in blood sugar levels before and after doing leg exercises, that is, after doing leg exercises, the sugar levels of the elderly tend to become normal.

Discussion

The results of the study showed that at the initial examination, the average elderly person had a blood sugar level of 145.02 mg/dl, included in the normal category, but some elderly people had blood sugar levels reaching 513 dl/mg (Table 1), because with lifestyle changes, not only the elderly suffer from diabetes mellitus, but adults are also at risk of suffering from diabetes mellitus. This supports research results (Meilani et al., 2022), that most diabetes clients are aged between 40-60 years. The results of the study also showed that there were 21 people (40%) elderly who had high blood sugar levels (>200 dl/mg), so you need to be careful so as not to cause complications because diabetes mellitus complications can be life-threatening if not handled properly (Milasari, 2023). This needs to be taken into account because in general almost half (47.73%) of elderly people with health problems treat their health problems themselves without requiring outpatient care (Girsang et al., 2022).

Management of diabetes mellitus patients includes education, nutritional therapy, physical activity and pharmacology. Therefore, it is important to prevent complications and the increase in elderly people experiencing diabetes mellitus to be given education about the disease and its treatment, including nutritional regulation including the type, amount and schedule of food that can be consumed. Previous research results show that diet influences the incidence of diabetes mellitus (DM) (Masi & Mulyadi, 2017; Meilani et al, 2022; Meliyana, 2020). During the counselling and demonstration of leg exercises, the elderly were enthusiastic, because the movements were easy and not tiring. At the monitoring and evaluation meeting, the elderly were also active in coming to the Integrated Healthcare Center. This finding also supports activities carried out by previous researchers that community service participants were enthusiastic when invited to do foot exercises (Chotimah et al., 2019).

The elderly's sugar levels before and after being given foot exercise intervention changed for the better. As a result of community service for those who initially had high sugar levels, others slowly decreased to near normal, those that were initially low rose to normal and for those whose initial sugar levels were normal, they could be maintained as normal. The Wilcoxon test results also proved that there was an influence on blood sugar levels before and after doing leg exercises in the elderly ($p = 0.007 < 0.05$).

These findings support the results of previous research, namely Fajriati & Indarwati (2021), Hardika (2018), Masi & Mulyadi (2017), Nuraeni & Arjita (2019), Priyoto & Widyaningrum (2020), Pratiwi et al., (2021), and Ruben et al. (2016) that there is a difference (decrease) in the value of sugar levels before and after being given leg exercise training. And this is confirmed by research by Meliyana (2020), that regular exercise can reduce blood sugar levels. Apart from maintaining fitness, exercise can also help you lose weight and increase insulin sensitivity, thereby improving blood glucose control. Research results of Meilani et al., (2022), Parellangi et al. (2022), Qona'ah et al. (2022), and Ramadhan & Mustofa (2022) also support the statement that leg exercises can be used to control blood sugar in DM patients. This is also confirmed by research Yulianti & Armiyati (2023) that foot exercises carried out regularly can reduce blood sugar levels in DM diabetes mellitus patients.

Leg exercises activate insulin binding and insulin receptors in the plasma membrane to reduce blood sugar levels. The benefits of exercise are lowering blood sugar levels by increasing muscle glucose absorption and increasing insulin use, improving blood circulation and muscle tone, and changing blood fat levels, especially by increasing HDL cholesterol levels and reducing total cholesterol and triglyceride levels. Apart from maintaining physical fitness, exercise can also reduce weight and increase insulin sensitivity, thereby improving blood sugar control, thereby improving the quality of life for the elderly.

4. CONCLUSION AND RECOMMENDATIONS

Carrying out community service brings excellent benefits to society. The benefits obtained by the community are an increase in public knowledge and awareness about the importance of physical exercise (leg exercises) for health. Regular leg exercises can reduce blood sugar levels in elderly people who experience high blood sugar levels and maintain blood sugar levels within normal limits. Conditions where sugar levels are within normal limits can improve the quality of life of well-maintained elderly people.

The limitation of this community service activity is that the team cannot routinely monitor the elderly's compliance with daily foot exercise activities and the duration of their implementation. Therefore, for further implementation of community service, it is necessary to involve the elderly's family in community service activities, which is useful for the elderly to carry out foot exercises together and remind and motivate them to do it regularly. Counselling materials in the form of videos can be shared with cadres to be distributed to elderly families. Inviting cadres to make the foot exercise program a routine activity at Integrated Healthcare Center.

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