

PHYSICAL EFFORT IN TREATING DEPRESSION IN THE ELDERLY – A SYSTEMATIC REVIEW

MONIKA FRONTCZAK^{A-F}

• ORCID: 0000-0002-6240-6175

NATALIA CIEMNA^{A-F}

• ORCID: 0000-0002-7103-7703

KORNELIA KĘDZIORA-KORNATOWSKA^{A,E}

• ORCID: 0000-0003-4777-5252

¹ Interdisciplinary Scientific Circle of Geriatrics

Collegium Medicum Ludwik Rydygier in Bydgoszcz,

Nicolaus Copernicus University in Toruń, Toruń, Poland

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ABSTRACT

Depression is the most common mental disorder among people over 65 years old, making it one of the most significant health problems for this population. Due to the fact that medications and psychological therapy are not effective in all cases, many studies in recent decades have highlighted alternative treatments for depression. In particular, physical exercise has been highlighted as a potentially beneficial form of treatment. The purpose of this paper was to conduct a review into the relationship between exercise and its effects on the treatment of depression in the elderly. Specifically, PubMed and Google Scholar were searched for articles on the effectiveness of physical activity interventions for the treatment of senile depression and the reduction of its symptoms.

The results show that physical activity is effective for reducing the symptoms of depression amongst the elderly. The positive effects of physical activity in the treatment of depression in the elderly were found for both endurance and resistance exercises, and for low-, moderate- and high-intensity exercise. Positive effects were observed for both traditional and water-based forms of exercise. Aligning the type and intensity of exercise to the patient's personal preferences also helps to enhance the effectiveness of training. Overall, it was concluded that physical exercise can serve as a valuable strategy for the protection of mental health amongst the elderly. However, more research is needed to clarify the most effective type, intensity, and frequency of exercises to treat depression.

KEYWORDS: depression, elderly people, physical activity, physical exercise

BACKGROUND

Depression is a recurrent psychiatric disorder with a chronic course [1], the main symptoms of which include: low mood, decreased interest or pleasure in most or all activities of everyday life, reduced motivation, increase or decrease in appetite and weight, insomnia or hypersomnia, psychomotor agitation or delay, fatigue, cognitive impairment (e.g. memory deficit), and thoughts of suicide or suicide attempt [2]. It is generally understood to be caused by impaired impulse transmission between neurons in the central nervous system, which causes abnormal sensitivity of receptors in synapses between nerve cells [3].

Depression is the most common mental disorder among the elderly [4]. The World Health Organization (WHO) estimate that one in ten older people are depressed, and it has been elsewhere reported that approximately 15% of adults over the age of 65 are depressed [5]. In older people, depression tends to occur along with cognitive impairment, which increases the

risk that the disease will persist. In addition, patients in this age group have a number of physical and mental comorbidities, which means that the effects of depression are more severe [6].

Several questionnaires can be used to measure depression. For example, different scales developed for the identification and diagnosis of depression include the Patient Health Questionnaire (PHQ) [7], the Hospital Anxiety and Depression Scale (HADS) [8], the Quick Inventory of Depressive Symptomatology (QIDS) [9], and the Raskin Depression Rating Scale [10]. The criterion of the 10th edition of the International Classification of Diseases (ICD-10) can also be applied by determining the occurrence and severity of depressive symptoms [11]. For elderly populations in particular, a common tool that is used is the Geriatric Depression Scale (GDS), which can be used together with a diagnostic interview performed by mental health specialists to provide an accurate diagnosis of depression [12].

Depression is commonly treated with antidepressants and psychological therapy. Medicinal pharmacological agents, such as selective serotonin reuptake inhibitors (SSRIs), serotonin / noradrenaline reuptake inhibitors (SNRIs), noradrenaline and specific serotonin antidepressants (NsSSA), are selected individually on the basis of pharmacological history and data confirmed in medical documentation [13]. The main goal of psychological therapy is to make contact with a sick person, create interest and sense of security, as well as focus on a positive perception of reality [14].

Research evidence suggests that only about half of people taking antidepressants tend to see a clinically significant response [2]. In addition, taking antidepressants is associated with side effects that may include weight gain, drowsiness, increased risk of diabetes, and sexual dysfunction [2]. Another problem associated with the treatment of depression is that antidepressants are often combined with each other, particularly when the patient struggles with other diseases, which involves numerous consultations with the doctor. Such solutions may prove to be too expensive for patients, which means that sometimes they give up treatment. Due to the limitations of existing treatments, some alternative and complementary methods have been given more attention. In particular, it has been suggested that combining existing treatments with physical exercise can lead to considerably better results [2].

Exercise has many health benefits. Physical activity leads to the secretion of endorphins (hormones associated with feelings of happiness and positive mood), and so helps to fight against stress and negative emotions. Furthermore, physical exercise reduces the level of cortisol, a stress hormone, thereby improving patients' mood and supporting the treatment of many conditions, including depression. Finally, exercise also stimulates the growth of new nerve cells and releases proteins that help the nerve cells survive, meaning that regular exercise can partially reverse the effects of aging in physiological functions [15].

An increasing amount of research is being conducted into the effectiveness of exercise in the healing process. This article focuses on geriatric mental health in particular, exploring the impact of exercise on depression symptoms in people over 60 years of age. Attention was paid to various types of exercise, their intensity, and other ailments (e.g. cancer, cognitive impairment, or reduced muscle strength). The effects of physical exercise in treating depression in the elderly were compared with cognitive-behavioral therapy (CBT), which is the most common form of psychological treatment for depression.

MATERIAL AND METHODS

A systematic literature review was carried out into the impact of physical activity on the effectiveness of depression treatment and the reduction of depressive symptoms. The PubMed and Google Scholar databases

were searched for articles on senile depression, treatment standards, the impact of physical exertion on the human body, and the depression treatment process. From the search results, all papers were examined for relevance and timeliness of information. In total, 39 relevant studies were identified. Eight studies were rejected because they were published prior to 2007 and/or because they used a sample which did not consist of elderly people. The above data is summarized in fig. 1. The studies which were included were mostly intervention studies, in which a physical activity intervention was described in detail.

RESULTS

Difficulties of the elderly

Reduced muscle strength is a phenomenon often found in older people [16], and is associated with the development of depression. For example, a review of 17 articles found a much greater likelihood of depression symptoms in people with reduced muscle strength. This suggests that the use of resistance exercises to increase muscle strength or prevent its decline could be an effective method for the treatment of depression in the elderly [17].

There are many scientific reports that oxidative stress, which can be defined as the build-up of excessive free radicals in the body (causing damage to tissues and cells), is associated with worsening symptoms of depression [18–20]. Oxidative stress is the build-up of too much free radicals in the body, which can damage tissues and cells [21]. In the Acordi da Silva study, the effects of water-based exercise on mental health and oxidative stress parameters in older people were examined. A 12-week study covered a study group of 20 depression patients aged 50–80 years and a control group of 20 people without depression aged 50–80 years. The training program completed by both groups included two 45-minute sessions per week of interval exercises in water. Exercises were performed in the low intensity range (50%-60% of maximum heart rate [HR max]). All participants were examined before and after the intervention. The study group showed a 53% decrease in depression symptoms, a 48% decrease in anxiety symptoms and a 46% decrease in oxidative stress, suggesting that low-intensity water exercises can be an effective means of treatment for depression in the elderly [22].

Older people often struggle with many different diseases at once. These comorbidities can be independent of the depression, or can serve to cause or worsen the disorder [6,23]. In both cases, physical exercise can help improve the patient's overall health and quality of life, as long as the disease is not a contraindication to physical activity. For example, the 12-week randomized study by Abdelbasset involved 69 patients with both heart failure and depression. They were randomly assigned to three groups: group 1 completed low-intensity exer-

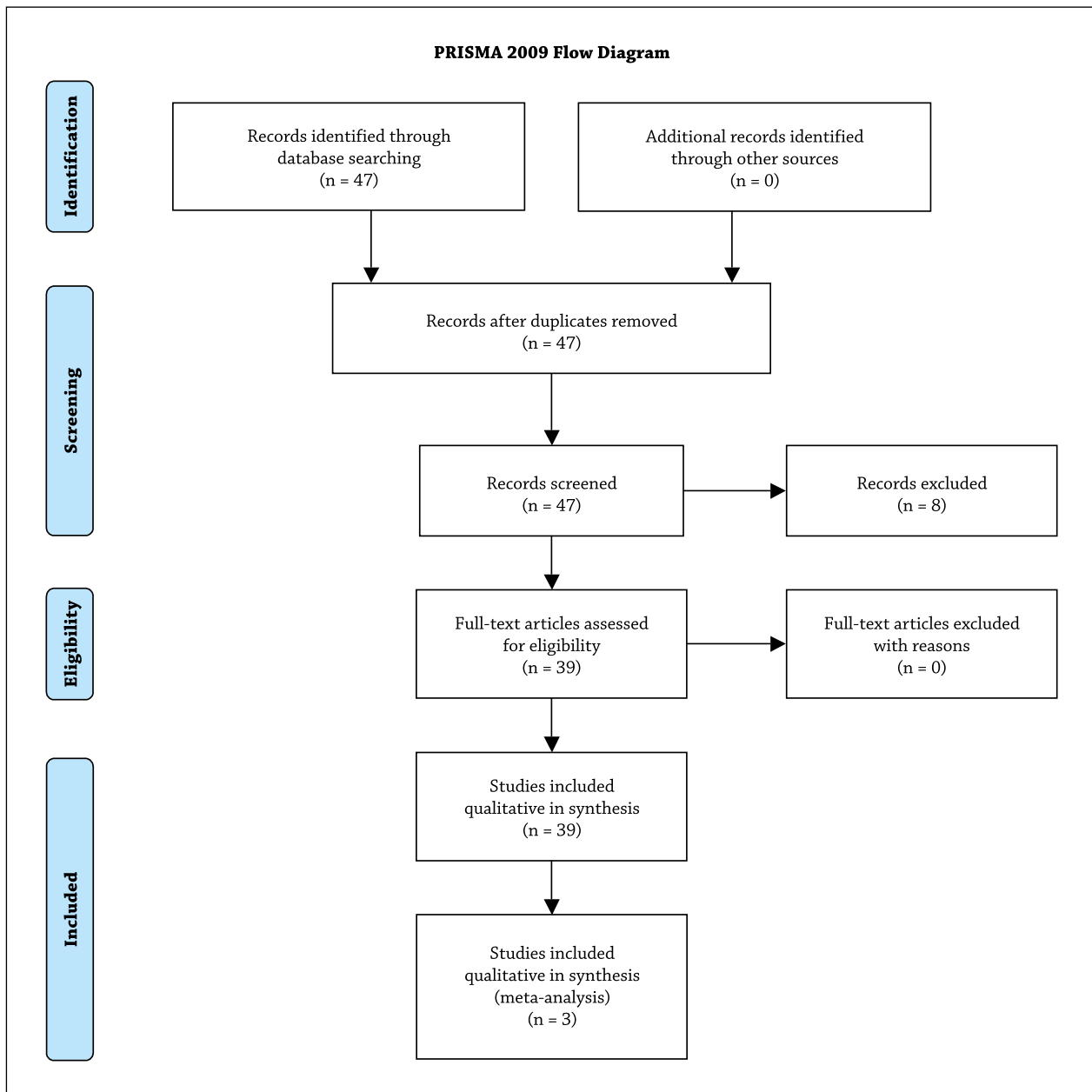


Figure 1. Summary of research used in the article

cises, group 2 completed low- to moderate-intensity exercises, while group 3 did not complete any exercise. The results of the study show that both exercise programs had a positive effect on reducing the severity of depression in patients with heart failure [24].

Depression also often accompanies cancer. Exercise helps cancer patients return to physical fitness and reduce depression symptoms. For example, a prospective study provided evidence that a 10-week intervention in the form of a twice-weekly exercise group program (consisting of gymnastics, movement games, relaxation, walking, and jogging) was effective in significantly improving the psychosocial well-being of patients and their ability to cope with the disease [25]. Similarly, the Coutiño-Escamilla study showed that a yoga exercise program resulted in a decrease in depressive symptoms in patients with breast cancer [23].

Exercise and depressive symptoms

Cognitive impairment is one of the symptoms of depression, and is also implicated in other diseases such as schizophrenia. Various studies have investigated the effects of physical activity on alleviating cognitive impairment. For example, one study showed a positive effect on mental health, cognitive function, and brain activity as a result of an exercise program in patients suffering from schizophrenia [26]. Moreover, a meta-analysis showed that a combination of cognitive and physical training strategies in patients with dementia was associated with significant improvements on patients' cognitive functions, although the study did not identify the features of the most effective types of training (e.g. exercise type, duration, and frequency) [27]. However, with respect to depression in particular, a review of randomized controlled stud-

ies including various aerobic (e.g. running, walking, and cycling) and anaerobic (e.g. weightlifting, isometric exercises) exercise interventions showed that there were no significant improvements in cognitive impairment [28]. These results were contrary to the literature data a positive effect of physical exercise on cognitive functions in other mental disorders [26,27,29]. These conflicting reports suggest there is a need for more research.

Another symptom associated with depression and a decreased quality of life is anxiety, which can be described as a fear of everyday life events. The cross-sectional study by de Oliveira and colleagues focused on the relationship between the level of quality of life, anxiety, and depression. They conducted a cross-sectional study which involved 100 older people who led an activity lifestyle and 100 people who lived in the same community but were not involved in physical activity. It was discovered that those with an active lifestyle had significantly better quality of life, and lower scores for anxiety and depression [5]. Similarly, De Mello compared the relationships between physical activity, depression, and anxiety, and found that depression and anxiety symptoms tended to be higher amongst elderly adults who did not exercise. Female participants tended to exercise less frequently than male participants, suggesting that they might be particularly at risk of developing depression [30].

Suicidal thoughts are another symptom of depression. Abbas Abdollahi investigated the effects of exercise as a complementary treatment to CBT for people with suicidal thoughts and mild to moderate depression. Seventy study participants were randomly assigned to two groups. The first group combined CBT with exercises that consisted of a 5-minute warm-up, light cardiovascular exercises, a 20-minute walk, and a 5-minute stretch combined with breathing exercises. Exercises were performed three times a week at 12 weeks at moderate intensity, with a rating of between 12 and 14 at the Borg Scale (a commonly-used scale for training intensity, based on the relationship between heart contractions and maximal oxygen uptake, where 6 indicates no effort at all and 20 indicates maximum effort). In the second group, the subjects underwent only cognitive behavioral therapy. The results showed that both groups experienced a decrease in depression and suicidal thoughts, but the improvements were greater in the group which combined CBT with exercise [31].

Exercise in the treatment of depression

Huang compared the effectiveness of CBT and physical activity in the treatment of depression amongst patients aged 65 and older. In the physical activity group, patients completed an exercise program lasting approximately 50 minutes three times per week for 12 weeks in total. Exercises began with warm-up, followed by moderate-intensity cardiovascular exercises, muscle strength exercises and finally stretching exer-

cises combined with breathing exercises. The exercises were accompanied by music. In contrast, those in the CBT group received 12 weekly group CBT sessions, lasting 60–80 minutes each. The results showed that the physical activity group experienced significant post-intervention improvements in depressive symptoms, physical fitness, and quality of life, whereas there were no statistically significant changes in the CBT group on these measures [32].

Physical exercises can be used both in the treatment of depression and its prevention [34]. Older people often tend to live sedentary lifestyles, and many studies show that people with lower levels of physical activity have a higher risk of depressive symptoms [34–36]. Mammen and Faulkner conducted a review into the relationship between physical activity and depression, and found that 25 out of 30 studies identified a protective effect of physical activity on the occurrence of depression [36]. In a different study, Meyer and colleagues found that a 20-minute bicycle ride led to a reduction of depressed mood 10 and 30 minutes after exercise, regardless of the intensity [37]. These studies suggest that physical exercise can therefore serve as a valuable strategy for reducing the risk of developing depression among older people and promoting mental health.

The Ströma study explored whether the effects of physical activity interventions differed with respect to depression severity, recruiting 48 patients with major depression as participants. The control group consisted of people with mild and moderate depression, and the study group consisted of people with severe depression. Both groups underwent an Internet-based physical activity promotion program, consisting of 9 modules, which people completed every Monday for 9 weeks. Participants also received pedometers, but no results were reported because they were used in different ways. The results did not show an increase in the level of physical fitness and muscle strength, but there were significant improvements in symptoms of depression, quality of life, and physical activity levels in both the study group and control group [38].

Finally, Nyström conducted a systematic review which aimed to determine which type of physical activity is most effective in the treatment of major depressive disorders. The most common intervention was aerobic, followed by anaerobic and mixed training. In aerobic training, activities such as jogging, cycling or walking were chosen, and in resistance training weightlifting was the most common activity. Exercises were more often performed individually than in groups. The average frequency was three times a week, with an intensity of 65–85% HR max and a session duration of 30–90 minutes. The results showed that both aerobic and resistance training were associated with reductions in the symptoms of depression, and these effects were consistent whether the training was performed by individuals or in groups. Longer interventions also tended to give more positive results [39].

DISCUSSION

Physical exercise can take various different forms. In the treatment of depression in the elderly, it is justified to use endurance exercises [22, 24, 25, 37] as well as resistance exercises [17]. For example, studies showing the positive impact of endurance exercises highlighted various forms of physical activity (e.g. aquabatics, jogging, cycling, walking) and classic gym exercises (e.g. warm-up, cardiovascular exercises, stretching exercises with breathing exercises) that can be effective in treating depression [22,28,39]. Furthermore, the combination of aerobic and resistance exercises also shows positive results in fighting depression [39]. However, too few studies have compared the effectiveness of different types of activities, and so it is still not clear which type of activity will be most effective in reducing depression symptoms [39].

Additionally, questions remain regarding the optimal intensity of the exercise for reducing depression symptoms. Many studies [22,24,39] show that benefits can be attained by imposing a pre-determined intensity (e.g. low, moderate, or high) on the exercise for patients. However, more positive results are attained when the patient can choose the intensity of their exercises, suggesting that patients in future research and practice should have a choice as to how intense the training set they will perform should be [38].

The optimal frequency and duration of the exercise is also an issue which will need to be explored in future research, as this has varied in existing studies with inconclusive results. In some studies it was found that exercise which took place once per week was sufficient for improving the depressive state, whereas other studies found improvements when the exercise took place three times a week [22,32,38,39]. Similarly, with respect to the duration of the exercise, the studies reviewed did not adjust exercise durations to the preferences of the subjects and instead selected a duration most often in the range of 30–60 minutes.

Finally, the impact of exercise on cognitive impairment, which is one of the most common symptoms of

depression in the elderly, is also unclear. Studies of other mental illnesses have shown a positive effect of exercise on cognitive impairment [26,27,29], but unfortunately this is not confirmed in studies on depression [28]. Therefore, more research is needed to determine the effectiveness of exercises in this area.

CONCLUSION

In this article, 39 studies into the effectiveness of physical exercise for elderly individuals struggling with depression were reviewed. First, attention was paid to people who also struggle with other ailments (e.g. reduced muscle strength, oxidative stress, heart failure, or cancer). Then, reference was made to the effect of exercise on depression symptoms, such as cognitive impairment, anxiety, and suicidal thoughts. Finally, the positive effect of exercise in treating depression is presented. It was demonstrated that physical activity is associated with reductions in the intensity of depression, improvements in the quality of life, and the prevention of the rapid development of the disease.

Therefore, it can be concluded that physical exercises have a positive effect in combating depressive symptoms. Regular activity under qualified supervision, whether completed individually or in groups, can be tailored to the individual needs and skills of a person in terms of the type of exercise, intensity, frequency, and duration. By exercising regularly, older people will improve biological and physical functioning, increase mobility and muscle strength, and improve mood. Specifically, it can be expected that physical activity will help to increase motivation and self-esteem amongst elderly populations, and also improve depressive symptoms, quality of life, and general daily functioning. This will help to eliminate or alleviate the experience of depression and its comorbidities. In future research, it will be most beneficial to explore the type, intensity and frequency of exercise that is associated with the most effective results in terms of preventing depression.

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Correspondence address:

Monika Frontczak
ul. Topolowa 3/2, 85-647 Bydgoszcz
Phone: (+48) 693 244 517
E-mail: monia27.09@gmail.com

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