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Effectiveness of Physical Activity as an Intervention for Clinical Depression: A Narrative Literature Review

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ABSTRACT

The WHO report states that almost 56 million of Indian's population (4.5%) suffer from depression at this moment. Depression is typically managed in primary care using both pharmacotherapy and psychological interventions; however, less than 25% of the population has access to these treatments. However, the role of exercise as an adjunct to conventional therapies is gaining momentum with large number of recent studies having demonstrated exercise to be effective in reducing depression symptoms. The primary objective of the review is to evaluate the clinical benefits of physical activity in reducing severity of depression symptoms in patients with clinical depression. An English-language literature search using MEDLINE, PUBMED, GOOGLE SCHOLAR for randomized controlled trials (RCTs) evaluating effects of physical activity among patients with clinical depression. Three RCTs, pharmacotherapy in combination with supervised physical activity showed significant reduction in Hamilton Depression Rating Scale (HAM-D) score of up to 10% from baseline compared to control (drug only) group. Further 4 RCTs demonstrated that exercise group had 16% reduction in HAM-D & Beck Depression Inventory (BDI) score from baseline; compare to control group. 4 RCTs showed no significant difference among exercise and control group out of which 3 RCTs reported 5% higher remission rate in exercise group compare to control group. High frequency, moderate intensity exercise either treadmill or outdoor walking or stationary cycle has effective in lowering the symptoms of depression, determined by significant reduction in HAM-D & BDI score from baseline (50%) and compare to other exercise intervention. Use of aerobic exercise to improve physical activity might be beneficial in improving symptoms of clinical depression. Improvement in functional capacity through aerobic exercises may be associated with antidepressant efficacy. This approach may decrease the use of high dose medications to receive the antidepressant response. However, only moderate effect size with significant remission rate have been reported.

Keywords: clinical depression, major depression, physical activity

I.INTRODUCTION

According to National institute of Mental Health: "Clinically depression is known as major depressive disorder or clinical depression. Though it is a common but serious mood disorder. It causes severe symptoms that affects the ability to feel, think, and handle daily activities, such as sleeping, eating, or working. To be diagnosed with depression, the symptoms must be present for at least two weeks." Genetic, biological, environmental and psychological factors cause Depression. People of any age can get affected with depression, but mostly adults are affected. Several chronic mood and anxiety disorders in adults are results of heightened stress in childhood. Serious medical illness, such as diabetes, cancer, heart disease and Parkinson's disease can cause depression in midlife or older adults. Drugs taken for these physical illnesses may cause adverse effects that contribute to depression. (1)

In India (2015-16) survey of National Mental Health Survey reported, one in 20 (5.25%) people over 18 years of age have ever suffered from depression amounting at least once in their lifetime, to a total of over 45

million persons with depression in 2015. Available antidepressant therapies currently provide unsatisfactory results, as no more than half of those treated reach remission after single treatment course. Recent studies have demonstrated physical activity may have positive effects in reducing depression symptoms.

"One-size-fits-all" rule do not work in terms of depression, it shows different symptoms and severity for each person affected. And so the respective treatment planning also varies individually. What is best for the treatment gets concluded after several trial and error. Even the most severe cases, can be treated for depression. Early diagnosis and treatment can provide better outcome. Pharmacotherapy, psychotherapy or combination of the two are usual treatment options for depression. Advanced treatment includes electroconvulsive therapy (ECT) and other brain stimulation therapies. [(1)]

II.PURPOSE

The primary objective of the review was to investigate the clinical benefits of physical activity in reducing severity of depression symptoms in patients with clinical depression.

III.METHOD

Database Searched:

An English-language literature search was done using MEDLINE, GOOGLE SCHOLAR for RCTS, and evaluating effect of physical activity among the patients with clinical depression.

Keywords used:

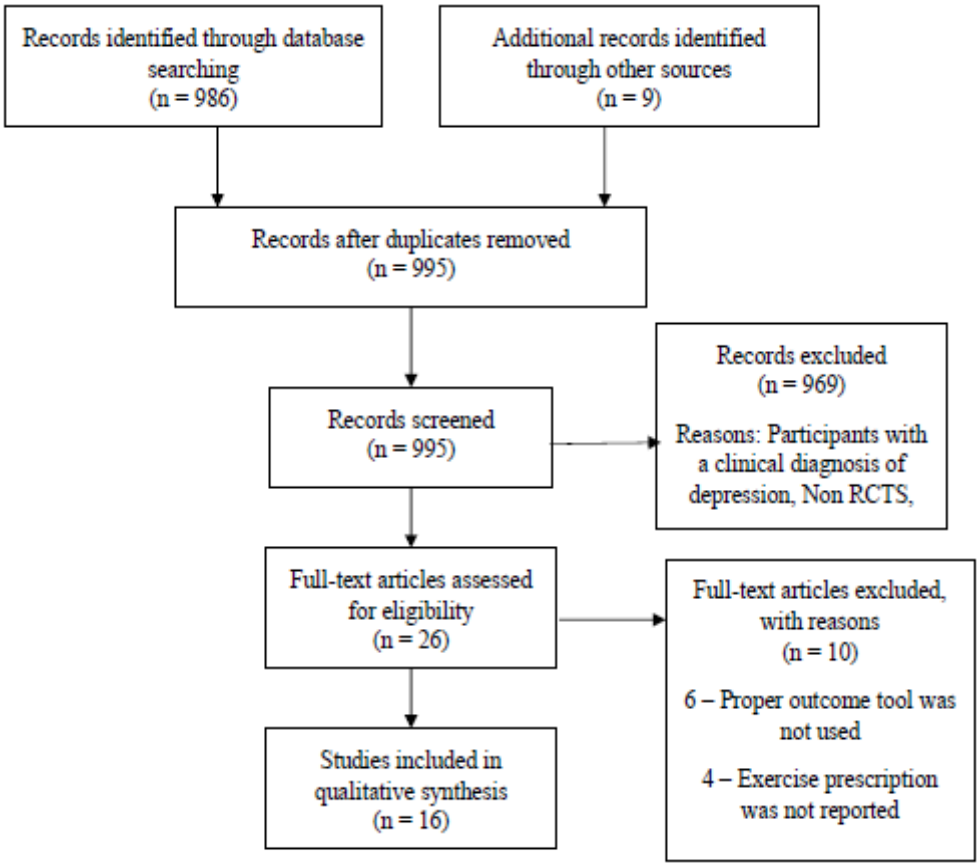
Physical exercise OR aerobic exercise, nonaerobic exercise, physical activity, physical fitness, resistance training, strength training, weight lifting AND major depression

Study Selection:

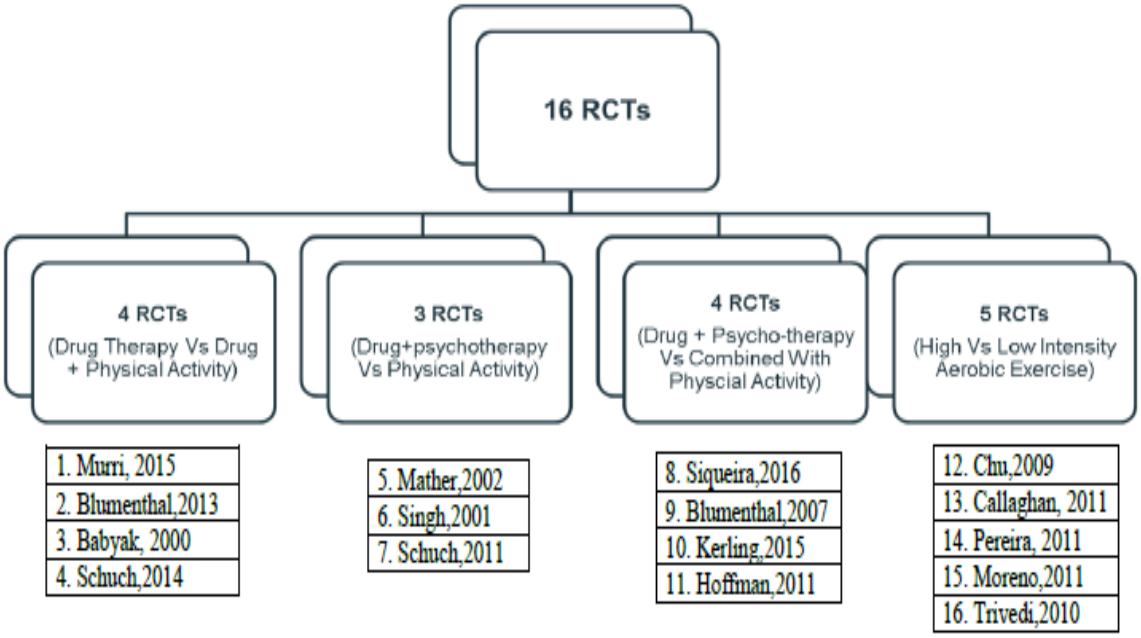
Included: RCTs, Studies with participants diagnosed with clinical depression, Physical activity given as one of the intervention

Excluded: Studies not measuring extent of depression symptoms as an outcome

PRISMA FLOW CHART



IV.RESULTS



Among 16 RCTs in general, 4 RCTs, reported 10% reduction in HDRS Hamilton depression rating scale) among supervised physical activity and drug therapy group compare to drug only group. Further 3 RCTs, demonstrated 16% reduction in HRDS and BDI (beck depression inventory) score from baseline compare to drug and psychotherapy group.4 RCTs, showed no significant difference among exercise group and non-exercise (drug /psychotherapy) group. But reported a 5% significant remission in exercise group.5 RCTs reported that high frequency, moderate intensity exercise either treadmill or outdoor walking or stationary cycle has effect in lowering the symptoms of depression, determined by significant reduction in HRDS & BDI scores from baseline i.e. 50%, compare to other exercise intervention. Both the compared interventions were added on to the usual drug therapy or psychotherapy.

Among 16 RCTs, 7 RCTs reported an average of 19.71% early remission in exercise group and group with moderate intensity exercise compare to the group with drug/psychotherapy & low intensity exercise respectively.

Table 1: 11 RCTs - Including drug as a comparative treatment with exercise or physical activity.
***MDD- MAJOR DEPRESSIVE DISORDER**

Study ID (First author surname, Year of publication)	Country	Objective	Participant Characteristics	Outcome measure
1.Murri, 2015[2]	USA	To investigate sertaline therapy with physical exercise leads to better outcomes of late-life major depression.	>65 years old with major depression	HRDS
2.Blumenthal2013[3]	USA	To assess the effectiveness of aerobic exercise with standard medication.	>50 years with MDD	HRDS & BDI
3. Babyak, 2000[4]	USA	To assess the effectiveness of exercise and sertaline for patients with MDD.	50 years with MDD	HRDS
4.Schuch,2015[5]	Brazil	To evaluate the effects of add on exercise vs only usual treatment	18-60 years	HRDS
5. Mather,2002[6]	UK	To determine whether exercise is effective as an adjunct to antidepressant therapy	>53 years with MDD	HRDS
6.Singh,2001[7]	New England	To test the feasibility and efficacy of exercise as a long term treatment for clinical depression in elderly patients.	>60 years with depression	BDI
7. Schuch,2011[8]	Brazil	To assess the effectiveness of aerobic exercise as an adjunct to depression	18-60 years	HRDS
8. Siqueira,2016[9]	USA	To assess the effectiveness of add on exercise and sertaline for patients with MDD.	18-55	HRDS
9.Blumenthal,2007[10]	England	To assess the effectiveness of add on exercise and sertaline for patients with MDD.(remission)	>40 years	HRDS
10. Kerling,2015[11]	Germany	To assess the effectiveness of adjunctive exercise(remission)	IPD MDD	BDI
11. Hoffman,2011[12]	England	To assess the effectiveness of add on exercise and sertaline for patients with MDD.(remission)	>52 years	HRDS

Table 2: 5 RCTs - Comparing effect of 2 different exercise protocols.

Study ID (First author surname)	Country	Objective	Participant Characteristics	Outcome measure
12. Chu,2009[13]	USA	To test the effect of two different exercise intensities prescribed for aerobic training on depressive symptoms.	18-43 years, F	BDI
13. Callaghan, 2011[14]	UK		50-60 years, F	BDI
14. Pereira, 2011[15]	Portugal		40-50 years, M/F	HRDS
15. Moreno,2011[16]	Brazil		40-45 years, M/F	HRDS
16. Trivedi,2010[17]	USA		45-50 years, F	HRDS

Table 3: 11 RCTs Qualitative results.

	Experimental Group					Control Group						
Study ID	**Sample size**	**Type of intervention**	**Duration of treatment**	**Baseline mean (SD)**	**Post test mean (SD)**	**Sample size**	**Type of intervention**	**Duration of treatment**	**Baseline mean (SD)**	**Post test mean (SD)**	**Between group mean difference**	**p-value**
1	42	drug+ exercise	24	19.8(2.6)	7.1(4.2)	42	sertaline(drug) only	24	20.4(3.4)	11.7(5.9)	-4.6	0.010
2	55	drug+ exercise	16	17.9(4.5)/22.1(4.1)	7.3(2.1)/ 8(2)	48	Drug only	16	18.3(2.2)/22.4(3.2)	7.1(1.2)/ 7(1.5)	0.2/1	0.02
3	29	drug+ exercise	16	18.2(0.6)	10.6(0.75)	29	Drug only	16	18.5(1.8)	11(0.81)	-0.4	0.028
4	25	drug+ exercise	2	26.5(0.5)	7.9(1.1)	25	Drug only	2	27.1(1.5)	12.1(0.2)	-4.2	0.007
5	43	exercise	10	16.7(0.0)	11.5(0.0)	43	non exercise(Drug + psychotherapy)	10	17.4(0.0)	13.5(0.0)	-2	0.05
6	15	exercise	10	21.9(1.2)	13(2.2)	14	non exercise(Drug + psychotherapy)	10	20(1)	14.4(2.2)	-1.4	0.03
7	15	exercise	2	25.6(2.6)	5.93(4.46)	11	non exercise(Drug + psychotherapy)	2	27.7(4.7)	9.45(3.56)	-3.52	0.041
8	29	drug + psychotherapy+ exercise	4	19.20(3.14)	11.383.94)	28	non exercise(Drug + psychotherapy)	4	20.42(2.99)	12.64(5.74)	-1.26	0.16
9	51	drug + psychotherapy+ exercise	16	16(4)	7.2(6.9)	49	non exercise(Drug + psychotherapy)	16	17(4)	6.1(6.7)	1.1	0.123
10	22	drug + psychotherapy+ exercise	6	29.4(10.9)	13.4(13.2)	20	non exercise(Drug + psychotherapy)	6	28.3(11.2)	15.9(12.5)	-2.5	0.41
11	43	drug + psychotherapy+ exercise	16	20.1(4.2)	9.1(0.5)	41	Drug only	16	21.4(5.3)	9.2(0.23)	-0.1	0.2

Table 4: 5 RCTs Qualitative results.

	TREATMENT 1(study intervention					TREATMENT 2(comparative intervention)						
Sample ID	**Sample size**	**Type of intervention**	**Duration of treatment**	**Baseline mean (SD)**	**Post test mean (SD)**	**Sample size**	**Type of intervention**	**Duration of treatment**	**Baseline mean (SD)**	**Post test mean (SD)**	**df**	**p-value**
20.	18	high intensity aerobic training 40-55% VO2max	10 weeks	21.6(6.1)	6.4(4.0)	18	low intensity aerobic training 65-75%	10 weeks	22.4(4.9)	12.7(10.4)	-6.3	0.07
19.	19	low intensity 40-45% (12 sessions per month)	4 weeks	26.5(10.7)	18.1(13.0)	19	low intensity 40-55% (3 sessions per month)	4 weeks	30.5(12.0)	29.6(13.9)	-11.5	0.006
18.	19	3.7-4 METs , 5 days/week, supervised, 30-45 min	6 weeks	26.30(1.03)	13.0(4.6)	10	1/week ,30-45 min	6 weeks	29.02(2.46)	22.75(5.3)	-9.75	0.05
17.	15	16.5kcal/kg/week, 3 /week	variable(at hospital discharge)	25.6(2.6)	9.3(3.2)	11	6.5kcal/kg/week, 2/week	variable	27.7(4.7)	12.0(2.7)	-2.7	0.041
16.	61	16-kkw, 3/week	12 weeks	17.8(3.8)	8.7(1.3)	61	4-kkw 2/week	12 weeks	18.1(3.8)	12.9(1.0)	-4.2	0.005

V.DISCUSSION

The results of our study demonstrate that physical activity is a feasible therapy for patients suffering from clinical depression and may serve as useful adjunct to standard pharmacotherapy and psychotherapy. However, only small to moderate effect size with significant remission rate have been reported in exercise group.

Only 4 trials included patients with less than 40 years of age so the beneficial effect of physical exercise would be specific, irrespective of chronicity and severity of depression, of patients' demographic characteristics and of physical comorbidities.

Additional support for the specificity of exercise as a treatment for depression suggest that aerobic exercise is approximately equipotent to medication management. The remission was greater in exercise group, participants in the exercise group were less likely to relapse than participants in group receiving medication. As only small to moderate significance was found in group where exercise combined with pharmacotherapy, the reasons for this are open to speculation. However with unclear physiological explanations, it is convincible that the concurrent use of medication may undermine the additive effect of exercise.

One of the positive psychological benefits of exercise is the development of a sense of personal mastery and positive self-regard, which we believe is likely to play some role in the depression-reducing effect of physical activity.

Limitations

1. Less number of trials were studied.
2. There was methodological heterogeneity among studied trials; objective of trials was different.
3. Though all included trials were of good quality, only 5 trials reported adequately concealing the allocation of their participants, only 9 trials reported blinding of their assessors and only 7 trials reported the blinding of the patients.
4. Quantitative synthesis of the data and grading of evidence was not carried out.

VII.CONCLUSION

The finding of this review suggest that physical activity is beneficial when used independently or in combination with drug therapy or cognitive behavioral therapy. However regardless of the beneficial effect of exercise, like those of antidepressant drugs, that may get dissipate after the intervention is discontinued. Hence it is possible that depressed patient may be able to get benefit from regular physical activity participation. Concurrent medical or psychological therapy should therefore not be a barrier to the use of exercise to treat depression.

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