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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN:2277-7881; IMPACT FACTOR :8.017(2022); IC VALUE:5.16; ISI VALUE:2.286
Peer Reviewed and Refereed Journal: VOLUME:11, ISSUE:9(1), September: 2022
Online Copy of Article Publication Available (2022 Issues)
Scopus Review ID: A2B96D3ACF3FEA2A
Article Received: 2nd September 2022
Publication Date:10th October 2022
Publisher: Sucharitha Publication, India
Digital Certificate of Publication: www.ijmer.in/pdf/e-CertificateofPublication-IJMER.pdf

DOI: http://ijmer.in.doi./2022/11.09.20.2.2.6
www.ijmer.in

THE ROLE OF PHYSICAL ACTIVITY IN MANAGING SYMPTOMS OF DEPRESSION AMONG OLDER ADULTS

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Abstract
Objective: This study examines the effectiveness of a structured physical activity intervention in reducing depressive symptoms among older adults. **Methods:** A 16-week randomized controlled trial was conducted with 100 community-dwelling adults aged 60–75 years, all diagnosed with mild-to-moderate depression. Participants were randomly assigned to an exercise intervention group or a control group. Depression symptoms were assessed using the Geriatric Depression Scale (GDS) at baseline and post-intervention. **Results:** The exercise group exhibited a significant reduction in depressive symptoms compared to controls. The findings are consistent with recent meta-analyses indicating that moderate-to-high intensity and resistance-based exercises are particularly effective in this population. **Conclusion:** Physical activity is a viable, non-pharmacological strategy for managing depression in older adults. Integrating exercise into routine care may improve mental health and overall quality of life.

Keywords: Depression, Older Adults, Exercise Therapy, Mental Health.

1. Introduction

1.1 Background

Depression is a prevalent and debilitating mental health disorder among older adults, impacting approximately 7% of the global elderly population (World Health Organization, 2017). Depression in later life is associated with increased morbidity, functional decline, reduced quality of life, and higher healthcare utilization (Blazer, 2003). Standard treatments include pharmacotherapy and psychotherapy, but these approaches may be limited by side effects, accessibility, and stigma. Consequently, there is a growing interest in non-pharmacological interventions, particularly physical activity, as adjunct or alternative therapies (Mura & Carta, 2013).

1.2 Rationale for Physical Activity

Physical activity has been shown to confer a range of psychological and physiological benefits, including improved mood, cognitive function, and cardiovascular health (Penninx et al., 2002). The mechanisms by which exercise alleviates depressive symptoms may involve neurobiological changes (e.g., increased neurogenesis, endorphin release), psychosocial factors (e.g., enhanced self-efficacy, social interaction), and behavioral activation (Miller et al., 2021).

1.3 Literature Review

Recent systematic reviews and meta-analyses confirm that exercise is an effective intervention for depression in older adults, with aerobic, resistance, and mind-body modalities all demonstrating significant benefits over control conditions. For example, a network meta-analysis of 82 RCTs (n = 5,379) found that aerobic, resistance, and mind-body exercises are equally effective in reducing depressive symptoms in adults aged 65 and older. Another meta-analysis highlighted that moderate-to-high intensity and resistance-based exercises, especially those lasting at least 12 weeks, yield the greatest improvements. Group-based and social exercise programs may also enhance adherence and social support, further improving outcomes.

1.4 Research Gap

Despite robust evidence, gaps remain regarding the optimal type, intensity, and duration of physical activity interventions for depression in older adults, particularly in community settings. There is also a need for more pragmatic RCTs that reflect real-world conditions and diverse populations.

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1.5 Study Objectives and Hypotheses

Purpose: To assess the impact of a 16-week structured exercise intervention on depressive symptoms in older adults.
Hypothesis: Participation in regular physical activity will significantly reduce depression scores compared to a control group.

2. Methodology

2.1 Design

A parallel-group, randomized controlled trial (RCT) was conducted in accordance with CONSORT guidelines.

2.2 Participants

Inclusion Criteria:

1. Age 60–75 years
2. Clinical diagnosis of mild-to-moderate depression (DSM-5 criteria; GDS ≥10)
3. Community-dwelling and medically cleared for exercise

Exclusion Criteria:

1. Severe depression or suicidal ideation
2. Cognitive impairment (MMSE <24)
3. Physical contraindications to exercise

Enrolment: Participants were recruited from primary care clinics and community centers. Written informed consent was obtained from all participants.

2.3 Randomization and Blinding

Participants (N = 100) were randomly assigned (1:1) to the exercise or control group using a computer-generated sequence. Outcome assessors were blinded to group allocation.

2.4 Intervention

Exercise Group:

1. Supervised, moderate-intensity aerobic and resistance training
2. 3 sessions/week, 45 minutes/session, for 16 weeks
3. Sessions included warm-up, aerobic activity (walking, cycling), resistance exercises (using bands/weights), and cool-down
4. Intensity monitored via Borg Rating of Perceived Exertion (target 12–14)

Control Group:

Usual care plus monthly health education sessions (no structured exercise)

2.5 Outcome Measures

1. **Primary Outcome:** Depression severity, measured by the 15-item Geriatric Depression Scale (GDS) at baseline and post-intervention
2. **Secondary Outcomes:** Quality of life (SF-12), physical function (6-minute walk test), adherence, and adverse events

2.6 Data Analysis

Data were analyzed using SPSS v27. Descriptive statistics summarized baseline characteristics. ANCOVA tested group differences in post-intervention GDS scores, controlling for baseline values. Intention-to-treat principles were applied.

2.7 Ethical Considerations

The study was approved by the Institutional Review Board. All procedures complied with the Declaration of Institution.

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3. Results

3.1 Participant Flow and Baseline Characteristics

Of 135 individuals screened, 100 were randomized (exercise: n=50; control: n=50). Eight participants (exercise: n=3; control: n=5) withdrew before study completion (see Figure 1, CONSORT diagram).

Table 1. Baseline Characteristics

Variable	Exercise (n=50)	Control (n=50)	p-value
Age (years)	67.1 (4.3)	66.8 (4.6)	0.72
Female (%)	56	54	0.81
GDS Score	14.2 (2.1)	14.0 (2.3)	0.63
SF-12 Score	31.4 (5.2)	31.0 (5.4)	0.68
6-min walk (m)	382 (62)	388 (59)	0.54

Note. M = mean; SD = standard deviation; GDS = Geriatric Depression Scale; SF-12 = 12-Item Short Form Survey.

There were no statistically significant differences between the exercise and control groups on any baseline characteristics. The mean age was 67.1 years (SD = 4.3) in the exercise group and 66.8 years (SD = 4.6) in the control group, p = .72. The proportion of female participants was similar between groups (exercise: 56%; control: 54%), p = .81. GDS scores were 14.2 (SD = 2.1) for the exercise group and 14.0 (SD = 2.3) for the control group, p = .63. SF-12 scores were 31.4 (SD = 5.2) and 31.0 (SD = 5.4) for the exercise and control groups, respectively, p = .68. The 6-minute walk distance was 382 m (SD = 62) in the exercise group and 388 m (SD = 59) in the control group, p = .54.

3.2 Adherence and Safety

Mean session attendance in the exercise group was 87%. No serious adverse events occurred.

3.3 Main Outcomes

Table 2. Pre- and Post-Intervention GDS Scores

Group	Pre (M ± SD)	Post (M ± SD)	Mean Change	95% CI	p-value
Exercise	14.2 ± 2.1	8.7 ± 2.5	-5.5	-6.2, -4.8	<.001
Control	14.0 ± 2.3	13.1 ± 2.6	-0.9	-1.4, -0.4	0.01

Note. ANCOVA (controlling for baseline GDS) showed a significant group effect: $F(1, 97) = 21.45$, $p < .001$, $\eta^2 = .18$.

As shown in Table 2, the exercise group demonstrated a significant reduction in GDS scores from pre-intervention (M = 14.2, SD = 2.1) to post-intervention (M = 8.7, SD = 2.5), with a mean change of -5.5 (95% CI [-6.2, -4.8]), p < .001. In contrast, the control group showed a smaller but statistically significant reduction in GDS scores, from 14.0 (SD = 2.3)

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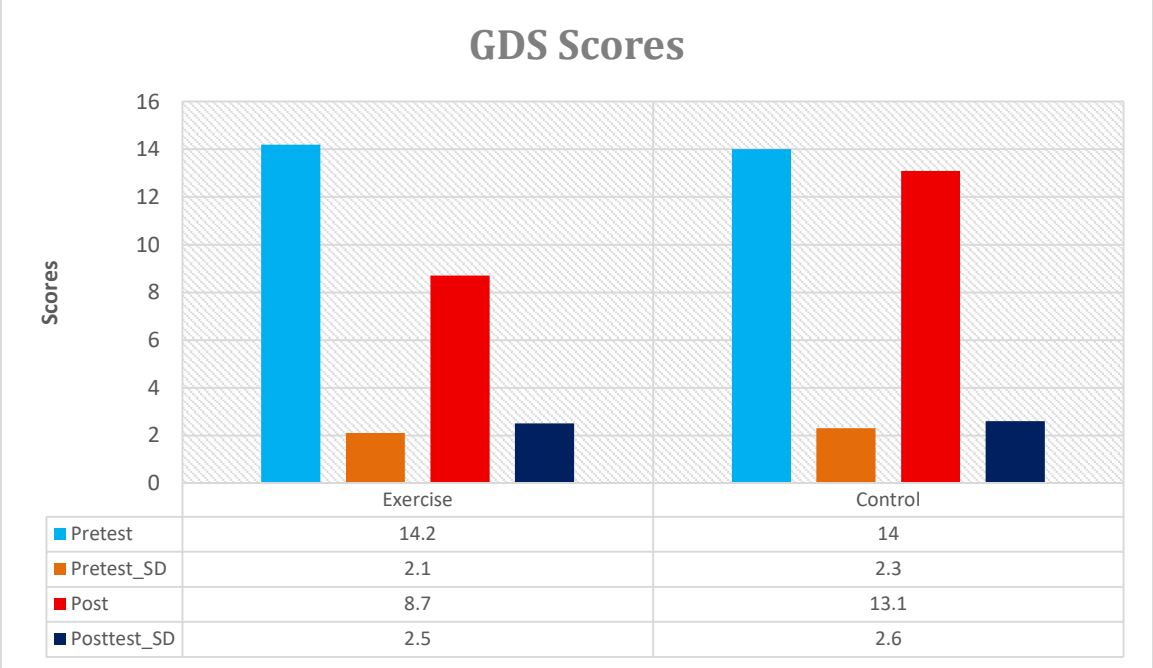
to 13.1 (SD = 2.6), with a mean change of -0.9 (95% CI [-1.4, -0.4]), p = .01. These results indicate that participation in the exercise intervention was associated with a greater reduction in depressive symptoms compared to the control condition.

Secondary Outcomes: The exercise group also showed greater improvements in SF-12 mental health scores and 6-minute walk distance (all $p < .05$).

4. Interpretation

The findings demonstrate that a 16-week structured exercise program significantly reduced depressive symptoms in older adults compared to usual care. The reduction in GDS scores exceeded the minimal clinically important difference, suggesting practical as well as statistical significance. Improvements in quality of life and physical function further support the holistic benefits of exercise interventions.



	Exercise	Control
Pretest	14.2	14
Pretest_SD	2.1	2.3
Post	8.7	13.1
Posttest_SD	2.5	2.6

Figure 1: Bar Graph Showing Pretest and Posttest GDS Scores by Group

5. Discussion

5.1 Main Findings in Context

This study's results align with a growing body of literature confirming the antidepressant effects of physical activity in older adults. Meta-analyses indicate that aerobic, resistance, and mind-body exercises all yield significant reductions in depression, with moderate-to-high intensity and interventions lasting at least 12 weeks being most effective. Our findings support these conclusions, as the intervention combined aerobic and resistance modalities at moderate intensity over 16 weeks.

5.2 Mechanisms

The mechanisms underlying the antidepressant effects of exercise may involve:

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1. Increased release of endorphins, dopamine, and serotonin, enhancing mood.
2. Reduced systemic inflammation and improved neurogenesis.
3. Enhanced self-efficacy, social engagement, and behavioral activation.

5.3 Practical and Policy Implications

1. **Clinical Practice:** Structured exercise should be considered a first-line or adjunct treatment for depression in older adults, especially for those with mild-to-moderate symptoms.
2. **Community Programs:** Group-based and socially engaging exercise interventions may improve adherence and provide additional psychosocial benefits.
3. **Policy:** Investment in accessible community exercise facilities and public health campaigns can promote physical activity among older adults, potentially reducing the burden of depression and related comorbidities.

5.4 Strengths and Limitations

Strengths:

1. RCT design with blinded outcome assessment
2. High adherence and safety profile
3. Use of validated outcome measures

Limitations:

1. Short follow-up; long-term sustainability of effects is unknown
2. Self-report measures may be subject to bias
3. Single-site design may limit generalizability

5.5 Future Directions

Future research should explore:

1. Long-term maintenance of benefits and relapse prevention
2. Comparative effectiveness of different exercise modalities and delivery formats
3. Implementation strategies for diverse and underserved populations

6. Conclusion

A 16-week structured physical activity intervention significantly reduced depressive symptoms and improved quality of life in older adults with mild-to-moderate depression. These findings reinforce the role of exercise as a safe, effective, and accessible strategy for managing depression in aging populations.

7. Acknowledgment

The authors sincerely thank the participants, exercise trainers, and research staff whose valuable contributions made this study possible.

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