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Newspaper Leg Exercise to Reduce the Type 2 Diabetes Mellitus Physical Symptoms

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ABSTRACT

This study aimed to determine the differences in paper leg exercise to reduce the symptoms of Type 2 DM in Elderly Family Guidance Center in Indonesia. This study used a pre-experimental method with a one-group pretest-posttest design. Inclusion criteria were the elderly who were more than 45 years old. All respondens are notready diagnosed with diabetes. The research subjects became one group and then data collection and measurements were carried out before and after being given newspaper gymnastics treatment. This is intended to be able to find out the differences experienced by the subject before and after being given treatment. Data analysis using Wilcoxon. The mean value for the pretest is 1.65 and for the posttest is 0.01. The mean between the two shows results that have different differences.. The results of Wilcoxon's analysis showed a significance differences. Its means that paper leg exercise can provide a significant difference in reducing physical symptoms of Type 2 DM. There were differences between the pretest and posttest. This shows that exercise can significantly reduce the physical symptoms of diabetes millitus in the elderly.

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Introduction

Diabetes mellitus (DM) considers a common health issue in the elderly population. DM death in Indonesia placed second position of leading cause of death after Srilanka [1]. Data from the National Statistical Institute, Ministry of National Development Planning, and UNFPA stated that unhealthy elderly population would put more burden on the working-age population [2].

A diabetes mellitus risk screening conducted in Padukuhan Semanu Tengah Gunungkidul confirmed that 85.9%, 6.3%, and 7.8% of survey participants were identified as low, moderate, and high risk of type 2 DM, respectively [3]. The older age group (>45 years old) is a typical target of DM primary prevention [4]. Research result found that foot exercise is a highly recommended physical activity for DM patients [5]. A more specific form of the exercise is a paper foot exercise. Further, another research confirmed the effect of foot exercise to lower blood glucose levels in the elderly population in the Public Health Center Area of Colomadu 1 Karanganyar [6].

International Diabetes Federation (IDF), IDF Diabetes Atlas 7th Edition 2012 defined Diabetes Mellitus (DM) as a chronic condition marked by blood glucose level elevation due to pancreas failure to produce an adequate amount of insulin [7]. Lack of physical activity, genetic, and unhealthy eating habits had been widely confirmed as factors that contributed to DM [8]. The classic symptoms of DM include polydipsia, polyphagia, glycosuria, dehydration, fatigue, weight loss, vision loss, muscle cramping, constipation, and candida infection [9].

The symptoms of DM are divided into two major groups: acute and chronic. Acute symptoms consisted of polydipsia, polyphagia, polydipsia, and weight loss. Tingling/ burn/ thick sensation on the skin, cramping, fatigue, tiredness, blurry vision, tooth decay, sexual dysfunction, and impotent are classified on chronic symptom group. Additionally, pregnant women with DM could experience miscarriage or give birth to a large baby (macrosomia)[10].

Diabetes mellitus causes several complications which are divided into microvascular and macrovascular, as many as 1,785 diabetic patients in Indonesia who experience complications, including 16% of patients experiencing macrovascular complications, and 27.6% microvascular complications, while the incidence of diabetic neuropathy which includes microvascular complications is 63, 5% [11]. Diabetic neuropathy is one of the complications of diabetes mellitus with the most frequent occurrence because its incidence is between 60%-70% in type I and type II diabetes mellitus patients and worsens the quality of life due to decreased sensory sensation which results in diabetes mellitus patients being more susceptible to injuries in the foot area [12]. The results of Tofure's study (2021) showed that the age of most diabetic peripheral neuropathy patients was >55 years as many as 20 patients (71.43%), female sex as

many as 17 patients (60.71%), duration of suffering from DM was >5 years as many as 21 patients (75%). With increasing age, the risk of neuropathy complications increases [13].

One of the efforts in realizing strong elderly is in the form of gymnastics for the elderly. Newspaper/paper gymnastics is an example of such gymnastics. Gymnastics is a physical exercise that delivers advantageous effects on elderly physical health. Gymnastic sessions for the elderly population have been designed with simple movements, well-planned and directed movements, and regular tones. Routine gymnastic sessions provide a wealth of benefits for elderly physical, psychological, social, and environmental aspects. Gymnastics maintain body fitness, remove free radicals, and improve cardiovascular endurance [14]. In line with these beneficial impacts of gymnastic sessions, The several benefits of gymnastic exercise on the elderly population: body fitness improvement, balance and movement coordination improvement, breathing process correction, and healthy blood pressure maintenance. It also relieves insomnia, improves the quality of sleep, suppresses negative feelings, alleviates stress levels, and manages pain [15].

Law Number 13 of 1998 mentioned elderly as an individual 60 years of age or older. The population of the elderly is estimated will be increased annually. A healthy, productive, and independent elderly brings a positive impact to societies [16]. The law also explains that there is cooperation between the government and the community to deal with issues regarding the welfare of the elderly. The need for local-based institutions development recently raised due to the demand for close management and supervision of the local elderly population. The National Board of Population and Family Planning is mandated to provide adequate funds and technical aid for these local institutions. An Elderly Family Guidance Center is a form of the local group developed to enhance family members' skills in caring for their elderly family members, creating resilient elderly (*lansia tangguh* in Bahasa Indonesia) [17].

Based on data from the DM cohort of the Saptosari Health Center in mid-2021, there was an increase in the number of services for DM patients. An increase in the number of DM patient visits from January to June 2021 by 85% [18]. Elderly Family Guidance Center of Manunggal Asih is an local elderly community-based institution in Saptosari District, Gunungkidul, Yogyakarta. Fivety two participants were considered active members of the guidance center. Elderly Integrated Healthcare Service is routinely conducted every month. In addition to the posyandu, since 2019 this BKL has participated in other activities. The activity is an elderly school organized by Indonesia Ramah Lingkungan (IRL). This school meetings are also held monthly [19]. During the observation of activities carried out from 2019-2021, elderly participants were always given consumption of sweet tea. This is in line with the culture of the local community, regarding the habit of drinking sweet tea for everyone, whether in the

morning or during a celebration. So that when the pretest was measured, DM symptoms appeared. On average 5 out of 52 elderly feel the physical symptoms of DM. The symptoms of DM are polydipsia, polyphagia, polyuria and other chronic symptoms. The old age group (elderly) is the primary prevention target for DM. This study aimed to determine the differences in newspaper leg exercise to reduce the physical symptoms of type 2 DM in BKL Manunggal Asih Saptosari Gunungkidul.

Methods

This study used a pre-experimental method with a one-group pretest-posttest design, where the research subjects became one group and then collected data and measurements before and after being given treatment with the intention of knowing whether there were changes experienced by the subject before and after being given treatment [20]. The exercise intervention was carried out once a week for two months. Inclusion criteria were the elderly who were more than 45 years old at BKL Manunggal Asih. All respondens are notready diagnosed with diabetes.

The instrument used in this study was a DM symptom check list sheet in the form of a pretest and posttest with the same question content. Data collection in this study used a check list sheet for DM symptoms with the grid listed in Table 1.

Table 1. Research Instrument Rubrics

Indicator	Questions	No. Item
Polydipsi	Many drink,	1
Polyphagia	Eat a alot	2
Polyuria	Pee a lot	3
Weight loss	Weight loss	4
Chronic symptoms	fatigue, tingling, burn/needling, itchy thick/numb, cramps, sleepy, blurry vision, tooth decay, sexual dysfunction, miscarriage, obesity	5-15
Total		15

The process of data analysis is carried out after the results of the answers from the collected questionnaires are obtained, then processing is carried out with the steps. The instrument was tested with validity and reliability tests in 30 respondents. Cronbach`s Alpha value 0.885 >0.6 which means reliable.

The results of the data that have been collected are then analyzed by presenting the data descriptively and being tested for differences between pre-test and post-test using Wilcoxon.

Result

Findings revealed that the majority of participants were female (61%: 32 participants). Only 20 male participants (39%) participated in the study. Thirty participants (58%) were aged between 60-74 years old. Only 13 (25%) and 9 (17%) participants aged between 45-59 and 75-90 years old, respectively. The majority of participants did not go to school (52%). Twenty-three (52%), 1 (2%), and 1 (2%) participant graduated from elementary school, Junior High School, and Senior High School, respectively.

Table 2. Participant's Demographic Characteristics

Demographic Characteristic		Total	%
Gender	Male	20	39
	Female	32	61
Age (Years)	45-59	13	25
	60-74	30	58
	75-90	9	17
	>90	0	0
Educational Background	Did not go to school	27	52
	Elementary School	23	44
	Junior High School	1	2
	Senior High School	1	2
	Total	52	100

The data were collected by the cadres due to the physical distancing measures during the Covid-19 pandemic. Type 2 DM symptoms among the participants were elaborated in Table 3.

Table 3. Symptoms of Type 2 DM Perceived by Participants

Indicators	Question Items	N Pretest		N Prostest	
		Yes	No	Yes	No
Polydipsia	1	2	50	0	52
Polyphagia	2	2	50	0	52
Polyuria	3	7	45	0	52
Weight Loss	4	0	52	0	52
Fatigue, tiredness	5	14	38	0	52
Tingling	6	15	37	0	52
Burn/needling	7	1	51	0	52
Itchy	8	6	46	0	52
Thick/cramps	9	2	50	0	52
Sleepy	10	11	41	0	52
Blurry vision	11	7	45	0	52
Tooth decay	12	12	40	1	51
Sexual Dysfunction	13	5	47	0	52
Miscarriage	14	2	50	0	52
Obesity	15	0	52	0	52
Total		86	694	1	779

Table 3 presents the symptoms perceived by the participants before and after the paper leg exercise mentorship. Participants perceived fewer polydipsia, polyphagia, and polyuria symptoms on the post-test. Only two participants perceived the symptoms of polydipsia and polyphagia in the pre-test session. However, none of the participants perceived those symptoms during the post-test session. This finding indicated that no symptoms of polydipsia and polyphagia were perceived by the participants after the paper leg exercise mentorship. Further, seven participants stated the symptom of polyuria in the pre-test session. Later on, in the post-test session, none of the participants stated the symptom of polyuria. No symptoms of weight loss were perceived by the participants before and after the intervention. Findings also revealed a noteworthy decrease in chronic symptoms (fatigue, tingling, burn/needling, itchy, thick/cramps, sleepy, blurry vision, sexual dysfunction, miscarriage, obesity) perceived by the participants. Only one participant perceived a chronic symptom (tooth decay) depicted by question number 12 at the post-test.

The results of the descriptive analysis of DM symptoms data pretest and posttest can be presented in Table 4.

Table 4. Result of The Pretest And Posttest Data Analysis

	Mean	N	Std. Deviation	P
Pretest	1.6538	52	2.51181	0.000
Postest	0.0192	52	0.13868	

Based on the results obtained, it is shown that the mean value for the pretest is 1.65 and for the posttest is 0.01. The mean between the two shows results that have different differences. The results of Wilcoxon's analysis showed a significance value of 0.000. This value means that 0.000 <0.05 thus there is a significant difference between the pretest and posttest.

Discussion

This study was conducted in the Elderly Family Guidance Center of Manunggal Asih Saptosari Gunungkidul from September to December 2021, involving 52 participants. The recent study directly distributed a pre-test and post-test questionnaire to the participants to identify the effect of leg paper exercise activity on type 2 DM physical symptoms. The results showed that the significant value was 0.000 so it could be stated that there was a significant difference between the pretest and posttest. This shows that newspaper leg exercise can significantly reduce the physical symptoms of diabetes millitus in the elderly at BKL Manunggal Asih Saptosari Gunungkidul. Gymnastic sessions for the elderly have been designed with simple movements, well-planned and directed movements, and regular tones. Gymnastics has been widely proven as a physical exercise type with a wealth of benefits, including maintaining body fitness, removing free radicals, and improving cardiovascular endurance [14].

The absence of physical symptoms of DM that appeared after the posttest means that the benefits of newspaper leg gymnastics can be felt by the elderly. This is in line with the research results of Agustia (2003) that elderly exercise can be felt physiologically, psychologically and socially. On the physiological benefits, the direct impact can help regulate blood sugar levels, stimulate adrenaline and non-adrenaline, improve sleep quality [21]. It manages the blood glucose level, Additionally, the long-term exercise would provide higher aerobic/cardiovascular endurance, stronger skeletal muscle, higher flexibility, balance, and movement coordination. Hence, it could decrease the risk of falls, improve range of motion, and boost the immune system [21]. Nearly all participants perceived no chronic symptoms in the post-test sessions. Only one participant stated the complaint of tooth decay (item number 12). He was diagnosed with type 2 DM by a family physician at Saptosari Public Health Center and taking regular medication to manage his blood glucose level. This chronic symptom finding did not statistically affect the level of effectiveness of the paper leg exercise gymnastic.

The psychological and social impacts among elderlies who regularly exercise together are also highlighted [21]. They stated pleasant feelings obtained from the social interactions. Pandemic had been limiting their social spaces, routine gymnastic sessions provided a healthy and safe space for social interactions for the elderly. This result was also parallel with the recent finding.

Conclusion

The conclusion of the research with the title of Newspaper leg exercise Gymnastics to Reduce phisical Symptoms of Diabetes Mellitus in the Elderly is known that the mean value for the pretest is 1.65 and for the posttest is 0.01. The mean between the two shows results that have different differences. The results of Wilcoxon's analysis showed a significance value of 0.000. This value means that 0.000 <0.05 thus there is a significant difference between the pretest and posttest. This shows that newspaper leg exercise gymnastic can significantly reduce the physical symptoms of diabetes mellitus in the elderly at BKL Manunggal Asih Saptosari Gunungkidul.

Recommendation

The limitation of this study is that it only measures physical symptoms of DM and does not measure blood suger level. For other researchers, measurements can be made with other forms of therapy and using blood suger lavel. So that it can be a comparison of its effectiveness with this newspaper leg exercise therapy. Furthermore, after this newspaper leg exercise therapy assistance is carried out, it is hoped that cadre officers and the local community will maintain their health so that DM symptoms do not reappear.

Conflict of Interest

The authors declare that there is no conflict of interest.

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