Complementary Therapies in Clinical Practice 36 (2019) 77–81

Contents lists available at ScienceDirect

Complementary Therapies in Clinical Practice

journal homepage: www.elsevier.com/locate/ctcp

Effect of anapanasati meditation on verbal aggression: A randomized controlled trial

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ARTICLE INFO

Keywords:
Anapanasati meditation
Mindfulness
Verbal aggressiveness scale

ABSTRACT

Background and purpose: Aggression is increasing in society, leading to health hazards. The aim of the present study is to investigate the effect of anapanasati meditation on verbal aggression in healthy individuals.
Materials and methods: In this randomized controlled trial, 140 participants were screened and 90 participants were randomly allocated to experimental and control groups, with 45 participants in each group. The Verbal Aggressiveness Scale (VAS) was used to assess the verbal aggression score, and anapanasati meditation was given as an intervention. The experimental group practiced anapanasati meditation every day for 6 months, and the control group did not receive any intervention.
Results: The experimental group showed a significant reduction in VAS ($p < 0.01$) score after the intervention, whereas the reduction was not significant in the control group.
Conclusion: This study showed that after a 6-month intervention, verbal aggression decreased significantly in the experimental group compared with the control group.

1. Introduction

The prevalence of aggression and emotional hypersensitivity is increasing in modern society, leading to health hazards [1]. Aggression, either hostile or instrumental, is a behavior in which an individual intentionally harms another person. In its extreme form, aggression becomes violence [2], which may have a long-lasting psychological impact on individuals, especially children. The violence is not related to just physical aggression; even verbal aggressiveness can cause violence. Verbal aggressiveness is a personality trait that can damage the self-concept of individuals and cause long-lasting psychological disorders [3]. A previous study on the verbal aggressiveness of a coach on athletes showed a negative correlation between intrinsic motivation and identified regulation [4]. In another study, the authors reported that childhood maltreatment has a direct impact on academic progress and intelligent quotient [5].

Research suggests that increased mindfulness improves psychological well-being and reduces aggressive behavior [6]. Recently, there has been an increase in research and clinical interest in developing and implementing mindfulness-based interventions (MBI) in treating a wide range of psychological disorders, such as anxiety, depression, and aggression [7–12]. In the context of aggression, Singh et al. studied the effectiveness of the Meditation on the Soles of the Feet (SoF) to control physical and verbal aggression, and the results of independent studies on adolescents with Prader-Willi syndrome [13], adolescents with autism [14], individuals with mild intellectual disabilities [15], and individuals with mental illness [16] suggest that both physical and verbal aggression are reduced with SoF. Milani et al. studied the effectiveness of mindfulness-based cognitive therapy (MBCT) in reducing the aggression of individuals in a juvenile correction and rehabilitation center, and they reported that MBCT was associated with a significant reduction in physical aggression but not in verbal aggression [17].

The role of yoga and mindfulness in treating mental illnesses has been reviewed recently, and researchers have emphasized the importance of these two interventions in improving mental health disorders [18]. A study on the effect of integrated yoga on verbal aggression showed a decrease in verbal aggressiveness score after a yoga intervention composed of asanas, pranayama, and meditation [19]. Others studies have shown that meditation as an intervention helps to reduce anxiety, depression, hostility, and stress [20–23], and specifically, it reduces the levels of the stress hormones adrenaline and cortisol [24]. Similar results have been noted in another study of an

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https://doi.org/10.1016/j.ctcp.2019.06.004
Received 23 July 2018; Received in revised form 11 June 2019; Accepted 11 June 2019

integrative body-mind training program [25].

Anapanasati meditation is the name of one of the meditation practices adopted by Goutam Buddha in which *Ana* means "inhaling," *Apana* means "exhaling," and *Sati* means "being with." [26] Anapanasati meditation is essentially quieting the mind with inhaling and exhaling and deals specifically with the development of mindfulness of breathing [27], whereas mindfulness meditation deals with paying attention to the present moment [28]. In anapanasati meditation, mindful breathing alone is vital for observation, and this derives the power of intuitive insight, whereas other kinds of mindfulness meditations dwell on objective concentrations [27]. Earlier, the effect of anapanasati meditation on electron photonic imaging (EPI) parameters was investigated, and authors reported a significant reduction in the activation coefficient as measured by EPI [29]. The activation coefficient represents the stress level of a person, and a number of tests have shown a significant statistical correlation between levels of stress and the activation coefficient [30]. In another study, anapanasati meditation showed a stronger association with attention task performance [31].

Studies on aggression have used various MBI [28], but there have been no studies on aggression using mindfulness of breathing. In addition, earlier studies on aggression were done on individuals with psychological and neurodevelopmental disorders, but there have been no studies on healthy individuals. As anapanasati meditation has been associated with a significant reduction in the stress levels as measured by EPI, the aim of the present study was to investigate the effect of anapanasati meditation, a mindfulness of breathing, on verbal aggression. We hypothesized that regular practice of anapanasati meditation reduces verbal aggression as measured by the Verbal Aggressiveness Scale (VAS).

2. Materials and methods

2.1. Participants

A total of 140 participants were selected from the visitors of Pyramid Valley International, which has a mega pyramid in which 5000 people can meditate at a time sitting inside the pyramid. Pyramid Valley International and Pyramid Spiritual Science Academy, Bangalore, are nonprofit organizations under Pyramid Spiritual Societies Movement, India. The participants ranged in age from 20 to 65 years.

2.2. Inclusion criteria

Both men and women between the ages of 20 and 65 years were included in the study.

2.3. Exclusion criteria

Individuals with any prediagnosed diseases were excluded from the study.

2.4. Ethical clearance

The institutional ethical committee (IEC) of S-VYASA, Bangalore, approved the project proposal (approval RES/IEC/SVYASA/24/2014). The purpose and benefit of the study and procedure of anapanasati meditation were explained to the participants. Informed consent with all details printed in English was given to the participants. Participants signed the informed consent with an understanding that they could withdraw from the study at any point in time if they did not want to participate.

2.5. Design

The study used a prospective randomized controlled design to compare the effect of anapanasati meditation technique between practicing and nonpracticing participants among normal healthy volunteers. The sample size of 140 was computed based on a previous study on verbal aggression that had a demonstrated effect size of 0.4 [19]. The power was set to 0.8 with a 5% level of significance, and GPower was used for sample size computation. The participants were selected from the visitors of Pyramid Valley International. Initially, 140 participants provided consent to participate in the study, but at the end of the screening, 50 participants withdrew as they were not interested. Ultimately, 90 participants were enrolled. The participants were randomly divided into experimental and control groups consisting of 45 participants each. The participants were given an identification number (ID) that was generated by a random-number generator program. The random IDs were allocated to both groups in such a way that the first ID was assigned to the experimental group and the next ID was assigned to the control group. This procedure was continued until all IDs were assigned. The allocation was done by an independent person who was not part of the training, data collection, or analysis. The participants were informed about their group through an opaque sealed envelope. The participants of the experimental and control groups were blind to each other; however, the researcher was not blind to the group allocation, as he was one of the trainers of anapanasati meditation.

In our study, we used the VAS developed by Infante and Wigley [32]. It contains 20 items scored on a 5-point linear rating format with reverse scoring on 10 out of 20 items (questions 1, 3, 5, 8, 10, 12, 14, 15, 17, 20). The scores can range from 20 to 100. The participants read each statement and selected the appropriate response to indicate how often each statement was true for him or her personally when he or she tried to influence other persons. The responses were selected from (1) almost never true, (2) rarely true, (3) occasionally true, (4) often true, and (5) almost always true [32]. The VAS gives a single overall score that describes the disposition of an individual toward low, moderate, or high verbal aggressiveness. Scores from 20 to 46 suggest low verbal aggressiveness, 47–73 suggest moderate verbal aggressiveness, and 74–100 suggest high verbal aggressiveness. The psychometric properties of the VAS were as follows: coefficient alpha was 0.81 and test-retest correlation was 0.82 ($P < 0.001$) [32]. The invigilators coded and saved the answer sheets 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 were completed.

2.6. Data generation

The VAS contains a set of items for normal scoring and a set of items for reverse scoring. The scoring of the items was carried out as per the guidelines provided in the VAS for reverse scoring, and the scores were reviewed by a psychologist for correctness.

2.7. Intervention

Anapanasati meditation was given as an intervention over a 6-month period for the experimental group. Anapanasati is essentially quieting the mind by being with inhalation and exhalation. It involves inhaling and exhaling slowly and naturally and has no variation in breathing in and out. In this anapanasati practice, we used mindfulness of breathing as the object of concentration, as it is not a physical object that arouses a distraction in the mind. It is not repulsive but comforting, and it is not frightening but cajoling. Furthermore, it is a quiet and natural, unfluctuating, effortless process [27].

The intervention was administered in easy steps. The participants were advised to sit comfortably in any posture convenient to them and clasp their hands together. Next, they were asked to close their eyes and begin witnessing their own inhaling and exhaling normally. Importantly, the breathing process had to be uniform with no fluctuations such as high and low breathing. Participants were advised to be

mindful of this natural process of breathing in and breathing out for 1 h once every day. They were advised to restart if they happened to be unmindful of breathing during this course of practice.

The experimental group practiced anapanasati meditation 1 h daily along with their routine duties. The control group did not practice meditation but continued their daily routine. The participants of the experimental group practiced anapanasati meditation under the supervision of trainers for 1 week in Pyramid Valley International and later continued the practice at their residence. The trainers had practiced anapanasati meditation for the past 15 years. There was no interaction between the groups during the entire 6 months. The scale was administered on the first and last day of the study and during that time participants were accommodated in a quiet environment free from distractions.

2.8. Statistical analysis

The data were analyzed using SPSS Statistics Version 10. The data are presented as mean ± standard deviation. The data were assessed for normality using Shapiro-Wilks test, and the verbal aggression score was normal in both the experimental and control groups. The pre-post comparison within the groups was performed using paired-samples *t*-test, with a p value < 0.05 considered statistically significant for all comparisons. In the tables, the data (mean and standard deviation) are reported to two significant figures after the decimal.

3. Results

As shown in Fig. 1, of the total 140 participants enrolled, 90 were considered for randomization, as 50 participants were not interested to continue with the study. At the end of the randomization, 45 participants were allocated to the experimental group and 45 persons to the control group. In the experimental group, 10 participants and in the control group 3 participants were lost to follow up as they were not interested. The VAS score before and after the anapanasati meditation was analyzed for both experimental and control groups using a paired-samples *t*-test, and the results are tabulated in Table 1. A statistically significant difference of VAS scores was found in experimental group

Table 1
Comparison of VAS scores before and after the intervention for experimental and control groups.

Group	n	VAS Pre	VAS Post	p Value	CI
Experimental					
All	35	66.63 ± 6.46	47.34 ± 6.57	0.00*	[15.39, 23.18]
Men	11	66.0 ± 6.25	45.18 ± 3.79	0.00*	[14.63, 27.00]
Women	24	66.92 ± 6.67	48.33 ± 7.36	0.00*	[13.38, 23.79]
Control					
All	42	73.43 ± 5.11	70.50 ± 11.13	0.09	[-0.423, 6.14]
Men	35	73.49 ± 5.35	70.00 ± 12.09	0.09	[-0.53, 7.31]
Women	**7**	**73.14 ± 4.02**	**73.00 ± 3.11**	**0.84**	**[-1.49, 1,78]**

Data are represented as mean ± standard deviation.
VAS: Verbal Aggressiveness Score.
n: Number of participants.
Pre: Data taken before intervention.
Post: Data taken after intervention.
*p value significant at 0.05 level.
CI: 95% confidence interval of the difference between pre and post VAS scores.

Table 2
Comparison of VAS scores before and after the intervention in the experimental and control groups for the age groups greater than and less than 40 years.

Age Group	Experimental Group			Control Group		
	VAS (Pre)	VAS (Post)	p Value	VAS (Pre)	VAS (Post)	p Value
< 40 yrs	66.00 ± 7.67	42.83 ± 4.02	0.004*	72.17 ± 5.73	71.00 ± 5.45	0.013*
> 40 yrs	67.20 ± 6.47	47.36 ± 5.73	0.000*	74.09 ± 4.86	72.36 ± 4.52	0.07

Data are represented as mean ± standard deviation.
VAS: Verbal Aggressiveness Score.
VAS (Pre): VAS score before intervention.
VAS (Post): VAS score after intervention.
*p value significant at the 0.05 level.

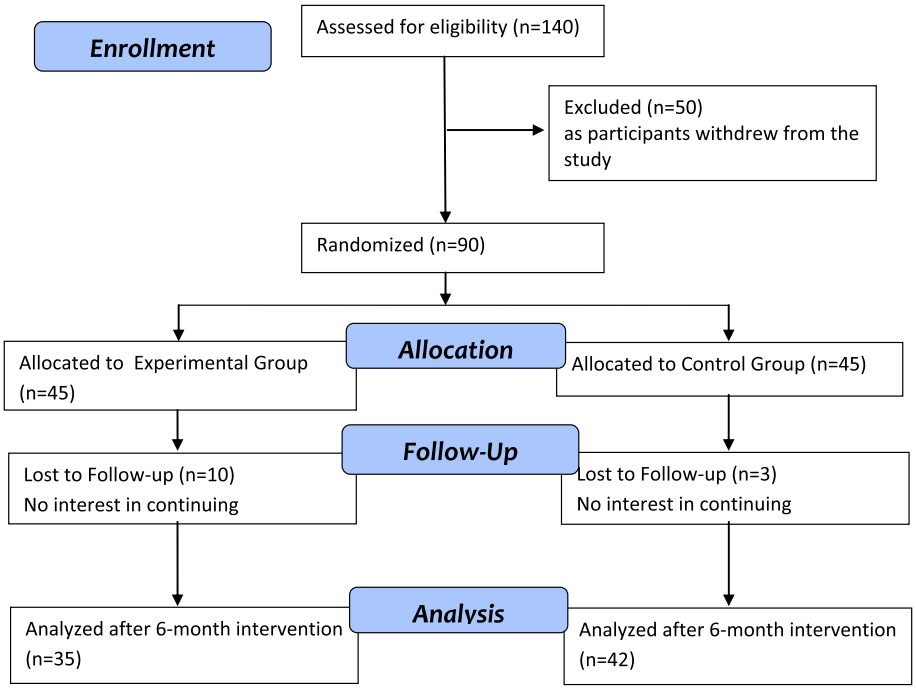

Fig. 1. CONSORT Flow diagram of the phases of the randomized controlled trial (enrollment, allocation, follow-up, and analysis).

when compared to control group. The pre and post-VAS scores across age groups of the experimental and control groups are tabulated in Table 2. A statistically significant difference of VAS scores was found in both the age groups of experimental group. Of the 35 participants in the experimental group, the VAS score was moderate for 33 and high for 2, whereas in the control group, 21 participants had a moderate score and the remaining 21 participants had a high score.

4. Discussion

The aim of the study was to investigate the effect of anapanasati meditation on verbal aggressiveness. After the 6-month intervention, we observed a significant reduction in VAS score of the participants practicing anapanasati meditation compared with the participants who were not doing meditation. The results of the present study were consistent with the results of previous studies on aggression by Singh et al. [13,15,16] but differed from the results of the study on aggression by Milan et al. [17] The studies on aggression by Singh et al. demonstrated the effectiveness of SoF on both physical and verbal aggression, and from the results of the present study, we observed a similar effect on verbal aggression, with mindfulness of breathing indicated as an intervention that may be a significant first step toward understanding the effect of anapanasati meditation on aggression. The only difference is that previous studies were conducted with individuals with psychological or neurodevelopmental disorders, whereas in our study, participants were of normal health. MBCT is widely used in the treatment of psychiatric disorders [9], but it has not shown a significant effect on verbal aggression of individuals in a rehabilitation center [17]. The authors attributed this to the prison environment and recommended conducting studies on other groups with at least 6 months of follow-up. In the present study, we observed a significant reduction in verbal aggression when healthy individuals practiced anapanasati meditation for 6 months.

The research suggests that mindfulness is closely associated with psychological well-being, and recent studies on hostility and anger have shown positive outcomes with mindfulness intervention [33]. In our study, we observed a significant reduction in VAS score with anapanasati meditation, a mindfulness of breathing. In the experimental group, the VAS score was significantly reduced in both men and women, with a slightly greater reduction for women compared to men, which can be attributed to the difference in the sample size between men and women. In the experimental group, a significant reduction in VAS score was consistent across the two age groups (< 40 years and > 40 years). The results suggest that anapanasati meditation is effective in all groups.

In our previous study on verbal aggression with yoga as an intervention, we observed a similar reduction in VAS score in the yoga group compared with the control group [19]. The yoga program in the study consists of various breathing exercises, asanas, pranayama, and meditation. According to Patanjali, yoga is effective in developing mastery over the mind, and meditation has a significant role in calming the mind, leading to reduced aggression [34]. The difference between previous and current studies is that in the previous study, meditation was done for 10 min along with other yogic practices, and the intervention was given for 8 weeks, whereas in the current study, only anapanasati meditation was given for 6 months, and there were no yogic practices. Both experiments showed a similar reduction in VAS score, which emphasizes the importance of yoga and meditation in reducing aggression. Hostility and anger are considered to be the causes of aggression, and pacifying or controlling the anger would reduce aggression [2]. Although the effect of mindfulness meditation is quite evident on aggression, the mechanisms for such a decrease in aggression are not clear but can be attributed to rumination, which leads to anger and hostility, which in turn can cause aggression [35].

The practice of anapanasati develops concentration, which leads to intuitive insights and the ability to calm the mental formation with complete control of defilements [27]. We think verbal aggressiveness is one of the defilements that erodes the mind, and the results of this study suggest that mindfulness of breathing controls verbal aggression. This is the first time the effect of anapanasati meditation on verbal aggression has been studied, and the reduction in VAS score emphasizes the significance of anapanasati meditation as an intervention to reduce aggression. Guru Deo et al. [29] previously studied the effect of anapanasati meditation on stress levels of persons as measured by EPI, and the results suggested that the practice of anapanasati meditation reduces stress levels. The results of the study by Brown and Ryan suggest that mindfulness is closely associated with attention and awareness [33], and a similar association of anapanasati was explained, which says that the practice of mindfulness of breathing by paying attention to breath leads to awareness and clear comprehension [27]. The above research findings indicate that enhanced mindfulness increases awareness and reduces aggression and other psychological symptoms. The results of our study were consistent with the research findings and also signify the role of anapanasati in reducing aggression. There is a need for focused studies to establish the effectiveness of anapanasati in addressing psychological disorders.

The present study has a few limitations that need to be addressed in future studies. We did not record the socioeconomic status of the participants as part of this study, as participants were not willing to share this information. The effect of subjective socioeconomic status on aggression [36] is well understood, and because of the lack of such information, generalization of our results to a wider population is difficult. Second, the study lacks strength in assessing the therapeutic benefits of the intervention, as we did not measure general anthropometric or clinical parameters such as height, weight, blood pressure, pulse rate, and so on.

5. Conclusion

This study showed that after a 6-month intervention, the participants who practiced anapanasati meditation had a significant decrease in their VAS score when compared with a control group who did not practice meditation. All of the above results show that the practice of anapanasati meditation was associated with significant positive results in those who practiced this technique, and there was not much of an improvement in persons who did not practice meditation. As the results of the initial studies on anapanasati meditation are encouraging, further studies are recommended to investigate the effectiveness of the anapanasati meditation intervention on various other psychological disorders.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgments

I am thankful to all who willingly participated in this study, and I sincerely acknowledge their wholehearted participation. I thank all those who helped me to make this study and arrive at the results.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ctcp.2019.06.004.

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