



Clinical Study

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The Effect of Anapanasati Meditation on Depression: A Randomized Control Trial

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ABSTRACT

Aim: To study the effect of Anapanasati Meditation on individuals with moderate depression. **Methods:** A total of 115 participants who were willing to participate in the study were recruited for the study. Anapanasati meditation was used as an intervention. The participants were divided into two groups experiment and control groups. Experiment group had 59 persons performing Anapanasati meditation and Control group had 56 persons not performing any type of meditation. The experiment group practiced one hour of Anapanasati meditation daily under the supervision of experts for six months and continued their daily routine and control group was not given any intervention, but they continued their daily routine. Beck Depression Inventory II is used to assess the depression level. **Results:** The BDI score before and after Anapanasati meditation was analysed for both experiment and control groups using Paired Samples T test. The experiment group has shown significant reduction in the BDI ($P < 0.05$) score after the intervention whereas in the control group the reduction in BDI score was not significant. **Conclusion:** This study has shown that after six months of intervention, the subjects with moderate depression who practiced Anapanasati meditation had a significant decrease in their Depression score and the control group has not shown significant change in the depression score.

Keywords: Anapanasati meditation, Beck Depression Inventory, Mindfulness.

INTRODUCTION

Meditation is well known to India and it is one of eight limbs (Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi) in Patanjali Yoga. There are number of definitions for meditation and as per western definition meditation is termed as a set of self-regulatory practices, the focus of which is to train the attention and awareness such that the mental processes will be under control and the concentration will be developed [1]. Felipe in his systematic review has given a similar definition for meditation and has termed meditation as a set of psychosomatic practices which involve training and regulating attention towards the interoceptive foci such as breath or other parts of the body and exteroceptive foci such as statue, flame or images [2].

In the recent past there has been increasing research interest in understanding the therapeutic benefits of meditation for psychological disorders such as anxiety, depression and as per the recent studies meditation has shown significant positive results in psychological disorders [3]-[5]. In another study authors have reported that self-rated mental health has improved with meditation though there were no significant changes in primary cognitive functions or physiological measures [6]. In similar lines the preliminary results of automatic self-transcending meditation on late life depression are positive and encouraging [7]. Although the therapeutic benefits of meditation are quite impressive with research results, the studies on the effect of meditation on brain have shown considerable discrepancies in their results may be due to lack of standardized designs for studying the meditation effects [8]. The studies were done using Electroencephalogram (EEG), evoked potential, event related potential, neuroimaging techniques such as Positron Emission Tomography (PET), functional Magnetic Resonance Imaging (fMRI). Considering the clinical utility of meditation practice there is a need for in depth studies to understand the effects of meditation on the brain.

There are various meditation techniques such as Yoga, Tai Chi, Qigong, Jewish Hassidic and Kabalistic dillug and Tzeruf, Islamic Sufism's zikr but the Mindfulness and Transcendental meditation techniques have gained significant research interest [1]. The earlier studies have considered different meditation techniques but there were no studies done with Anapanasati meditation, a form of Mindfulness meditation. In Pali 'Ana' means inhaling, 'Apana' means exhaling and 'Sati' means being with. Anapanasati meditation is the name of the meditation practice adopted by Goutam Buddha and it is nothing but mere

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observation of one's own breath i.e., inhaling and exhaling [9]. In this study we aimed at studying the effect of Anapanasati meditation on the individuals with moderate depression when assessed with Beck Depression Inventory II.

METHODS

Subjects

The subjects were selected from Pyramid Valley International Bangalore and Pyramid Spiritual Science Academy, Koramangala, Bangalore. A total of 115 subjects who were willing to participate in the study were selected for the study. The age group ranged between 20 and 65 years.

Inclusion Criteria

The individuals with mild to moderate depression were included in the study. Both males and females within the age group of 20 to 65 years were included in the study.

Exclusion Criteria

Individuals who have been diagnosed with diabetes, cancer, hypertension were excluded from the study.

Ethical Clearance

Signed informed consent was obtained from all the subjects. The institutional ethical committee of the parent institution (S-VYASA) had cleared the project proposal.

Design

This is a prospective random control design. The participants were divided into two groups experiment and control. The subjects selected for study were randomly allotted into two groups by using random number generator program. A total of 59 participants were included in experiment group and 56 participants were included in control group. The investigators coded and saved the answered questionnaires after the study. A person not involved in group formation evaluated the coded answer sheets. A person who was not involved in this study decoded the answer sheets only after noting the scores before and after data was completed.

Beck Depression Inventory II [10], [11] is used as the scale for measuring the effect of intervention. BDI is a 21-point questionnaire on a 4-point scale with each question taking points from 0 to 3 such that total score lies between 0-63. A score of 0-9 is considered as no or low depression, 10-18 as mild depression, 19-29 as moderate depression and 30-63 as severe depression. The subjects were to read each statement and

select one statement in each group that best describe the way they have been feeling during the past few weeks, including that day. Earlier studies have shown that BDI has significant correlation with Hamilton depression rating scale and other scales [12]. The consent form was distributed to all the participants who were willing to participate in the study. After reading the instructions the participants willingly consented to participate in the study duly signing the consent forms.

Intervention

The Experiment Group was practicing Anapanasati Meditation, one hour daily along with their routine duties and the Control Group did not practice meditation but they were asked to continue their daily routine. The Meditation classes were conducted six days a week for six months under the supervision of experts. It was ensured that there was no interaction between the groups during the entire period of six months. The tests were administered on the first and last day of the study. The subjects were accommodated at a quiet environment free from distractions to fill up the questionnaires. The subjects were asked to fill up the questionnaires with experts present for any clarification and without consulting other subject while filling up the questionnaire.

Statistical Analysis

The data were analysed using SPSS Statistics Version 10. The data was presented as mean \pm standard deviation. The data was assessed for normality using Kolmogorov-Smirnov test and BDI score was found to be normal in both experimental and control groups. P value <0.05 is considered statistically significant for all comparisons and the data were reported to two significant figures. The statistical tests used were Paired Samples T test for pre-post comparison within the groups. The Cohen's d effect size for assessing the effect of intervention was computed as the ratio of the difference between means of experiment and control groups to the pooled standard deviation.

RESULTS

The BDI score before and after the Anapanasati intervention was analysed for both experiment and control groups using Paired Samples T test as shown in Table 1. The experiment group has shown significant reduction in the BDI ($P < 0.05$) score after the intervention whereas in the control group the reduction in BDI score was not significant.

The pre and post BDI scores across age groups of Experiment and Control groups were tabulated in Table 2. The pre and post BDI scores of Experiment and Control groups across low, mild, moderate and severe categories were tabulated in Table 3.

The Cohen's d effect size was computed and it has taken a value of 1.38.

Table 1: Paired Samples T Test

Group	N	BDI Score Pre	BDI Score Post	P Value	CI
Experiment	59	26.09 \pm 8.98	4.09 \pm 6.08	0.00*	[18.41, 24.1]
Control	56	18.84 \pm 13.47	8.84 \pm 13.84	1.00	[-1.78, 1,78]

Data is represented as mean \pm standard deviation

BDI: Beck Depression Inventory II

N: Number of Participants

Pre: Pre data taken before intervention

Post: Post data taken after intervention

*P Value significance at 0.05 level

CI : 95% Confidence Interval of the difference between pre and post BDI scores

Table 2: BDI Score vs Age in Experiment and Control Groups

Age Group	Experiment Group		Control Group	
	BDI Pre	BDI Post	BDI Pre	BDI Post
20-29	19.5 ± 6.36	6.37 ± 2.10	17.86 ± 12.20	16.93 ± 11.59
30-39	21.17 ± 5.67	10.82 ± 7.71	16.33 ± 17.61	16.22 ± 18.16
40-49	25.96 ± 1.86	6.95 ± 2.92	18.33 ± 15.82	18.30 ± 15.64
50 and above	26.1 ± 4.05	10.87 ± 4.57	18.67 ± 13.63	22.33 ± 18.35

Data is represented as mean ± standard deviation

BDI: Beck Depression Inventory II

BDI Pre: BDI Score before intervention

BDI Post: BDI Score after intervention

Table 3: Pre and Post BDI Score across low/mild/moderate/severe categories

BDI Score	Experiment Group		Control Group	
	BDI Pre (N1)	BDI Post (N2)	BDI Pre (N3)	BDI Post (N4)
0-9	9 (1)	2.25 ± 2.63 (52)	3.19 ± 3.31 (16)	2.94 ± 3.26 (16)
10-18	14.86 ± 1.83 (14)	14.0 ± 2.55 (5)	14.60 ± 2.17 (15)	14.87 ± 2.48 (15)
19-29	23.92 ± 3.29 (24)	22 (1)	23.55 ± 3.1 (11)	21.70 ± 1.77 (10)
30-63	35.20 ± 4.54 (20)	32 (1)	37.57 ± 4.85 (14)	37.87 ± 5.83 (15)

Data is represented as mean ± standard deviation

N1: Number of participants before intervention in Experimental Group in each of the four categories

N2: Number of participants after intervention in Experimental Group in each of the four categories

N3: Number of participants before intervention in Control Group in each of the four categories

N4: Number of participants after intervention in Control Group in each of the four categories

BDI Pre: BDI Score before intervention

BDI Post: BDI Score after intervention

DISCUSSION

In this study the effect of Anapanasati meditation on the individuals with mild to moderate depression was investigated and BDI score was used for assessing the depression level. BDI score has been used in many studies on depression and is well established scale for assessing depression [13]–[15]. The BDI scores have significantly reduced in the participants who have participated in Anapanasati meditation whereas in control group there was no significant change in the BDI score.

In Anapanasati, as the name indicates, there is only observation of inhaling and exhaling and there is no interference of the breathing in and out. It is just observation of breathing in and out and nothing else. This is in a way 'Sukha Prānāyāma'. Anapanasati translates as the mindfulness (Sati) of inhalation (Ana) and exhalation (Apana) as a result of an engaged observation of it. The Buddhist practice of Anapanasati envisages the breathing exercises are almost similar to those exercises taught in the Upanishads. In the Upanishads, we call 'Prānāyāma' where there is some forceful interference in inhaling and exhaling.

The mindfulness meditation technique has gained significant research interest and has shown positive results on depression [4]. The Anapanasati meditation technique comes under mindfulness meditation technique as Sati in the name implies mindfulness or being with the self and in our study we have seen that the depression levels have reduced with Anapanasati meditation. The difference is that earlier studies have used Hospital anxiety and depression scale-subscale depression, 20 item Centre for Epidemiologic Studies-depression scale, 17 item Hamilton depression scale whereas we have used Beck's depression inventory II for our study. In the experiment group subjects were divided into four groups based on age (Table 2). The average pre BDI scores of all age groups were moderate lying between 19 to 29 with a gradual increase with the age. We have observed that Anapanasati was effective in all the age groups as post BDI score has changed from moderate to low after six months of intervention. A similar analysis was done for control group but the

change in the BDI score was not that significant. At the end of six-month intervention BDI score has shown significant change from mild, moderate and severe depression levels to low depression level with large effect size (Table 3) when compared to control group. Earlier studies explain the therapeutic benefits of the mindfulness meditation but this is the first time the effect of Anapanasati meditation was studied on depression and the results were encouraging.

According to Delphi poll on future trends of psychotherapy, mindfulness theories along with cognitive-behavioural, integrative and multi-cultural theories are predicted to be increasingly used in the next decade [16]. This emphasizes the importance of studying the mindfulness meditation techniques in the line of psychotherapy and we considered Anapanasati meditation, a mindfulness meditation technique, to investigate its effect on depression. The initial study on the effect of Anapanasati meditation on Electron Photonic Imaging (EPI) parameters has shown that the stress parameter activation coefficient (AC) and health parameter integral area (IA) have reduced significantly [17]. In another study Lee et.al has shown that the Anapanasati (Focussed Attention Meditation) is associated to attention task performance [18]. As the results with Anapanasati meditation were encouraging we aimed at investigating its effect on depression and the BDI score in our study has reduced from moderate to low in meditators compared to non-meditators. The results are of the initial study are promising.

The current study has some limitations which need to be addressed in future studies. Firstly the socio-economic status of the participants was not recorded as part of the study and hence the results cannot be generalized to a wider population. It is quite evident from the results that Anapanasati meditation has reduced the BDI scores when compared to control group but comparing them at the same or similar socio-economic status would have brought in the strength to the study. Secondly we have not measured general anthropometric and clinical parameters such as height, weight, blood pressure, pulse rate etc. and hence study lacks the strength in assessing the therapeutic benefits of the intervention.

CONCLUSION

In conclusion, the participants of Anapanasati meditation have shown significant reduction in the depression score measured with Beck Depression Inventory II. There was no such significant change in the BDI score of control group. Anapanasati meditation is a form of mindfulness meditation and Psychotherapy trends indicate that mindfulness is increasingly used in the next decade which signifies the importance of Anapanasati meditation.

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