

## Increasing Elderly Physical Activity Through the Elderly Sports Health Promotion Program "GANTARI" in Senggreng Village, Malang Regency, Indonesia

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### Abstract

*The World Health Organization (WHO) estimates that there will be an increase in the number of elderly people throughout the world. Malang Regency is one of the areas with the largest number of elderly people in East Java. This program's community service activities collaborate with partners at the Resilient Elderly School Kromoleo 1 in Senggreng Village, Sumberpucung District, Malang Regency. These older adults have several health complaints, such as diabetes, cholesterol, and gout, and the organ they complain about most is the knee area, so activities become hampered. The community service activity "GANTARI" (Gerakan Lansia Tangguh, Bugar dan Aktif) is here to increase awareness of the elderly about the importance of sports and physical activity to avoid degenerative diseases, especially diabetes mellitus. This community service activity has three stages, namely preparation, implementation and evaluation. An overview of the physical activity of the elderly was obtained through filling out the pre-test and post-test with the IPAQ questionnaire which was successfully completed by 52 senior citizens of Senggreng Village. Based on these results, there was a change in behavior and increased knowledge in the elderly of Senggreng Village after participating in the "GANTARI" activity. Therefore, the "GANTARI" community service activity has succeeded in promoting sports and physical activity to prevent the elderly from degenerative diseases, especially diabetes mellitus.*

### Abstrak

WHO memperkirakan adanya peningkatan jumlah lansia di seluruh dunia. Kabupaten Malang menjadi salah satu daerah dengan angka lansia terbesar di Jawa Timur. Kegiatan pengabdian kepada masyarakat ini bekerjasama dengan mitra di Sekolah Lansia Tangguh Kromoleo 1 di Desa Senggreng, Kecamatan Sumberpucung, Kabupaten Malang. Para lansia ini mempunyai beberapa keluhan kesehatan seperti diabetes, kolesterol, dan asam urat, dan organ yang paling banyak dikeluhkan adalah area lutut sehingga aktivitas menjadi terhambat. Kegiatan pengabdian masyarakat "GANTARI" (Gerakan Lansia Tangguh, Bugar dan Aktif) hadir untuk meningkatkan kesadaran para lansia akan pentingnya olahraga dan aktivitas fisik agar terhindar dari penyakit degeneratif khususnya diabetes melitus. Kegiatan pengabdian masyarakat ini memiliki tiga tahapan yaitu persiapan, pelaksanaan dan evaluasi. Gambaran aktivitas fisik para lansia didapatkan melalui pengisian pre-test dan post-test dengan kuesioner IPAQ yang berhasil diisi oleh 52 lansia Desa Senggreng. Berdasarkan hasil tersebut, terdapat perubahan perilaku dan peningkatan pengetahuan pada para lansia Desa Senggreng setelah mengikuti kegiatan "GANTARI". Oleh karena itu, kegiatan pengabdian masyarakat "GANTARI" berhasil mempromosikan olahraga dan aktivitas fisik guna menghindarkan para lansia dari penyakit degeneratif khususnya diabetes melitus.

## 1. INTRODUCTION

The World Health Organization (WHO) has predicted an increase in the number of elderly people throughout the world. Population pyramids in developed countries and developing countries currently tend to show a constructive (old) pyramid shape. This indicates that life expectancy is getting higher and the population's birth rate is decreasing (Ministry of Health of the Republic of Indonesia, 2022). Based on data from the Central Statistics Agency (BPS), the number of elderly people in Indonesia is 18 million people and this figure will increase in 2020 to 27 million people (BPS, 2022). Data from the population census released by BPS East Java in 2018 shows that the number of elderly people in East Java is 12.64% and continues to increase in 2020 to 13.48%. Malang Regency is one of the largest contributors to the number of elderly people in East Java (Gani et al., 2017). In 2018 the percentage of elderly people in Malang Regency reached 13.30%. Then it increased quite rapidly to 14.20% in 2020 (BPS Jawa Timur, 2021).

The increase in elderly people needs to be a concern for all parties. As we age, the function and structure of body tissues will decrease, which can increase the risk of various degenerative diseases. Degenerative disease is a medical condition in which the function structure of tissues and organs decreases or does not function at all (Ministry of Health of the Republic of Indonesia, 2019). Degenerative diseases include Non-Communicable Diseases (NCDs), which often occur in the elderly, including hypertension, Coronary Heart Disease (CHD), stroke, cancer, diabetes mellitus, osteoarthritis, osteoporosis, Chronic Obstructive Pulmonary Disease (COPD), asthma, cataracts and so on. Degenerative diseases are often only realized by the elderly when the disease is already in a severe condition. This certainly increases the risk of death and reduces the quality of life of the elderly and their ability to carry out daily activities (Ministry of Health of the Republic of Indonesia, 2019, 2022).

One of the degenerative diseases that often occurs in the elderly is diabetes mellitus which is included in the top 10 diseases most commonly suffered by the elderly in Indonesia (Health Development Policy Agency, 2022; Ministry of Health of the Republic of Indonesia, 2019). The prevalence of diabetes mellitus in Malang Regency in 2017 reached 2,322 cases. Diabetes mellitus is a chronic disease whose severity can increase rapidly, potentially causing complications in the elderly such as neuropathy, nephropathy, retinopathy, blood vessels and musculoskeletal disorders (Nasution & Azwar Siregar, 2021; Rosyada & Trihandini, 2013). The severity of degenerative diseases such as diabetes mellitus can be minimized by intervention to increase physical activity in the form of exercise. Exercise is one way to control blood sugar levels. When exercising, the muscles use blood sugar levels so that blood sugar levels become more stable. The type of exercise suitable for elderly people with diabetes mellitus is aerobic exercise, including diabetes exercise with moderate intensity. Diabetes exercise is a series of movements designed to suit the age and physical condition of diabetes mellitus patients. Diabetes exercises can be done regularly for 30-60 minutes 3-5 times a week (Lubis et al., 2021). Diabetes exercise is effective in reducing blood sugar levels in people with type II diabetes mellitus (Komalasari, 2018).

There are 680 Elderly Family Development Groups (Kelompok Bina Keluarga Lansia/BKL) in Malang Regency, and 3 (three) of them will implement Resilient Elderly Schools (Sekolah Lansia Tangguh), one of which is the Kromoleo 1 Resilient Elderly School in Sumberpucung District. The Resilient Elderly School is a learning forum to create Elderly that SMART (Sehat, Mandiri, Aktif, Produktif dan Bermanfaat/Healthy, Independent, Active, Productive and Useful). It is hoped that the elderly and pre-elderly in Malang Regency will be educated and have good knowledge and skills, to be able to make wiser and healthier life choices, so that life expectancy can increase, prosperity can be achieved, productivity can be optimized, and happiness can also be achieved (Pemkab Malang, 2022). Activities carried out at the elderly school include exercise and posyandu for the elderly, which provides health checks and vitamins. This program's community service activities collaborate with partners at the Resilient Elderly School Kromoleo 1 in Senggreng Village, Sumberpucung District, Malang Regency. Based on direct observations and discussions with partners, it was found that the problem faced was that there were many elderly people affected by diabetes mellitus and hypertension in Kromoleo, Senggreng.

Based on the background above, it is vital to implement a program to increase exercise in the elderly to reduce the risk of degenerative diseases, especially diabetes mellitus. This is carried out through the community service program "GANTARI" (Movement for Resilient, Fit and Active Elderly People/Gerakan Lanjut Usia Tangguh, Bugar, dan Aktif), which is carried out by lecturers and students of the Department of Public Health, Faculty of Sports Sciences, Universitas Negeri Malang. This community service activity was carried out with partners from the Resilient Elderly School Kromoleo 1 in Senggreng Village, Sumberpucung District, Malang Regency. Through this program, it is hoped that the public will be able to know and understand the importance of physical activity, especially exercise, for the elderly to prevent degenerative diseases.

## 2. METHODS

Partner problem solving is carried out through a series of Community Service activity programs for community empowerment entitled "GANTARI" (Gerakan Lansia Tangguh, Bugar dan Aktif) as a strategy to create healthy and active elderly in the Resilient Elderly School Kromoleo 1 in Senggeng Village, Sumberpucung District, Malang Regency. Universitas Negeri Malang funds this program through the Community Partnership Program (PKM) scheme.

### 1. Preparation

#### a. Initial observation activities

Observation activities were carried out to obtain initial data about partners and targets for elderly people in Senggeng Village. The data from this observation is used as material to create a program of community service activities that will be carried out.

#### b. Coordination with partners and related parties

Coordination involved the founder of the Resilient Elderly School Kromoleo 1 and the Head of Senggeng Village to collaborate on the program and determine the right time for this activity.

#### c. Creating program materials

The events are organized effectively and efficiently but are still adapted to the aim of community service, namely, to promote healthy sports in the elderly. The content of the material and counseling methods are adapted to the needs and conditions of the elderly in Senggeng Village.

#### d. Making pre-test and post-test questionnaires

To find out the changes that occur in the elderly after activities, a pre-test and post-test questionnaire is needed. The International Physical Activity Questionnaire (IPAQ) was modified and adapted into Indonesian. This questionnaire is designed to measure a person's physical activity based on the Metabolic Equivalent Task (MET) used during the last seven days. This IPAQ instrument has been tested for effectiveness in adults aged 15-69. The questionnaire can be tested in the age range of 15-69 years (Dharmansyah & Budiana, 2021; IPAQ, 2022).

#### e. Carry out permits

Licensing for this community service activity was carried out by the Chair of the Department of Public Health, the Dean of the Sports Faculty, the Head of Senggeng Village, and the Head of the Sumberpucung District.

#### f. Preparation of premises and infrastructure

The place used for this community service activity is the home yard of the founder of Resilient Elderly School Kromoleo 1, Mrs. Asemah. The committee prepared various infrastructure and facilities for activities with assistance from the Senggeng Village community. These infrastructure facilities are used to facilitate the implementation of community service activities.

### 2. Implementation

#### a. Pre-test filling

Before the main activity, the elderly members of Resilient Elderly School Kromoleo 1 were asked to fill out a prepared questionnaire. This questionnaire is filled out by the elderly with the help of a companion who can come from the elderly's family or relatives.

#### b. Gantari Program

Community service activities were carried out on May 26, 2023, and June 1, 2023, targeting elderly people from Resilient Elderly School Kromoleo 1 Senggeng Village, Sumberpucung District, Malang Regency. The event began with attendance and exercise for 15 minutes. After that, the community service activity "GANTARI" was opened with remarks from the head of the program, representatives of lecturers from the Department of Public Health Sciences, the Head of Senggeng Village, and representatives of the Social Welfare Section of Sumberpucung District. The event continued with health education regarding diabetes mellitus and a question and answer session. Next, education and practice of foot exercises for diabetes are carried out. This event was also enlivened with games with prizes and poetry reading, singing, and dancing performances from the elderly. At the end of the event, gifts and food were distributed for the elderly, as well as a group photo session.

#### c. Post-test filling

After completing the core activities, seniors are asked to fill out a post-test questionnaire to see how their knowledge and activities on June 1, 2023. This completion is also done with assistance from Public Health students, Faculty of Sports Sciences, Universitas Negeri Malang. After completing the post-test questionnaire, the practice of foot exercises for diabetes was refreshed.

### 3. Evaluation

The evaluation stage is carried out jointly between lecturers and students to thoroughly assess the planning process, technical implementation, and obstacles during the activity. This evaluation is also carried out to measure the achievement of community service objectives. The collected pre-test and post-test results were also analyzed to see the changes after sports health promotion activities in the elderly.

### 3. RESULTS AND DISCUSSIONS

The "GANTARI" community service program was implemented on May 26, 2023, and June 1, 2023, targeting elderly people from Resilient Elderly School Kromoleo 1 Senggeng Village, Sumberpucung District, Malang Regency. Participant characteristics can be seen in Table 1.

Table 1. Participant characteristics

	Category	N (n=52)	Percentage (%)
Sex	Man	6	11,5
	Woman	46	88,5
Age (years)	50 – 60	20	38,5
	61 – 70	26	50,0
	71 – 80	5	9,6
	>80	1	1,9
Living with	Husband/wife	27	51,9
	Child	9	17,3
	Family member	10	19,2
	Alone	6	11,5
Activities	Just stay at home	37	71,2
	Seller	4	7,7
	Part time work	3	5,8
	Farmers/Ranchers	4	7,7
	Work	4	7,7
Reading ability	Yes	46	88,5
	No	6	11,5
Senility	No	50	96,2
	Yes	2	3,8
Income	No income	37	71,2
	<2 million rupiah	11	21,2
	2-5 million rupiah	4	7,7
Health insurance	Yes	45	86,5
	No	7	13,5
Illness	There isn't any	17	32,7
	Hypertension	13	25,0
	Diabetes mellitus	6	11,5
	Osteoporosis	1	1,9
	Gout	4	7,7
	High cholesterol	4	7,7
	Indigestion	7	13,5

The results showed that the majority of elderly people (88.5%) who took part in this activity were women. As many as 50% of the elderly who participated in this activity were 61-70 years old. Most elderly people live with their husband/wife (51.9%). Most of the elderly's activities are at home (71.2%). Most elderly people can read (88.5%), are not senile (96.2%), have no income (71.2%), and have health insurance (86.5%). The diseases most elderly suffer from in Resilient Elderly School Kromoleo 1 Senggeng Village are hypertension (25%) and diabetes mellitus (11.5%). The majority of elderly people do not suffer from any disease, namely 32.7%. The problems faced by partners in this community service program can be overcome by a series of Community Service activity programs for community empowerment entitled "GANTARI" (*Gerakan Lansia Tangguh, Bugur dan Aktif*) as a strategy to create healthy and active elderly in the Resilient Elderly School Kromoleo 1 in Senggeng Village, Sumberpucung District, Malang Regency. The recommended sport for the elderly is exercise with movement, which includes breathing and cardio exercises, muscle strength training, and joint strength, and the exercise is recreational so that the elderly do not get bored quickly (Dharma & Boy, 2019).



The GANTARI program activities were carried out on May 26, 2023 and June 1, 2023 (Figure 1 and 2). The core activity of this program was carrying out elderly exercise, followed by health education regarding diabetes mellitus and a question and answer session. Health education related to material about diabetes starts from myths and facts about diabetes that have been circulating in society, risk factors, symptoms, dangers, early detection, and what must be done to prevent diabetes and prevent complications if you have diabetes, as well as related to foot exercises diabetes as a therapy for people with diabetes are given. Next, education and practice of foot exercises for diabetes is carried out. This program received positive appreciation from various parties. This activity was attended by 52 elderly people and accompanied by 10 elderly *posyandu* cadres. The elderly in Resilient Elderly School Kromoleo 1 were also very enthusiastic about participating in this activity.



Figure 1. First-day of community service activities (exercise, diabetes prevention, and foot exercises for diabetes education)

The GANTARI program is not only to maintain physical health but also to maintain mental health and become a place for socializing for the elderly. Apart from the GANTARI activities carried out, Resilient Elderly School Kromoleo 1 Senggreng Village, Sumberpucung District, Malang Regency regularly holds *posyandu* for the elderly, so this increases the motivation of the elderly to carry out physical activities and sports. Elderly women who have high social support tend to have higher physical activity (Zhou et al., 2023). Social factors such as social support and social networks play an essential role in encouraging physical activity in the elderly. Among various social factors, involvement in social activity groups, such as senior clubs, volunteer activities, hobby and cultural groups, and sports groups, can encourage physical activity in old age (Nemoto et al., 2021). Community-based programs that include simple exercise can increase motivation, increase exercise adherence, and lifestyle changes, thereby increasing people's autonomy to exercise (García-sánchez et al., 2020). Interventions that provide physical activity information in printed materials or face-to-face interactions have a long history and appear to be successful in promoting physical activity in older persons. Population-based physical activity promotion initiatives are required to improve older individuals' health and quality of life in general and to avoid frailty and the beginning or progression of chronic diseases later in life. According to the findings of the study, interventions with a theory-base were more effective than those without a theory-base in increasing physical activity (Muellmann et al., 2018).

At the end of the event, the founder of the elderly school, who is familiarly called Mrs. Asemah, said that she was happy with the program involving older adults in the elderly school. Mrs. Asemah also hopes that events like this will not only be held for one day but will be continuous or ongoing. The sustainability of this program can be practiced by service partners. It is hoped that the elderly at Resilient Elderly School Kromoleo 1 Senggreng Village can continue to do physical activities and diabetes exercises. With increasing knowledge about diabetes mellitus, older people can carry out preventative behaviors for diabetes mellitus.



Figure 2. Community service activities on the second day (filling out post-test questionnaires, prevention and foot exercises for diabetes education)

The pre-test and post-test using the IPAQ questionnaire were successfully completed by 52 elderly people. Table 2 shows the results before and after providing education regarding the prevention of diabetes and foot exercises for diabetes.

Table 2. Pre-test and post-test results

Kategori		Pre-test		Post-test	
		N (n=52)	%	N (n=52)	%
Physical Activity Level (IPAQ)	Low	43	82,7	35	67,3
	Moderate	9	17,3	17	32,7
	High	0	0,0	0	0,0
Participates in exercise	Often	30	57,7	34	65,4
	Rarely	22	42,3	18	34,6
Diabetic Foot Exercises	Ever	20	38,5	52	100,0
	Never	32	61,5	0	0,0
Routine health checks	Routine	47	90,4	50	96,2
	Not routine	5	9,6	2	3,8
Controlling eat/diet	Yes	29	55,8	47	90,4
	No	23	44,2	5	9,6
Know how to prevent diabetes	Know	30	57,7	50	96,2
	Did not know	22	42,3	2	3,8
Physical changes after doing exercise activities	Yes (body is fitter, body muscles are not stiff, feeling happy)			50	96,2
	No			2	3,8

The finding showed that after community service, there was an increase in the level of physical activity, from 9 people at a moderate level to 17 people at a moderate level. This shows an increase in awareness among the elderly for physical activity. This increase can occur because in this community service activity, the elderly is given an understanding of the importance of sports, such as exercise in an effort to prevent diabetes mellitus. They are also encouraged to take the time to take part in elderly exercise activities, which are regularly held in Senggreng Village. Doing physical activity regularly can improve the physical condition, and it is better than people who do not regularly do physical activity. Physical activity's benefits are increasing flexibility and balance, maintaining metabolism, maintaining body weight, strengthening bones, reducing joint pain, improving blood flow, increasing body immunity, and reducing stress (Jehaman et al., 2022).

There has been an increase in elderly people who often exercise, have done foot exercises for diabetes, have health checks, control their diet, and have knowledge of diabetes prevention. The majority (96.2%) of the elderly in Resilient Elderly School Kromoleo 1 Senggreng Village stated that they felt physical changes after doing exercise activities, such as a fitter body, less stiff muscles, and a feeling of happiness. Given the rapid increase in the elderly population, the importance of mobility and independent movement in the coming years should not be underestimated. The standard for being physically independent is to carry out normal daily activities such as

doing simple household work, climbing stairs, lifting and carrying objects, and shopping alone so as to maintain the required physical fitness capacity (Diedhiou & Andre, 2021).

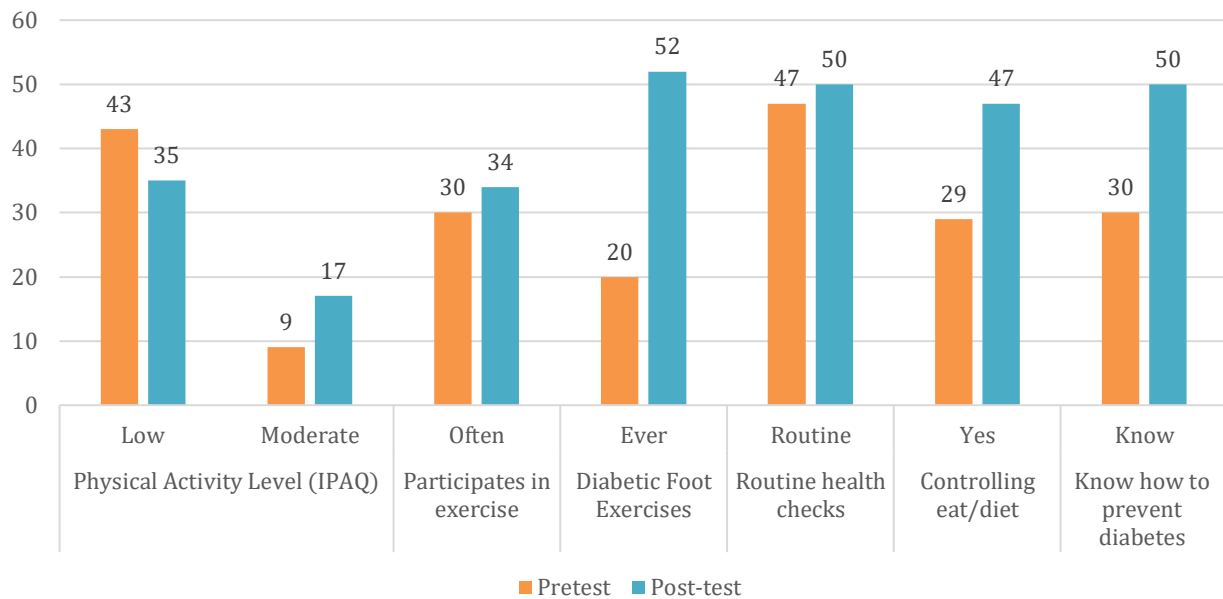


Figure 3. Pre-test and post-test results

Physical activity can be defined as body movement caused by the body's muscles and resulting in the burning of energy. When doing physical activity, muscles will use glucose stored in the body so that glucose levels in the blood will decrease and become more stable. Therefore, more active elderly tend to be healthier compared to elderly people who are sedentary (Lumi et al., 2018). Elderly people, or seniors, who are active and exercise have been shown to be healthier and have a lower risk of chronic disease. Apart from that, active elderly people also suffer less from cognitive disorders; their physical and mental function is still relatively good compared to those who rarely exercise. Elderly exercise can be a way for the elderly to move their bodies, and exercise can also be an effective physical therapy for the elderly (Widayati et al., 2020). Regular physical activity plays a role in the primary and secondary prevention of chronic diseases, including cardiovascular disease, diabetes, depression, premature death, and so on (Zhou et al., 2023). One of the complaints that many elderly experiences is that they get tired easily when doing daily work. This can happen because the body is not trained to do physical activity and exercise. Regular physical activity can increase body stamina and make the body fitter due to increased immunity (Jehaman et al., 2022). The World Health Organization (WHO) recommends that older persons exercise moderately for 150 minutes each week to get health advantages. Strength and flexibility training at least twice a week is also recommended (Muellmann et al., 2018).

Diabetes in the elderly is becoming more common as the diabetes epidemic spreads and people with diabetes live longer (Kalra & Sharma, 2018). The most common diabetic complication is the development of diabetic peripheral neuropathy (DPN), which results in muscle dysfunction in the lower limbs, impairing movement and increasing the risk of falls in the elderly. It has been postulated that improving balance and stability, as well as lower-body strength, in people with DPN has the potential to improve gait and physical activity while also reducing disability, foot deformity, and the risk of amputation (Holmes & Hastings, 2021). Physical activity is one of the most important parts of diabetes care. In the elderly, maintaining mobility as well as regular physical activity is an essential aspect of nursing care. Such workouts help in the prevention and reduction of sarcopenia or muscle loss. This, in turn, contributes to the prevention of falls and fractures (Kalra & Sharma, 2018).

The occurrence of diabetes mellitus can not only be prevented by doing regular physical activity but can also be prevented by avoiding foods high in glucose. Some examples of foods that diabetes mellitus patients need to limit are rice, sticky rice, rice cake, potatoes, sweet potatoes, and flour-based foods. Meanwhile, foods that diabetes mellitus patients should not eat are granulated sugar, sweet cakes, jam, sweetened condensed milk, and sweet soy sauce (Setyaningrum & Nissa, 2020). Then, after participating in community service activities, there were an increase in the knowledge of the elderly regarding the prevention of diabetes mellitus and an increase in elderly who controlled their diet to maintain health. This increase shows that the elderly better understands and realize the importance of controlling their diet to maintain their health. With the knowledge, it is hoped that the elderly will be able to prevent themselves from diabetes mellitus. Dietary control is an activity to reduce or

avoid certain types of food. Controlling diet is a good thing for the elderly to prevent degenerative diseases. The body aging process in the elderly can be slowed down with good physical fitness and food intake (Kurniawati, 2018).

The community service program "GANTARI" also introduces another type of exercise for the elderly, namely diabetic foot exercises. Diabetic foot exercises focus on improving blood circulation and maintaining the strength of the small muscles in the feet. This exercise is light and easy for the elderly to do. Diabetic foot exercises have been linked in reducing blood sugar levels in people with type 2 diabetes mellitus and also foot exercise significantly decreases the ulcer areas in type 2 diabetic patients (Eraydin & Avsar, 2018; Sari, 2018). Diabetic foot exercises can be done anywhere and by anyone, not necessarily people who suffer from diabetes mellitus.

The elderly in Senggreng Village changed their behavior and gained knowledge after participating in the "GANTARI" activity. As a result, the "GANTARI" community service activity was successful in promoting sports and physical activity to protect the elderly from degenerative diseases, particularly diabetes mellitus. This GANTARI program has the potential for sustainability, which can be seen through the results of evaluations carried out on the problems faced by partners. Therefore, this service activity will be initial data that can be used to carry out subsequent program.

#### 4. CONCLUSION

The community service program "GANTARI" (*Gerakan Lansia Tangguh, Bugar dan Aktif*) received a positive response from various parties. The pre-test and post-test with the IPAQ questionnaire were successfully completed by 52 elderly people in Senggreng Village. Based on the results of the pre-test and post-test, there were several changes in behavior and increased knowledge in the elderly of Senggreng Village after participating in the "GANTARI" community service program. These changes include increasing the level of physical activity, increasing awareness of physical activity such as taking part in elderly exercise or diabetes exercise, improving the physical condition of the elderly to become fitter, increasing knowledge about the prevention of diabetes mellitus, and the importance of controlling diet. The community service activity "GANTARI" which was carried out in Senggreng Village, Sumberpucung District, Malang Regency was successful in promoting sports and physical activity to prevent the elderly from degenerative diseases, especially diabetes mellitus and can be recommended as a routine program in the community. As a result, this service activity will serve as the starting point for future programs.

#### 5. ACKNOWLEDGMENT

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