

THE EFFECTS OF DIVERSE EXERCISE IN ALLEVIATING LONELINESS AND SOCIAL ISOLATION IN THE ELDERLY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Summary

Purpose: This research primarily seeks to understand the effects of various exercise programs on loneliness and social isolation experienced by the elderly, thereby supplying practical data for health promotion initiatives. **Methods:** In alignment with the PRISMA standards, we executed a thorough review and meta-analysis. A thorough examination was performed to locate significant literature released from 2000 to 2023 found in PubMed, PsycINFO, Web of Science, and Cochrane Library. Studies that conformed to the established inclusion criteria were meticulously screened and subjected to analysis. **Results:** A total of ten studies encompassing 9,213 participants fulfilled the inclusion criteria. The findings indicated that all categories of exercise substantially diminished feelings of loneliness and instances of social isolation among older adults. The collective effect size is established at (Cohen's $d = 0.36$, 95% CI = 0.32-0.40, $p < 0.001$); exercise plans manifested moderate encouraging outcomes in reducing feelings of seclusion from others ($d = 0.37$, 95% CI = 0.33-0.41) and emotions of loneliness ($d = 0.34$, 95% CI = 0.30-0.38). The results showed that joining group exercise classes led to a somewhat enhanced reduction in loneliness ($d = 0.39$ versus 0.33) and social isolation ($d = 0.38$ compared to 0.30) than individual exercise. Additionally, anaerobic exercises revealed slightly enhanced effects over aerobic exercises in mitigating loneliness ($d = 0.41$ vs 0.32) and social isolation ($d = 0.37$ vs 0.28). Also, open-skill exercises, different from closed-skill ones, resulted in somewhat superior effects on lowering loneliness ($d = 0.38$ instead of 0.34) and diminishing social isolation ($d = 0.37$ relative to 0.31). When examining exercise environments, outdoor sessions revealed slightly superior effects in lowering loneliness ($d = 0.36$ compared to 0.33) and social isolation ($d = 0.35$ against 0.30) than their indoor counterparts. When evaluating the intensity level of exercise, those categorized as moderate-intensity proved to be the most beneficial for reducing loneliness ($d = 0.38$, 95% CI: 0.33-0.43) and social isolation ($d = 0.35$, 95% CI: 0.30-0.40). **Conclusion:** Every type of exercise yielded positive impacts on lowering loneliness and social isolation in the elderly, with group or open moderate-intensity exercise in outdoor environments being particularly effective. It is advisable for governmental and community entities to allocate additional resources and facilities to facilitate older adults' engagement in exercise, thereby enhancing their social networks and overall quality of life.

Keywords: Elderly, loneliness, social isolation, systematic literature review, meta-analysis.

INTRODUCTION

Global population aging poses significant challenges to public health and social welfare frameworks. Proposed forecasts for 2050 reveal that the older generation, classified as those aged 65 and over, is expected to comprise 1.6 billion individuals, which is 16.5% of the global populace (United Nations, 2022). The elderly are prone to loneliness and social isolation, which detrimentally impacts health and elevates disease susceptibility (Leigh-Hunt et al., 2017). Active participation in sports is considered a favorable non-drug remedy for boosting health in mature adults. Research indicates that group exercise,

aerobic activities, open-skill exercises, and outdoor activities may be especially advantageous (Hwang et al., 2019), while other structured forms of exercise can also produce favorable results. This analysis carries out a meticulous literature review and meta-analysis to evaluate the effects of multiple exercise forms on feelings of loneliness and social seclusion in older individuals. The research intends to reach several critical targets: (1) to scrutinize how effectively different exercise forms perform; (2) to isolate the variables that influence exercise program achievements; and (3) to bring to light topics that necessitate further investigation in academia.

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RESEARCH METHODS

This comprehensive evaluation and synthesis of data followed PRISMA standards. A thorough examination was performed across PubMed, PsycINFO, Web of Science, and Cochrane Library, highlighting studies on humans written in English released from 2000 to 2023. Eligibility was evaluated by two independent reviewers, with a third reviewer consulted for discrepancies.

RESULTS AND DISCUSSION

Description of studies

Various exercise classifications were examined, including group versus individual, aerobic versus anaerobic, open versus closed-skill, and outdoor versus indoor, along with varying intensities. The findings are derived from statistical evaluations of eligible studies, employing Cohen's d effect size to measure the impact of the exercise interventions. Subsequent sections present detailed analysis results and discussions. A systematic literature review identified ten studies meeting predefined criteria, encompassing participants aged 60 and older, with sample sizes ranging from 532 to 1,356.

1. Group vs Individual Exercise

Taking part in collective fitness activities shows a noticeably greater influence on the sense of being alone (d = 0.39, 95% CI: 0.33-0.45) and feeling socially disconnected (d = 0.38, 95% CI: 0.32-0.44) as opposed to working out in solitude (loneliness d = 0.33, 95% CI:

0.27-0.39; social disconnection d = 0.30, 95% CI: 0.24-0.36). These outcomes validate the earlier analyses by Kanamori et al. (2014). The advantages of group exercise may arise from enhanced social interactions, peer support, and an organized social milieu.

2. Aerobic vs Anaerobic Exercise

A thorough examination revealed that engaging in anaerobic regimen emphasized a more substantial success in alleviating sensations of exclusion (d = 0.41, 95% CI: 0.30-0.52) and minimizing intervals of social isolation (d = 0.37, 95% CI: 0.26-0.48) when set against aerobic regimen (exclusion d = 0.32, 95% CI: 0.26-0.38; social isolation d = 0.28, 95% CI: 0.22-0.34). The advantages of anaerobic exercise may encompass improved self-efficacy, diversion from loneliness, and augmented social engagement in communal contexts.

3. Open vs Closed-skill Exercise

Participation in open-skill tasks yielded somewhat enhanced outcomes in mitigating loneliness (d = 0.38, 95% CI: 0.31-0.45) and social seclusion (d = 0.37, 95% CI: 0.30-0.44) relative to closed-skill tasks (loneliness d = 0.34, 95% CI: 0.28-0.40; social seclusion d = 0.31, 95% CI: 0.25-0.37). Open-skill exercises enhance sensory engagement and social interactions. Conversely, closed-skill exercises yield notable benefits due to their organized settings.

4. Outdoor vs Indoor Exercise

Taking part in outdoor physical activities

Table 1. Effect Sizes of Different Exercise Types on Loneliness and Social Isolation in the elderly

Exercise Type Comparison	Loneliness Effect Size (d)	Social Isolation Effect Size (d)
Overall Effect	0.37 (0.33-0.41)	0.34 (0.30-0.38)
Group vs Individual	0.39 vs 0.33	0.38 vs 0.30
Anaerobic vs Aerobic	0.41 vs 0.32	0.37 vs 0.28
Open-skill vs Closed-skill	0.38 vs 0.34	0.37 vs 0.31
Outdoor vs Indoor	0.36 vs 0.33	0.35 vs 0.30
Moderate Intensity	0.38 (0.33-0.43)	0.35 (0.30-0.40)
Low Intensity	0.33 (0.25-0.41)	0.30 (0.22-0.38)
High Intensity	0.33 (0.22-0.44)	0.30 (0.19-0.41)

Notes: 1. Values in parentheses represent 95% confidence intervals 2. Overall effect size is Cohen's d = 0.36 (95% CI: 0.32-0.40, p < 0.001)

revealed a slightly better outcome in addressing loneliness ($d = 0.36$, 95% CI: 0.31-0.45) and social isolation ($d = 0.35$, 95% CI: 0.30-0.44) as opposed to indoor exercise (loneliness $d = 0.33$, 95% CI: 0.28-0.40; social isolation $d = 0.30$, 95% CI: 0.25-0.37). Outdoor physical activity promotes mental well-being through natural engagement, enhances life satisfaction in older adults, and facilitates social interaction due to greater community integration.

5. Exercise Intensity

Investigations reveal that exercise of moderate intensity are the most efficient means to alleviate loneliness ($d = 0.38$, 95% CI: 0.33-0.43) and diminish social isolation ($d = 0.35$, 95% CI: 0.30-0.40). Wang and colleagues (2023) revealed that engaging in moderate-intensity multi-modal exercise greatly eases loneliness. Despite being less effective, both low and high-intensity exercises yielded beneficial effects.

CONCLUSION

This research emphasizes the crucial role of physical activity in alleviating loneliness and social isolation in older adults. Various exercise modalities yield benefits, with group and outdoor activities proving especially effective, particularly at moderate intensity. It is advised that governmental and community efforts increase to facilitate older adults' engagement in these activities, thereby improving social ties and overall well-being. Nevertheless, the study acknowledges limitations such as variability among studies and insufficient long-term outcome assessment. Future investigations should prioritize longitudinal studies, synergistic effects of diverse exercise types, technology-assisted programs, cost-benefit analyses, and the impact of personal factors on exercise efficacy. Such initiatives are intended to formulate more precise and impactful exercise strategies to tackle social issues in aging demographics.

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