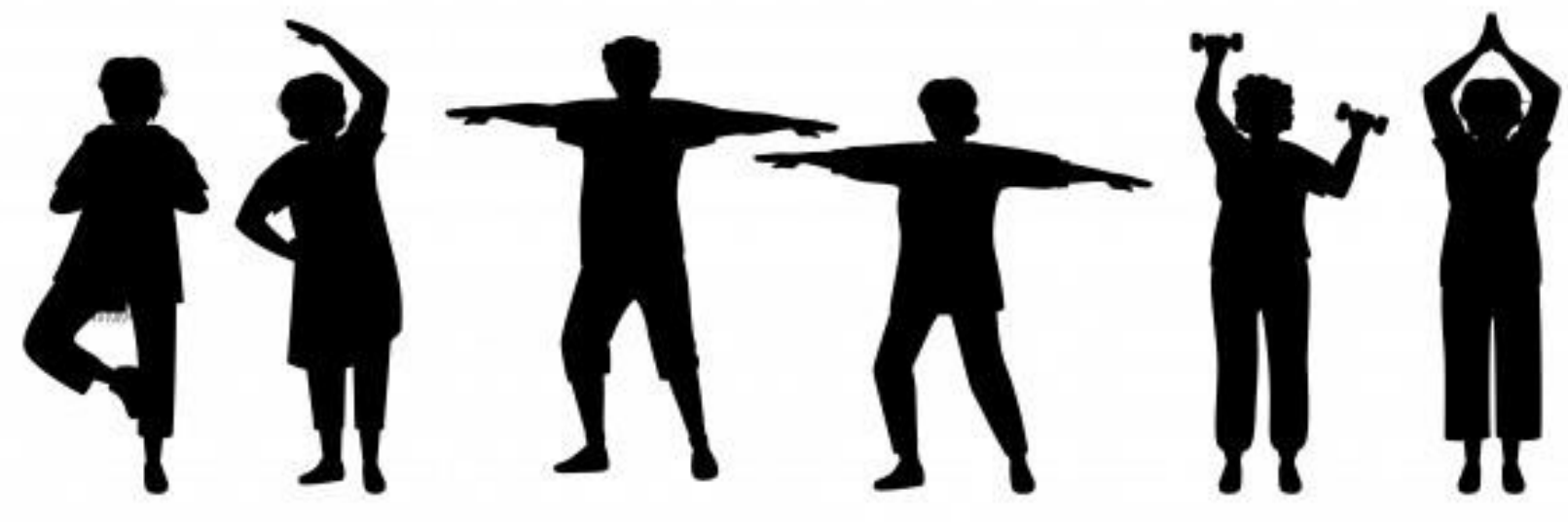


# The Efficacy of Physical Exercise as a Treatment for Major Depressive Disorder compared to Selective Serotonin Reuptake Inhibitors in Patients over 50 Years of Age



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## Introduction

### Major Depressive disorder (MDD)

Defined as a mood disorder characterized by:

- Overwhelming feelings of sadness
- Inability to find joy in activities they once found joy in
- Insomnia
- Changes in weight
- Feelings of worthlessness

### Why is this Important?

- By 2030, older adults aged 65 and older will make up more than 20% of the United States.
- Of these older individuals, 60% are living with at least one chronic condition and 5-10% are estimated to have depression

*This is projected to become the second leading cause of disease burden in this population by the year 2020*

### What is the Current Treatment?

- Selective serotonin reuptake inhibitors (SSRIs) are the mainstay of treatment; others include Selective Serotonin Norepinephrine Inhibitors (SNRIs), Tricyclic antidepressants (TCAs), and Monoamine Oxidase Inhibitors (MAOIs)

### Common adverse effects of these medications include

- Withdrawal effects (73.5%)
- Sexual dysfunction (71.8%)
- Weight gain (65.3%).

In addition, they can experience adverse emotional effects such as feeling emotionally numb (64.5%) and addiction to the medication (43%)

### Benefits of Exercise

- Improve cardiovascular health and lower cholesterol
- Build muscle strength
- Improve symptoms of chronic diseases such as Type II diabetes and hypertension

## Methods

A literature search was done using Google Scholar, ScienceDirect, and PubMed on November 2019. A total of ten articles were selected based on their relevance to the proposed research question; publication date, average age of participants, what type of antidepressants were used in each of the studies chosen were taken into consideration.

## Results

**Table 1:** Comparison of Study Designs for Selective Serotonin Reuptake Inhibitors (SSRIs) vs Physical Exercise in the Elderly

Study	Design	Total N	Population Demographics	Disease at Baseline	Duration of Study	Control	Tx Regimen	Outcome Measure
Kurdi FN, Flora R	Randomized Control Study	70	70 Female	7+ score on the HRSD rating scale	28 days	SSRIs w/ no exercise	Treadmill @ speed of 6km/h for 15 minutes every day	HRSD, MMSE, BDNF serum level, BG, Uric acid, cholesterol
Zanetidou S, Murri MB, Menchetti M, et al	Single-blind randomized trial	121	92 Female 29 Male	18+ on the HAM-D rating scale	24 weeks	Sertraline w/ no exercise	Mat work/ instrumental exercise + bicycles	HAM-D
Roh SY	Single-blind randomized controlled trial	148	150 Female *148 completed the study	5+ Geriatric Depression Scale Short Form	16 weeks	Placebo	8 wk Pilates mat and 8 wk band exercises	GDSSF
Lok N, Lok S, Canbaz M	Single-blind randomized controlled trial	80	36 Female 44 Male *80 completed the study	10+ on Beck Depression Inventory	10 weeks	Placebo	4x a wk: 40 min exercise + 30 min free walking time	Beck Depression Inventory, SF
Carney R.	Single-blind randomized controlled trial	202	46 Male 133 Female *179 completed the study	18+ score on the HAM-D rating scale	16 weeks	Placebo	3 45-minute exercise classes/ week	HAM-D rating scale; GLTPAQ
Murri MB, Ekkekakis P, Menchetti M, et al	Randomized Control Study	121	121 Female *106 completed the study	18+ score on the HAM-D rating scale	24 weeks	Sertraline w/ no exercise	Supervised progressive exercise 3x a week for 1hr	HAM-D rating scale

Key → HAM-D: Hamilton Depression Rating Scale, GLTPAQ: Godin-Leisure-Time and Physical Activity Questionnaire; HRSD: Hamilton Rating Scale for Depression; MMSE: Mini-Mental Status Exam; BDNF: Brain-Derived Neurotrophic Factor; BG: blood glucose; GDSSF: Geriatric Depression Scale Short Form; SF: Social Function 36 Quality of Life Scale

Based on the studies included in the review, **there has been significant evidence which shows physical exercise improved depressive symptoms in the elderly population**

- Most of the studies used the Hamilton Depression Rating Scale (HAM-D)
- Each of them saw a significant decrease in depressive symptoms
- In one follow up study a year later, it showed 67% of the individuals who used exercise as a form of treatment were fully remitted.
- Overall, the results from the studies exhibited physical exercise for at least 135 minutes a week reduced the severity of depressive symptoms

**Table 2:** Validity Assessment Information Used for the Evidence

Study	Sample Size	Recruitment Strategies	Blinding	Timeline	Biases	Data
Kurdi FN, Flora R	M	I	I	I	A	A
Zanetidou S, Murri MB, Menchetti M, et al	A	A	M	A	A	A
Roh SY	A	I	M	M	A	A
Lok N, Lok S, Canbaz M	M	A	M	M	A	M
Carney R.	A	A	M	M	A	A
Murri MB, Ekkekakis P, Menchetti M, et al	A	A	I	A	M	A

Key → A - Adequate, M - Marginal, I - Inadequate

Sample Size:	Recruitment Strat:	Blinding:	Timeline:	Biases:	Data:
A = 100+ people M = 70 + people I = <70 people	A= Diverse pop M=Semi-biased pop I= Biased pop	A= Double-blind M= Single-blind I= No blinding/ cohort	A = 23+ weeks M = 10+ weeks I = <10 weeks	A= Information bias highly unlikely M= unlikely I= likely	A= All variables support hypothesis M= Some variables support hypothesis I= Does not support hypothesis

## Discussion

Many of the studies displayed physical activity, whether it be used alone as a treatment or in conjunction with an SSRI, **showed significant reduction in depressive symptoms with the elderly population.**

- Studies included reputable ways of measuring the severity of depression: HAM-D Score, the Beck Depression Inventory (BDI), and Geriatric Depression Scale Short Form (GDSSF)
- Also incorporated similar inclusion strategies: Participants were older than 50 years of age, need to be clinically diagnosed for MDD using the DSM-V, and sedentary before the start of the clinical trials

**Table 3:** Comparison of Results

Study	Means of Evaluating Depression – HAM-D	Means of Evaluating Depression- BDI	Means of Evaluating Depression- GDSSF	Social Function 36 Quality of Life Scale
Kurdi FN, Flora R	S	NA	NA	NA
Zanetidou S, Murri MB, Menchetti M, et al	S	NA	NA	NA
Roh SY	NA	NA	S	S
Lok N, Lok S, Canbaz M	NA	S	NA	NA
Carney R.	S	NA	NA	NA
Murri MB, Ekkekakis P, Menchetti M, et al	S	NA	NA	NA

Key → NS: Not significant; S: Significant; NA: not available

HAM-D: Hamilton Depression Rating Scale; BDI: Beck Depression Inventory; GDSSF: Geriatric Depression Scale Short Form	Means of Evaluating Depression- BDI	Means of Evaluating Depression- GDSSF	Social Function 36 Quality of Life Scale
S= Measurements of major variables had significant results p<0.05	S= Measurements of major variables had significant results p<0.05	S= Measurements of major variables had significant results p<0.05	S= Measurements of major variables had significant results p<0.05
NS= Measurements of major variables does not have sensitivity and specificity p>0.05	NS= Measurements of major variables does not have sensitivity and specificity p>0.05	NS= Measurements of major variables does not have sensitivity and specificity p>0.05	NS= Measurements of major variables does not have sensitivity and specificity p>0.05

## Conclusion

Physical activity was thought of as a recommendation providers would give to help alleviate depressive symptoms in patients.

- Exercise for at least 135 min a week can be used as a **form of treatment** as either stand alone or in addition to SSRIs
- Pros: Beneficial for patients who are wary of taking SSRIs due to cost, side-effects, or any other concerns they may have.
- Cons: patients who are fall-risks and may need supervision to complete some of the activities

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