

Yoga Intervention in Patients of Depression and its Comparison with Conventional Treatment: A Randomized Controlled Trial

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Abstract

Introduction: Depression contributes significantly to global health burden. Yoga leverages many physiological and psychological changes involved in mood enhancement and may have the potential for being effective in patients of depression. Yoga comprises a mind-body intervention consisting of various elements including asanas, pranayama, and dhyana. **Aim:** To determine and compare the severity of depression in the study participants (with and without yoga intervention) with 3 months of follow-up and to analyse how different domains of the depression changed in patients of depression with and without yoga intervention. **Material and method:** An interventional study was conducted on 60 patients of depression aged 18-45 years, were randomized into an interventional group (with yoga intervention) and control group (without intervention of yoga). Depression scores were measured using the Hamilton Depression Rating Scale (HDRS), at the beginning (baseline), after one month and three months. **Result:** A statistically significant difference was observed with time scale at baseline, after one month and three months in both, interventional group ($F(1.543, 44.752) = 408.14, p < 0.001$) and in control group ($F(1.720, 49.877) = 5.740, p < 0.05$). A significant difference was also observed between interventional and control group ($p < 0.001$) after three months of yoga intervention, whereas no significant difference was observed at baseline and after one month of yoga intervention. **Conclusion:** Yoga intervention resulted in a significant reduction in depression scores within one month and improves its various domains significantly, whereas conventional treatment benefits take longer time and not improve all domains of depression.

Keywords: Depression, Hamilton Depression Rating Scale (HDRS), Yoga intervention, Randomized Controlled Trial (RCT), Conventional Treatment.

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Introduction

Depression is one of the most prevalent psychological illnesses, and it contributes significantly to the global burden of diseases, affecting people from all communities across the world.[1] In 2016, the global prevalence of depression was estimated to be 3.7 percent, while the prevalence of depression in India was 3.9 percent, which is higher than the global prevalence.[2] According to the study conducted in 2019 on coaching students of Jaipur city, Rajasthan (India), the prevalence of depression was found 31.75%.[3] According to the National Institute of Mental Health, a combination of genetic, biological, environmental, and psychosomatic factors in the individuals is the cause of depression.[4] The interview-based Hamilton Depression Rating Scale (HDRS) is the mostly used diagnostic tool in the hospitals, administered by a psychiatrist for depression.[5] Exercise, meditation, tai-chi, qigong, and yoga have the potential for being effective in many patients with clinical anxiety,

emphasizing some physiological and psychological changes which are involved in mood improvement methods.[6,7] Various type of other research on non-depressed individuals with the intervention of yoga have reported enhancement in a positive mood and reduction in a negative mood.[8] Javnbakht et al in 2009 performed a study on yoga and suggested that it can be often regarded as an alternative medicine[9] and is defined as a mind-body intervention consisting of three components: asanas, pranayama, and dhyana.[10,11]

The modern lifestyle is characterized by stress, worry, and depression. Investigators are performing many researches on yoga and other mindfulness exercises and focusing on non-pharmaceutical and non-invasive treatments for depression due to adverse side effects of medication treatment and less effective in some circumstances.[12] The intervention of yoga in depression may improve the physical health and psychological status of the individual, and improve the quality of life of the in them. Despite its popularity and beneficial psychological and physiological impacts, yoga has not been thoroughly studied to determine the measurable outcome of depression in terms of disease severity and moreover, there is a disparity in results and scarcity of follow-up studies on yoga intervention.

The present study was hypothesized to determine and compare the

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severity of depression in patients with depression among study groups (with and without yoga intervention) with three months of follow-up. The present research was also aimed to observe the different domains of the depression with and without yoga intervention.

Materials and Methods

Study design: Randomized Controlled Trial (RCT)

Study settings: The present study was conducted in the Department of Physiology with collaboration of the Department of Psychiatry, S.M.S. Medical College, Jaipur, Rajasthan, India.

Study participants: A total of 80 diagnosed patients of depression were recruited, after following the inclusion and exclusion criteria, out of which only 60 patients completed the study while remaining 20 patients dropped out during the three-month follow-up. The present study was commenced after taking informed written consent from participants.

Inclusion criteria: Patients with mild to moderate depression of both genders, aged 18-45 years, who had been on stable medication for at least one month, were recruited from the Psychiatry OPD using the depression scale (Hamilton Depression Rating Scale) [5] and according to this scale, depression was categorized on the basis of depression score (HDRS score) as follow:

- 1) Normal (0-7)
- 2) Mild (8-13)
- 3) Moderate (14-18)
- 4) Severe (19-22)
- 5) Very Severe (≥ 23)

Exclusion criteria

Patients with mental and medical co-morbidities, those who practised yoga or were receiving cognitive behavior therapy or psychotherapy, who had a history of drinking or smoking, or who used any other substance, and those who were non-cooperative all were excluded from the study.

Methods

The patients of depression were randomized (Chit-box method) into two groups: interventional group (with yoga intervention) and control group (without intervention of yoga). Both study participants allowed to continue their conventional treatment (medicine) as advised by their physicians. In both study groups, depression scores were measured at the beginning (baseline), after one month and three months. The test process was described to

each of the selected participants and suggested not to change their normal lifestyle throughout the three-month study period.

The interventional group only underwent yoga intervention and practiced yoga for an hour (5 days per week) in the morning (8–10 a.m.) under the supervision of a qualified yoga instructor. They were also given explanations on the benefits of yoga in everyday life. During the trial, participants were encouraged to practise yoga, which included particular postures (Asanas), breathing exercises (Pranayama's), and meditation (Dhyana).[10,11]

In both groups, test procedures with depression scale were repeated after one month and three months and statistical analysis was performed on the obtained results.

Statistical Analysis

The Hamilton scores of both groups were entered into a Microsoft Excel 2007 spreadsheet. Quantitative data was expressed in Mean \pm SD, whereas qualitative data was expressed in percentage and proportion. The chi-square test was used to analyze qualitative data, while the student "t" test was used to evaluate quantitative data (unpaired "t" test was used between two groups and paired "t" test was used within the same group). ANOVA with repeated measurements was used for multiple group comparison. The tests were run using SPSS version 20 with a confidence interval of 95% and an alpha error of 0.05. P-values less than 0.05 were considered statistically significant.

Ethical considerations

The study protocol was approved by the Institutional Ethics Committee (3951 MC/EC/2018) and University (No. F7 Research/RUHS/2018/16480).

Results

This study included 60 patients having depression, 39 (65%) of whom were males and 21 (35%) of whom were females. The interventional group's mean age was 28.23 ± 5.42 years, while the control group's mean age was 30.90 ± 8.54 years with non-significant difference. The preponderance of the participants was married men from an urban setting with a higher socioeconomic background. While no dominance of education, occupation and family type was observed. The distribution of socio-demographic variables was compared in both groups and found a non-significant difference except the socio-economic status ($p < 0.05$) (Table -1).

Table 1: Socio-demographic profile of the study participants

Variables	Interventional group (30) n (%)	Control group (30) n (%)	Chi-square	p-value
Gender				
Female (n=21)	12 (40)	9 (30)	0.659	0.417
Male (n=39)	18 (60)	21 (70)		
Locality				
Rural (n= 17)	6 (20)	11 (37)	2.052	0.152
Urban (n= 43)	24 (80)	19 (63)		
Education				
School (n= 31)	14 (47)	17 (57)	0.601	0.438
College (n= 29)	16 (53)	13 (43)		
Occupation				
Employed (n =31)	15 (50)	17 (57)	0.268	0.605
Unemployed (n= 29)	15 (50)	13 (43)		
Marital status				
Married (n= 42)	20 (67)	22 (73)	0.317	0.573

Unmarried (n= 18)	10 (33)	8 (27)		
Family type				
Joint (n= 30)	13 (43)	17 (57)	1.067	0.302
Nuclear (n= 30)	17 (57)	13 (43)		
Socioeconomic status				
Upper class	26 (87)	17 (57)	6.653	0.036*
Middle class	3 (10)	10 (33)		
Lower class	1 (3)	3 (10)		

Level of significance: *--- $p < 0.05$ (Significant)

The mean depression scores for the interventional and control groups were 14.97 ± 1.65 and 14.43 ± 2.46 at baseline, respectively. At the baseline level, there was non-significant difference observed in depression scores between various socio-demographic groups of subjects, except education. So, the present study data was compatible (Table-2).

Table 2: Depression scores analysis according to socio-demographic profile between interventional and control group at the baseline

Variables	Interventional group			Control group		
	Group	Baseline (Mean± SD)	p-value	Group	Baseline (Mean± SD)	p-value
Gender	Male (n=18)	14.83 ± 1.62	0.597	Male (n=21)	14.43±2.34	0.987
	Female (n=12)	15.17± 1.75		Female (n=9)	14.44±2.88	
Locality	Rural (n= 6)	14.50 ± 2.07	0.448	Rural (n=11)	14.91±2.34	0.430
	Urban (n= 24)	15.08± 1.56		Urban (n= 19)	14.16±2.54	
Education	School (n= 14)	15.64±1.447	0.033*	School (n= 18)	15.22±2.29	0.029*
	College (n= 16)	14.38±1.63		College (n= 12)	13.25±2.30	
Occupation	Employed (n=15)	15.13±1.92	0.589	Employed (n=16)	14.81±2.34	0.376
	Unemployed (n=15)	14.8 ± 1.37		Unemployed (n=14)	14.00±2.60	
Marital status	Married (n= 20)	15.1±1.89	0.541	Married (n= 22)	14.91±2.35	0.078
	Unmarried (n=10)	14.7±1.059		Unmarried (n=8)	13.12±2.41	
Family type	Joint (n= 13)	14.77± 1.54	0.576	Joint (n= 17)	14.65±2.34	0.595
	Nuclear(n=17)	15.12 ± 1.76		Nuclear(n=13)	14.15±2.67	

Level of significance: * -- $p < 0.05$ (Significant)

Depression scores of patients showed that severity of depression reduced more in the interventional group as compared to the control group in consecutive follow-ups from baseline to after 1 month and 3 months. In 73 percent of patients, the severity of depression was significantly decreased from moderate to mild after three months of yoga intervention and only three patients remained in the moderate depression group. The number of mild depression patients increased from 5 to 26 after three months of yoga intervention. Whereas, the severity of depression was non-significantly decreased from moderate to mild only in 10 percent of patients with the conventional treatment after three months of follow-up (Table 3).

Table 3: Distribution of severity of depression on the basis of depression scores among interventional and control group during follow-up

Severity of depression (scores)	Interventional group (Yoga intervention)			Control group (Conventional treatment)		
	Baseline n (%)	1 month n (%)	3 months n (%)	Baseline n (%)	1 month n (%)	3 months n (%)
Mild (8 -13)	5 (17)	6 (20)	26 (90)	12 (40)	11 (37)	15 (50)
Moderate (14 -18)	25 (83)	24 (80)	3 (10)	18 (60)	19 (63)	15 (50)
Chi square	41.00			1.18		
p-value	0.0001*			0.553		

Level of significance: * -- $p < 0.05$ (Significant), ** -- $p < 0.001$ (Highly significant)

Table 4: Comparison of depression scores among interventional and control group

Study groups	Baseline (Mean±SD)	1 month (Mean±SD)	3 months (Mean±SD)	F	p-value
Interventional group (n=30)	14.97±1.65	14.33±1.67	10.70±1.80	408.14	0.0001**
Control group (n=30)	14.43±2.46	14.37±2.24	13.90±2.47	5.740	0.008*
p-value	0.328	0.948	0.0001**		

Level of significance: * -- $p < 0.05$ (Significant), ** -- $p < 0.001$ (Highly significant)

Table 4 shows the statistically significant difference among mean depression scores at baseline, after one month and three months in interventional group ($F(1.543, 44.752) = 408.14, p < 0.001$) and in control group ($F(1.720, 49.877) = 5.740, p < 0.05$). A significant difference was also observed in depression scores between the interventional and control group ($p < 0.001$) only after three months. Whereas no significant

difference was observed at baseline and after one month between interventional and control group (Table 4).

Table 4(a): Pair-wise comparison among the interventional group.

Interventional group (time)		Mean difference	95% confidence interval for difference		p-value
			Lower Bound	Upper Bound	
Baseline	1 month	0.633	0.348	0.919	0.0001**
	3 months	4.267	3.780	4.753	0.0001**
1 month	3 months	3.633	3.203	4.064	0.0001**

Level of significance: ** -- $p < 0.001$ (Highly significant)

Table 4(b): Pair-wise comparison among the control group.

Control group (time)		Mean difference	95% confidence interval for difference		p-value
			Lower bound	Upper bound	
Baseline	1 month	.067	-.449	.583	1.000
	3 months	.533	.153	.913	0.004*
1 month	3 months	.467	.068	.866	0.018*

Level of significance: * -- $p < 0.05$ (Significant)

Table 4(a) shows highly significant difference in depression scores between all the groups in interventional group whereas, Table 4(b) observes a significant difference between baseline with three months, and one month & three months in control group.

Table 5: Various domains of depression scale among interventional and control group

S. No.	Variables	Groups	Baseline	1 month	3 month	F	p-value
1	Depressed mood	Interventional	1.4±0.50	1.4 ± 0.50	1.03±0.18	16.789	0.0001**
		Control	1.4±0.56	1.37±0.49	1.33±0.48	0.326	0.674
2	Feelings of guilt	Interventional	1.17±0.53	1.17±0.53	1.13±0.51	0.326	0.573
		Control	0.9±0.55	0.9±0.55	1.00±0.59	3.222	0.083
3	Suicide	Interventional	0.87±0.68	0.83±0.59	0.8±0.48	0.744	0.436
		Control	0.83±0.53	0.93±0.52	0.87±0.43	1.173	0.315
4	Insomnia (early)	Interventional	1.67±0.48	1.4±0.50	0.8±0.41	55.496	0.0001**
		Control	1.57±0.57	1.43±0.63	1.13±0.43	12.167	0.0001**
5	Insomnia (middle)	Interventional	0.7±0.47	0.63±0.49	0.17±0.38	26.238	0.0001**
		Control	0.53±0.51	0.53±0.51	0.4±0.50	4.462	0.043*
6	Insomnia (late)	Interventional	1.37±0.61	1.37±0.61	1.03±0.41	14.500	0.0001**
		Control	1.43±0.68	1.37±0.61	1.53±0.57	2.195	0.124
7	Work & activity	Interventional	1.47±0.57	1.43±0.57	1.03±0.49	15.539	0.0001**
		Control	1.43±0.57	1.53±0.57	1.47±0.57	1.796	0.178
8	Motor retardation	Interventional	0.3±0.47	0.27±0.45	0.3±0.47	1.000	0.326
		Control	0.23±0.43	0.2±0.41	0.2±0.41	1.000	0.326
9	Agitation	Interventional	0.83±0.75	0.83±0.75	0.77±0.73	0.659	0.423
		Control	0.87±0.86	1±0.79	1.03±0.89	2.183	0.128
10	Anxiety–psychic	Interventional	0.93±0.25	0.93±0.25	0.63±0.49	12.429	0.0001**
		Control	0.97±0.18	0.93±0.25	0.97±0.18	1.000	0.326
11	Anxiety –somatic	Interventional	0.57±0.50	0.53±0.51	0.33±0.48	7.467	0.006*
		Control	0.77±0.43	0.63±0.49	0.57±0.50	5.342	0.013*
12	Somatic symptoms – GI	Interventional	0.5±0.51	0.43±0.50	0.13±0.35	13.159	0.0001**
		Control	0.47±0.57	0.4±0.50	0.27±0.45	2.446	0.100
13	Somatic symptoms-general	Interventional	0.93±0.25	0.9±0.31	0.7±0.47	7.467	0.006*
		Control	0.87±0.35	0.93±0.25	0.9±0.305	0.744	0.436
14	Genital symptoms	Interventional	0.27±0.52	0.27±0.52	0.23±0.43	1.000	0.326
		Control	0.2±0.41	0.23±0.43	0.2±0.41	1.000	0.326
15	Hypochondriasis	Interventional	1.33±0.66	1.33±0.66	1.33±0.61	0.000	1.000
		Control	1.5±0.629	1.5±0.629	1.57±0.57	2.071	0.161
16	Loss of weight	Interventional	0.43±0.50	0.33±0.48	0.03±0.18	13.963	0.0001**
		Control	0.2±0.41	0.23±0.43	0.2±0.41	0.121	0.883
17	Insight	Interventional	0.23±0.43	0.27±0.45	0.23±0.43	1.000	0.326
		Control	0.27±0.45	0.23±0.43	0.27±0.45	1.000	0.326

Level of significance: * -- $p < 0.05$ (Significant), ** -- $p < 0.001$ (Highly significant)

Repeated measures ANOVA reveals the statistically significant difference among various domains of depression score with time scale, in interventional group for Depressed mood, Insomnia (early, middle and late), Work & Activity, Anxiety (psychic and somatic), Somatic symptoms (GI and General) and Loss of weight, whereas no significant difference occurred in other domains. A significant difference was also observed in control group only for Insomnia (early and middle) and somatic anxiety (Table 5).

Discussion

Depression is a common psychiatric condition that affects people of all ages, genders, and socioeconomic backgrounds in India and across all over the world.[13] The current study included 60

patients with mild to moderate depression, with an average age of 29.57±7.22 years. The fact that a majority of the participants in this study were male, from a city, married, and an upper-class family suggests that these people are more likely to be depressed. The severity of depression was significantly decreased in 73 percent of patients, after three months of yoga intervention as compared to conventional treatment alone which shows a non-significant reduction only in 10 percent of patients. The current study discovered a substantial reduction in depression scores even after one-month of yoga intervention (Table 4a), whereas the depression scores were lowered after three months in patients with depression who were getting conventional medical treatment

only (Table 4b). Depressed mood, insomnia (early, middle, and late), work and activity, anxiety (psychic & somatic), somatic symptoms (GI & general), and weight loss all are improved significantly by the yoga intervention. Only two phases of sleeplessness (early and middle) and somatic anxiety were significantly ameliorated in the control group (Table 5).

The present study findings on the role of yoga in reducing depression is similar to Kumar et al (2019) who assessed the effect of yoga therapy in patients with depression and reported significantly lower scores of Montgomery-Åsberg Depression Rating Scale (MADRS) and Hospital Anxiety and Depression Scale (HADS) of anxiety after 10 days and lower scores of depression after 30 days as compared to control group.[14] Srivastava et al (2021) evaluated the effect of Kriya Yoga as an additional therapy on depression and reported significant reduction in HDRS scores by the end of 2,4 and 8 weeks.[15] Prathikanthi et al (2017) conducted a Randomized Control Trial and reported that an 8 weeks Hath Yoga intervention resulted in statistically and clinically significant reduction in depression severity.[16]

In the present study, the interventional group shows a statistically significant difference among various domains of depression after yoga. These findings are similar to Lavretsky et al (2013) who conducted a pilot study on Yogic Meditation in Depressive patients and reported that it can lead to improved mental and cognitive functioning and lower levels of depressive symptoms.[17] Naveen et al. (2013) identifies the effects of yoga in depression by monitoring the elevation in Brain-derived Neurotrophic Factors (BDNF) and through the Hamilton Depression Rating Scale (HDRS) throughout a 12-week study on depressed outpatients before, during, and after three-month study. All participants experienced some decreased depression ratings according to the HDRS, but there was more improvement in the HDRS scores who were participating in the yoga group with and without medication than the conventional treatment alone which correlated with the increase in serum BDNF levels.[18] The study performed by Manjunath et al (2013) shows the efficacy of yoga as an intervention for patients with Psychoses and reported lower mean scores on Clinical Global Impression Severity (CGIS), Positive and Negative Syndrome Scale and Hamilton Depression Rating Scale (HDRS).[19] Yoga shows the improvement in patients of depression as well as promotes psychological health and quality of life and interrupt the negative thinking. Yoga alters the regulation of the GABAergic system of the brain and exerts beneficial effects in the patients suffering from depression. Transcranial magnetic stimulation and multiple yoga therapy increased the activity of GABA-mediated neurotransmitter. Enhancement of thalamic GABA levels has been suggested as a potential mechanism for the improvement of mood in patients of depression. Upgrading of brain-derived neurotrophic factor (BDNF), pointed to the possible role of increased neuroplasticity in the improvement of depression symptoms by the intervention of yoga in the patients of depression.[20]

Strength
The present study comprises of yoga intervention with follow-up with three months duration. The medicine was continued in interventional group, and with this depression scoring was reduced within short duration with yoga intervention than the patients with conventional medical treatment alone. No side effect of yoga observed on patients of depression and yoga also improve overall physical and mental health of the patients. Yogic exercises serve as an alternative in the individuals not participating in psychotherapy or conventional treatment due to fear, side effects, lack of resources or their personal choice.

Limitation

The present study was conducted with a small sample size and only for three months duration of yoga intervention.

Future recommendations

Further follow-up study with large sample size and long-term effect of yoga intervention are required that would redefine the

effect of yogic exercises in patients of depression with greater effectiveness. In this study yoga included three components i.e. postures (Asanas), breathing exercises (Pranayama's), and meditation (Dhyana). It is recommended that in future, effect of various component of yoga should be observed individually.

Conclusion

Yoga intervention reduces the severity of depression in 73% of instances, while the conventional treatment alone was not so effective as only in 10% of patients, the severity of depression reduces from moderate to mild depression. Yoga intervention resulted in a substantial reduction in depression scores even after one month of yoga. Patients with depression who received conventional medical treatment alone observed drop in their depression levels after three months. Yoga intervention improves various domains of depression significantly, although conventional medical treatment alone does not strengthen all domains of depression; suggests that yoga results in holistic brain growth that leads to emotional wellness. Yogic exercises can be adopted as an alternative therapy for depression patients since it improves health in a short period (one month), has no side effects, and are inexpensive.

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