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Resistance Training in Patients with Depression- Review of Literature

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ABSTRACT

Background: Depression is one of the most common mental diseases. It is estimated that this disease affects 4.4% of the world's population. Resistance training, which develops muscular strength and endurance, may serve as a supportive component in its treatment. *Aim:* The aim of this study was to analyze the effect of resistance exercises on alleviating depressive symptoms in patients of different age groups, diverse backgrounds, and varying health statuses. *Material and methods:* A literature review was conducted in PubMed and Google Scholar databases to identify publications investigating the effects of resistance training on alleviating depressive symptoms in humans. Outcomes were assessed, among others, using the Hamilton Rating Scale and the Geriatric Depression Scale (GDS). *Results:* The results were consistent - resistance exercises have a beneficial effect on the treatment of depression, reducing its symptoms (such as sadness and low mood) and improving quality of life. *Conclusions:* Resistance training may serve as an adjunctive treatment for individuals suffering from depression, reducing the symptoms of the disorder.

Keywords: depression, resistance exercise, physical activity, mental health, strength training, resistance training.

1. INTRODUCTION

Depression is one of the most common mental diseases. The World Health Organization estimates that around 320 million people worldwide currently suffer from depression, representing more than 4% of the world's population. The incidence of depression can be defined as a pandemic (Dębski et al., 2024). Depression is a disease that affects a person's mood, behavior, and cognitive abilities, which often accompany other health problems, both physical and mental, such as cardiovascular disease, metabolic syndrome, and an increased risk of suicide (Wang et al., 2025).

A characteristic feature of depressive disorders is a long-term decrease in mood, which reduces the quality of daily functioning for a peroid longer than two weeks and may become more severe to varying degrees. They are associated with negative self-esteem both cognitively and amotionally. Low self-esteem, on the other hand, leads to accompanying feeling of sadness and guilt, which causes frequent fatigue and figgiculty concentrating (Dębski et al., 2024). The treatment of depression is primarily based on the use of antidepressant medications. In addition to

pharmacotherapy, specialists also recommend cognitive-behavioral therapy and regular physical activity. Consequently, current guidelines developed by leading international organizations advocate for the integration of movement-related interventions into standard psychiatric care. Physical activity appears to be an effective form of support in the treatment of depression (Carniero et al., 2020).

Research indicates that various forms of physical activity - such as aerobic training, resistance training, or mind-body exercises - have a beneficial impact on mental health among various social groups. Physical activity not only alleviates the symptoms of common disorders such as depression and anxiety, but also significantly improves well-being and quality of life (Lassale et al., 2019). Resistance training (RT), which is also offten called strength training, consists of exercises that resist muscles to improve their strength, anaerobic endurance, and skeletal muscle mass. It is particulary recommended, especially for older people, due to its beneficial impact on overall health and its particular role in limiting age-related reductions in muscle mass and strength (Gordon et al., 2018).

In recent years, resistance training (RT) has become increasingly popular because it builds muscle strength and endurance, but it has also been shown to be very beneficial in reducing symptoms of depression. Numerous meta-analyses show that depression sufferers who engage in resistance training experience relief from symptoms, as well as an improvement in their sense of self and quality of life (Gordon et al., 2018). These benefits may result, among other factors, from increased self-confidence, improved metabolism, and regulation of hormonal balance associated with this type of training (Cunha et al., 2024).

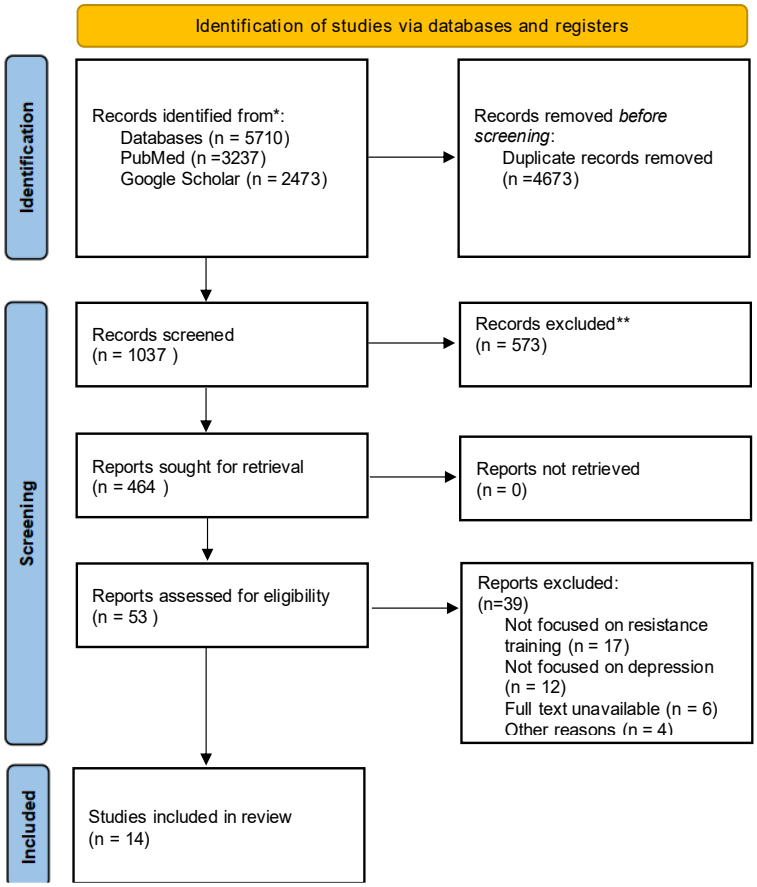

Figure 1. PRISMA flow diagram

2. REVIEW METHODS

To better understand the impact of resistance exercise on mental health, a review of the scientific literature was carried out. The search strategy focused on identifying clinical studies that examined the effects of resistance exercises on individuals suffering from depression. A literature review was conducted using electronic databases, covering English-language publications from January 2005 to January 2026. The following keywords were used: “depression”, “resistance exercise”, “physical activity”, “mental health”, “strength training”, “resistance training”. The article screening process followed the PRISMA guidelines (Figure 1).

Participants

Representatives of different age groups, individuals of diverse ethnic backgrounds, and patients at varying stages of the disorder were selected for the analysis.

3. RESULTS AND DISCUSSION

A meta-analysis was also conducted, which included 33 randomized controlled trials (RCTs) involving 1,877 people. The results showed that regular resistance training significantly reduced symptoms of depression. The observed effect size was moderate at 0.66 ([0.48, 0.83]; $p < 0.001$). Participants assigned to the intervention group (n = 947) engaged in resistance training approximately three times per week over an average period of 12 weeks. This type of exercise was found to be particularly effective in individuals presenting with mild to moderate depressive symptoms ($\Delta = 0.90$; [0.68; 1.11]). The observed outcomes were independent of total training volume, strength improvements, or participants' overall health status (Gordon et al., 2018).

Rosenbaum et al., (2014) carried out a study including 60 adults diagnosed with depression or exhibiting depressive symptoms, who were randomly placed into one of three groups: high-intensity resistance training, low-intensity resistance training, and a control group. The 8-week program demonstrated very high adherence, with mean attendance exceeding 95%. Primary outcomes were assessed using the Hamilton Rating Scale and the Geriatric Depression Scale (GDS), demonstrating improvement in depressive Symptoms in both training groups. Greater improvement was observed in the high-intensity group compared to the low-intensity group.

Carneiro et al., (2020) conducted a meta-analysis including four RCTs. The findings showed mixed effects of strength training. Of the four analyses based on different depression-specific outcome measures, two yielded statistically significant results. Overall, the effect size ranged from small to moderate (0.39-0.62). The interventions lasted from 8 to 16 weeks, with a training frequency of twice per week in three studies and three times per week in one study. Training sessions lasted between 30 and 90 minutes (Schuch et al., 2016).

Resistance training may improve the functioning of individuals suffering from depression (Table 1). Many studies confirm the positive impact of physical exercise as a non-pharmacological treatment for depressive disorders.

Table 1. Summary of the main findings regarding the effects of resistance training on depression

Aspect analyzed	Evidence from reviewed studies	Overall interpretation
Effect on depressive symptoms	Most studies demonstrated a significant reduction in depressive symptoms following resistance training interventions. Meta-analyses reported small to moderate, and in some cases moderate to large, effect sizes.	Resistance training appears to be an effective adjunctive intervention for reducing depressive symptoms.
Severity of depression	The greatest benefits were observed in individuals with mild to moderate depression.	Resistance training may be particularly beneficial during the early and moderate stages of depressive disorders.
Training intensity	Studies comparing different intensities found greater improvements in patients performing high-intensity resistance training.	Exercise intensity may influence the antidepressant effects of resistance training.
Training volume and frequency	Evidence suggests that total exercise volume may be more important than exercise frequency alone.	Optimizing training volume appears to be essential for achieving therapeutic benefits.
Muscle strength improvements	Increases in muscular strength were positively associated with reductions in depressive symptoms.	Physiological adaptations to resistance training may contribute to improvements in mental health.
Psychological outcomes	Resistance training improved self-esteem, self-confidence, self-efficacy, and body image.	Psychological adaptations may represent an important mechanism underlying symptom reduction.
Physical functioning	Participants demonstrated improvements in muscle strength, posture, and overall physical functioning.	Enhanced physical health may indirectly contribute to improved mental well-being.

Quality of life	Several studies reported improvements in quality of life and overall well-being.	Resistance training may provide benefits extending beyond symptom reduction.
Population characteristics	Positive effects were observed across different age groups and clinical populations.	Resistance training appears to be applicable to diverse patient populations.
Limitations of current evidence	Studies differed in methodology, intervention duration, training protocols, and participant characteristics.	Further high-quality randomized controlled trials are required to establish optimal treatment protocols.

Patsou et al., (2017) analyzed the impact of physical activity on the severity of depressive symptoms in women after breast cancer treatment. This meta-analysis was based on randomized controlled trials conducted between 2011 and 2016, including a total of 1,701 patients. The results demonstrated significant differences between the physically active group and the inactive group in terms of depressive symptoms, indicating the validity of implementing appropriately tailored physical activity programs in women following breast cancer therapy.

Studies by Mura & Carta, (2013) and Schuch et al., (2016) showed that exercise-based interventions can effectively improve the emotional state of individuals with depression, reducing symptom severity while simultaneously supporting overall health improvement. In particular, resistance training contributes to increased muscle strength, improved posture, and enhanced physical functioning, which fosters greater self-confidence and a stronger sense of self-efficacy among patients. Such physical changes support not only the process of psychological recovery but also help shape a more positive self-image, reducing low self-esteem and negative emotions.

In the study by Singh et al., (2005), strength gains were linked with a reduction in depressive symptoms ($r = 0.40$, $p = 0.004$). The study by Dunn et al., (2005) examined the dose–response relationship between the frequency of physical activity (three or five times per week) and its volume measured by energy consumption (7 or 17.5 kcal/kg/week). The results indicated that the key factor influencing the reduction of depressive symptoms in people with mild to moderate depression is primarily the total dose of physical activity rather than exercise frequency alone.

4. CONCLUSION

In summary, resistance training has a beneficial effect on reducing depressive symptoms. This is related, among other factors, to changes in hormonal regulation and to improved self-perception resulting from increased muscle mass and better posture. However, the effects depend on the frequency and intensity of exercise. The age and background of the participants, as well as their overall health status, are also significant factors. An experienced instructor should also be present to supervise patients during training. Further research in this area is necessary to draw more comprehensive conclusions.

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Authors' Contributions

Conceptualization: Kacper Paczosa
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Project administration: Kacper Paczosa, Iga Piórkowska
All authors have read and agreed with the final published version of the manuscript.

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Conflict of interest
The authors declare that they have no conflicts of interest, competing financial interests or personal relationships that could have influenced the work reported in this paper.

Data and materials availability
All data associated with this work are present in the paper.

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