The effect of ergonomic exercise based on spiritual care on distress levels in elderly with diabetes mellitus

Siti Nur Hasina*, M. Shodiq†, Mochamad Ikwan‡, Rahmadanier Aditya Putri§, Iis Noventi®, Budhi Setianto2,3

ABSTRACT

Introduction: The elderly are a range group, the older they get, the more problems they will have, such as Diabetes Mellitus. Diabetes Mellitus and distress are two things that affect each other, either directly or indirectly. Management of Diabetes Mellitus in daily life can be a burden for people with DM, so it can cause feelings of frustration, anger, being overwhelmed, and hopelessness. This study aimed to analyze the effect of Ergonomic Exercise Based on Spiritual Care on Distress Levels in the Elderly with Diabetes Mellitus.

Method: This study used a Quasy Experimental design with a pre-test and post-test with a control group. The population in this study were all elderly people with Diabetes Mellitus who attended the Mahatma Elderly Posyandu. Instrument The measurement of the level of distress using the Diabetes Distress Scale (DDS) questionnaire. Data analysis using paired t-test and independent t-test.

Results: The results of this study showed that the average level of distress before being given ergonomic exercise based on spiritual care in the intervention group was 2.65 (moderate distress) and 2.66 (moderate distress) in the control group with p-value = 0.843. The level of distress after being given an ergonomic exercise based on spiritual care found the average level of distress in the intervention group was 1.52 (mild distress) and in the control group 2.80 (moderate distress) with a p-value = 0.000.

Conclusion: This study shows that the effectiveness of ergonomic exercise and spiritual care can reduce distress levels. So that this research is highly recommended for nurses in carrying out their duties independently in providing non-pharmacological therapy to reduce distress levels, especially in the elderly with diabetes mellitus.

Keywords: Diabetes Mellitus, Distress, Ergonomic Exercise, Spiritual Care.

INTRODUCTION

The elderly are an age group in which people are entering the last phase of their life stages. The elderly will face different physical, biological, mental, and economic problems.1 Elderly is a group that is susceptible to disease, both communicable and non-communicable diseases. One of them is diabetes mellitus which is a group of non-communicable diseases. Diabetes mellitus is a serious disease and is a major cause of morbidity and mortality and imposes a high economic burden on healthcare systems worldwide.2 Diabetes mellitus is a chronic disease that must face discomfort, follow regular treatment, must change behavior to minimize unwanted outcomes, adjust social life, and work to minimize symptoms and functional limitations.3 Patients with chronic or terminal illnesses can lead to depression and loss of meaning in life.3

The 2016 World Health Organization (WHO) Global Report stated that globally an estimated 422 million adults were living with diabetes in 2014. The largest number of people with diabetes is estimated to come from Southeast Asia. The estimated number of people with diabetes mellitus in the top ten countries with the most diabetes sufferers in 2000, Indonesia was ranked 4th with 8.4 million people with diabetes. In 2030 WHO estimates that people with diabetes in Indonesia will reach 21.3 million.4 The prevalence of diabetes mellitus in East Java in 2018 was based on a doctor’s diagnosis in residents of all ages and the prevalence of routinely checking blood sugar levels was 2.4%.5 East Java Province is ranked 6th out of 10 Indonesian provinces for the highest diabetes prevalence of 2.1%, which is higher than the national average DM prevalence of 1.5%. The city of Surabaya has the highest number of Diabetes Mellitus sufferers and has increased from 102,599 in 2017 to 115,460 in 2018.6

Diabetes-related glucose metabolism disorders lead to disruptions in the control of blood glucose levels, which harm blood glucose homeostasis. Fasting blood glucose levels and blood glucose levels two hours after a glucose load are the standard tests.7 People with diabetes mellitus who are elderly may experience changes in their physiological function.8 Elderly people

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who change physiological processes experienced by a person depending on the ailment he suffers from can become stressed out as a result of these changes. Elderly people are less likely to experience stress when they are physically well, and vice versa; the worse their health, the more frequently they experience stress. If the stress in the elderly with diabetes mellitus is not addressed, it can lead to bad behavior that is frequently referred to as distress.

DM patients’ attempts to control their blood sugar will be impacted by their level of distress. People with type 2 diabetes who experience diabetes-related distress (DD) and depressive symptoms (DS) may alter their self-management strategies. Approximately, 40% of patients with diabetes are often distressed by their condition worldwide. In a study of 506 people with type 2 diabetes mellitus in San Francisco, Fisher et al. (2008) found that up to 70% of patients reported diabetes distress. People with Diabetes Mellitus may feel frustrated, angry, overwhelmed, and hopeless as a result of managing their condition daily. Twenty-six patients (39.4%) with DM did not suffer distress, and forty (60.6%) patients with DM fell into the moderate distress category.

Diabetes Mellitus and distress are two things that influence each other, both directly and indirectly. Management in preventing the decline in functions and organs of the elderly is very necessary so the management of DM has 5 pillars, namely diet planning, physical exercise, pharmacological therapy, education, and monitoring of blood glucose. Since 2011, the program for putting the five Diabetes Mellitus pillars into practice has been in place. Its execution, however, has not been ideal since patients find it challenging to do so with lifelong medical circumstances, and occasionally grow tired of the different restrictions linked to the management of Diabetes Mellitus.

Many persons with diabetes (DM) today are more focused and exclusively prioritize managing their food and taking medications, even though regular diet management does not always result in stable blood glucose levels and must be counterbalanced by proper physical activity. Because little muscle metabolism happens in people with diabetes who do not exercise, the amount of glucose used by the blood is decreased. High blood glucose may come from this because it can induce a buildup of glucose in the blood. Every DM patient frequently neglects physical activity or body movement. This can be attributed to several factors, including a lack of time for gymnastics or physical activity due to age-related limitations on employment, a lack of interest in physical activity, and a lack of knowledge about the benefits of exercise.

Physical exercises like gymnastics. The rise in DM cases can be attributed to unhealthy lifestyle choices. For instance, many people consume fatty meals, which leads to obesity, and they engage in less physical activity, which impairs their body’s metabolism and causes unstable blood sugar levels. If we understand the fundamentals of the condition and are aware of lifestyle modifications, diabetes mellitus can be avoided.

Even among diabetes people, regular exercise can lower the chance of developing several chronic diseases, including cancer, hypertension, obesity, cardiovascular disease, and others, as well as of dying too young. Most type 2 diabetes mellitus patients reported low levels of physical activity and increased diabetes-related distress. There was a significantly decreased risk of diabetic distress among those who reported engaging in moderate to intense physical activity. People with diabetes mellitus should engage in regular physical activity, especially when dealing with elevated blood glucose levels. Ergonomic exercises are one of the suggested exercises. Exercise that improves blood circulation, insulin sensitivity, and muscle glucose uptake, such as ergonomic exercise, lowers blood glucose levels.

Ergonomic exercise is a collection of movements in the body or usually called exercise (exercise) that is adapted to the rules of body creation or is fundamental to the arrangement of physiological functions that imitate prayer movements. Ergonomic exercise is a combination of muscle movement and breathing. Conscious breathing techniques using the diaphragm muscles can slowly lift the abdomen and fully expand the chest. Due to the diaphragm’s rise and fall, which opens blockages and increases blood flow to the heart and throughout the body, this breathing method can produce a helpful massage of the heart. Oxygen and nutrients may increase with increased blood flow. The brain will produce more serotonin when its oxygen levels are higher, which will calm the body and make it easier to fall asleep, improving the quality of both sleep and life.

Based on previous research, Ergonomic Exercise can significantly reduce distress in the elderly with diabetes mellitus. Ergonomic gymnastics can reduce Diabetes Mellitus distress scores performed on 30 respondents within 25 minutes for 6 consecutive days. The findings of Dian’s research (2019) showed that there was a decrease in blood sugar levels, with an average of 199.61 mg/dl before receiving ergonomic exercise compared to 146.56 mg/dl after receiving ergonomic exercise. Additionally, gout arthritis patients can benefit from the implementation of spiritual care-based ergonomic exercises to lessen their discomfort.

Because spiritual care is a crucial requirement for every person in all places and eras, with physical and spiritual aspects as well as religious and non-religious forms, the value of spiritual care that is incorporated into ergonomic exercise boosts effectiveness in lowering patient suffering. To treat patients effectively and prevent patients from becoming distressed or worsening a condition like diabetes mellitus, spiritual care is an innate need and the key component of comprehensive treatment.

Stressing the importance of spiritual care through growing closer to God can help people cope with life’s challenges and can create conditions that are accompanied by hope, which can help people stay stress-free.

The advantage of ergonomic exercise is that only with six movements the elderly can still do physical exercise, this exercise does not expend a lot of energy from the elderly but has many benefits for the body. Ergonomic exercise is useful for burning uric acid, cholesterol, blood sugar, and lactic acid, restoring the flexibility of the nervous system, maximizing oxygen supply to the brain, opening intelligence, being able to refresh the body, and being able to remove negative energy from the
body. From the above background, the purpose of this study was to determine the effect of spiritual care-based ergonomic exercises on the level of distress in the elderly with diabetes mellitus.

MATERIALS AND METHODS

Materials

The design of this study used a quick experimental design with a pretest and a posttest with a control group. The dependent variable in this study was ergonomic exercise based on spiritual care and the independent variables in this study were the level of distress and blood sugar levels in the elderly with diabetes mellitus.

The population in this study were all elderly people with Diabetes Mellitus who attended the Mahatma Elderly Posyandu in the RW. 03 Manukan Kulon Surabaya. Sampling was done by purposive sampling with inclusion criteria: Patients with type II diabetes mellitus with antidiabetic treatment, aged 60 years and over, diagnosed by a doctor with diabetes mellitus, experiencing moderate to severe distress, willing to participate in the entire exercise program to completion and exclusion criteria: elderly Diabetes Mellitus with comorbidities such as stroke and heart disease, shortness of breath, fractures in the legs. The total number of respondents in this study amounted to 104, divided into 52 persons in the intervention groups and 52 persons in the control groups.

This research was conducted in April-June 2022. Ergonomic Exercise based on spiritual Care-Intervention was given 3 times in 1 week and carried out for 4 weeks with a duration of 20 minutes. And the control group received therapy in the form of elderly gymnastics which was carried out routinely by the elderly Posyandu once every 1 week with a duration of 1 hour.

Data collection procedures

Researchers determine research respondents according to predetermined criteria based on data from the Chair of the Mahatma Elderly Posyandu. Researchers make door-to-door visits to each respondent’s house based on data obtained from the Head of Posyandu Mahatma Surabaya, regarding the research mechanism. Respondents who are willing to participate in the study are asked to sign an informed consent form. The researcher gives the DDS questionnaire sheet to the respondents to be filled in with an allocation of 10-15 minutes if the respondent has difficulty reading or interpreting the words in the text. The contents of the questionnaire, the researcher reads the contents of the questionnaire and explains words that are difficult to interpret so that they can be understood by the respondent. The researcher checks blood sugar levels at the time, to answer these questions and to check whether the respondents met the inclusion criteria. The door-to-door researcher conducted a spiritual-based Ergonomic Exercise intervention in the care intervention group for 4 weeks and the control group was not given any treatment. Ergonomic exercises based on spiritual care are 6 ergonomic exercise movements consisting of 6 movements, namely standing perfectly, chest movement, submission to gratitude, sitting mighty, sitting burning, and lying down resignedly with the remembrance of Allah, with feelings of sincerity and gratitude. At week 4 the intervention group and the control group were assessed the level of distress.

The measurement of distress in this study used the DDS questionnaire compiled by Polonsky et al (2005). This questionnaire consists of four sub-scales that represent the causes of diabetes distress in type 2 DM patients, namely emotional burden, distress related to health workers, distress due to DM care and treatment, and distress related to interpersonal. The assessment of the questionnaire is a score of 1 for the answer that does not match at all or never; a score of 2 for answers slightly appropriate or rarely; 3 points for appropriate answers at a certain level or sometimes; a score of 4 for answers for conforming within the considered limits or somewhat frequently; 5 points for appropriate or frequent answers; 6 points for every appropriate or very frequent answer. The results of measuring diabetes distress with the DDS questionnaire were obtained by adding up all values and then dividing by the number of questions listed. The minimum score for diabetes distress is 1 and the maximum score is 6. The criteria for assessing the Diabetes Distress Scale questionnaire are the average assessment of no distress/mild distress: <2.0, moderate distress: 2.0-3.0, and severe distress: >3.0.

The validity test on the DDS instrument has been carried out by Riska Annisa Hanif (2012) by using a sample of 20 types 2 DM patients in the work area of the Sumbersari Health Center with the value of r table in the DDS validity test is r = 0.444. The results of the validity test obtained r values between 0.534-0.607. The results of the reliability test obtained Crobanch’s Alpha value of > 0.87.

Data analysis

In this study, age, gender, profession, and length of diabetes mellitus were analyzed as a single variable. This study used independent t-tests and paired t-tests with a significance threshold of 0.05 to examine the effect of ergonomic exercise based on spiritual care on the distress levels of elderly people with diabetes.

RESULTS

Table 2 shows that the demographic data of this study by age showed that most (51.9%) of respondents in the intervention group were aged 55-65 years, while for respondents in the control group, the majority (53.9%) were aged 55-65 years. Characteristics of respondents according to gender, the results showed that most (67.3%) of respondents in the intervention group were female, while in the control group, the majority (71.2%) were female. Most of the respondents in the intervention group (53.8%) don’t work and the majority (55.7%) don’t work in the control group.

Table 1. Questionnaire Details

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Question Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Emotional burden</td>
<td>1,3,8,11,14</td>
</tr>
<tr>
<td>2. Distress related to health workers</td>
<td>2,4,9,15</td>
</tr>
<tr>
<td>3. Distress due to DM treatment and management</td>
<td>5,6,10,12,16</td>
</tr>
<tr>
<td>4. Distress related to interpersonal</td>
<td>7,13,17</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
</tr>
</tbody>
</table>

**Table 2.**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total dialysis</td>
<td>408</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>3.36 (1.32)</td>
</tr>
<tr>
<td>Median (Interquartile Range)</td>
<td>3.50 (2.78)</td>
</tr>
<tr>
<td>N (%)</td>
<td>104</td>
</tr>
<tr>
<td>Type of diabetes mellitus</td>
<td>Diabetes type 2</td>
</tr>
<tr>
<td>Age</td>
<td>55-65 years</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
</tr>
<tr>
<td>Profession</td>
<td>Not working</td>
</tr>
<tr>
<td>Length of diabetes mellitus</td>
<td>5 years</td>
</tr>
</tbody>
</table>

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</tr>
</tbody>
</table>
Duration of Diabetes Mellitus (DM) in the intervention group, almost half (42.3%) had diabetes mellitus for 5-10 years. Duration of Diabetes Mellitus (DM) in the control group, almost half (44.2%) had diabetes mellitus for 5-10 years.

The results of the normality test of the level of Distress variables pre-test and post-test in the intervention group and control group with the Kolmogorov Smirnov test obtained a p value > 0.05 which means the data distribution is normal so that data analysis can be continued by using the paired t-test and statistical tests.

Table 3 shows that the average level of distress in the intervention group is 2.65 (moderate distress) and 2.66 (moderate distress) in the control group with p-value = 0.843 meaning that there is no difference in the average level of distress in the intervention group and the control group before being given the intervention.

Table 4 shows that the average level of distress in the intervention group is 1.52 (mild distress) and in the control group is 2.80 (moderate distress) with p-value = 0.000 which means that there is a difference in the average level of distress in the intervention group and the control group after being given the intervention.

Table 5 that the results of the Paired T-Test statistical test, p-value = 0.000 in the intervention group and a significance value of p = 0.004 in the control group, p-value <0.05, it can be concluded that there is a significant change in the level of distress before and after the intervention is given ergonomic exercise based on spiritual care in the intervention group and the control group.

**DISCUSSION**

Diabetes distress is a condition of negative emotional burden about the worries of living Diabetes distress is a unique emotional problem that is directly related to the burdens and worries of living with a chronic disease. This condition is characterized by ”worrying, frustration, worry, and perhaps a bit of fatigue. These emotions can be related, for example, to concerns about appropriate treatment or communicating effectively with health care providers.” There are several causes related to diabetes, namely age, gender, marital status, education level, job level, socioeconomic conditions, suffering from chronic diseases, social support, biological factors, and psychological factors.

Patients with Diabetes Mellitus experience psychological changes including stress on themselves related to the treatment that must be undertaken. Based on a study by the National Institute of Diabetes Mellitus and Digestive and Kidney Disease, the elderly can have type 1 DM and type 2 DM. People with type 1 and type 2 DM, live chronic tensions with complex self-care and are at high risk of depression and specific Emotional Distress due to DM. Distress in people with diabetes mellitus can trigger the hormone cortisol which can increase blood sugar. Distress is experienced by the elderly due to not accepting the disease they are experiencing and worrying about their illness, fearing that the disease will not heal and they feel a burden to the family and the absence of special attention from the family.

It's crucial to manage diabetes mellitus properly. Five pillars can be used to manage diabetes mellitus: education, meal planning, physical activity, medication therapies, and blood sugar monitoring. If the patient has a positive attitude, the five pillars of diabetes mellitus can...
be managed effectively. Attitude has an impact on how someone acts. It will be simpler for the patient to take action when they are in a good frame of mind, and more challenging for them to do so when they are in a negative frame of mind. It will affect stabilizing blood glucose and enhancing the quality of life of people with diabetes when the attitude of people with Diabetes Mellitus is willing to implement the five pillars of Diabetes Mellitus with the absorption of good education, appropriate eating arrangements, regular exercise, adherence to medication, and diligently checking blood sugar at the closest health facility. Mellitus.31

Chronic diseases such as diabetes mellitus can cause psychological changes, including excessive anxiety, stress, and lack of control over the stress experienced so stress causes negative things. Elderly people with diabetes mellitus certainly do not escape from distress, therefore it is important to carry out treatment so that the distress experienced can be controlled and the management can be done with physical exercise such as ergonomic exercise based on spiritual care. The results of this study prove that spiritual care-based ergonomic exercise affects decreasing the average distress of the elderly with diabetes mellitus.32,33

The elderly are an age group of people who are entering the last phase of their life. Diabetes mellitus (DM) is a metabolic problem described by hyperglycemia associated with irregular digestion of starch, lipids, and egg whites caused by decreased hormone release in the pancreas and causes persistent microvascular, macrovascular, and neuropathic discomfort. Reducing distress can be done with ergonomic exercises. Ergonomic gymnastics is a development that advances the position and adaptability of sensory systems in the bloodstream, strengthens oxygen supply to the cerebrum, and ignition system for corrosive levels of uric acid, cholesterol, and glucose. Distress in people with diabetes mellitus can trigger the hormone cortisol which can increase blood sugar. Distress is experienced by the elderly due to not accepting the disease they are experiencing and worrying about their illness, they are afraid that the disease will not heal and they feel that they are a burden to the family and there is no special attention from the family.26,34

Ergonomic exercise based on spiritual care is a gymnastic technique to restore or correct the position and flexibility of the nervous system and blood flow, maximize blood supply to the brain, open the intelligence system, sweat system, uric acid burning system, cholesterol, blood sugar, lactic acid, oxalate crystals, carbohydrate conversion system, electrolyte or ozone making system in the blood, body freshness system, and immune system from negative energy or viruses, and negative energy removal system from the body. If the health buttons have been opened, they will be free from premature senility, breast cancer, prostate, migraine, stress, cholesterol, diabetes (Diabetes Mellitus), and so on.35 According to research from Lestari, D. T., & Wahyuni, F (2016) entitled the effect of ergonomic exercise on Diabetes Mellitus Distress, it can be concluded that ergonomic exercise can reduce Diabetes Mellitus distress scores which were performed on 30 respondents within 25 minutes for 6 consecutive days.14

CONCLUSION
This study shows that the effectiveness of ergonomic exercises based on spiritual care can reduce distress levels. So this research is highly recommended for nurses in carrying out their duties independently in providing non-pharmacological therapy in reducing distress levels, especially in the elderly with diabetes mellitus.

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CONFLICT OF INTEREST
The authors declare that there is no conflict of interest. and the final manuscript of this paper has been approved by all authors.

ETHICAL CLEARANCE NUMBER
This Research has Ethical approval letter with No. 005/007/IV/EC/KEPK from the Ethics Committee of the Brahmanda Lentera Chakra Institute

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AUTHOR CONTRIBUTION
Siti Nur Hasina: Conceptualization, methodology, writing-original draft, and formal analysis
Rahmadaniar Aditya Putri: Investigation, resources, and data duration
Iis Noventi: Visualization, project administration, and funding acquisition
Budi Setianto: Writing-review and editing

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