

Effectiveness of Vipassana Meditation and Yoga in Enhancing Forgiveness and Reducing Anger among Individuals with Coronary Heart Disease: A Prospective Interventional Study

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ABSTRACT

Introduction: The detrimental effects of anger on psychological and physical health have been highlighted by traditional and contemporary perspectives. Conversely, forgiveness is increasingly recognised as a protective factor that contributes to emotional regulation and good health. In recent years, mind-body practices, such as yoga and Vipassana meditation, have gained empirical support for their therapeutic potential, particularly in managing stress-related conditions.

Aim: To examine the effectiveness of Vipassana meditation and yoga in enhancing forgiveness and reducing anger among individuals diagnosed with Coronary Heart Disease (CHD).

Materials and Methods: The prospective interventional study design was used in the present research. The purposive sampling technique was used to collect data from Agra, Gwalior and Firozabad cities of India. Subjects were contacted through personal and social connections as this study required six-months commitment. Nearly 230 subjects were contacted and 74 gave consent to participate. In the final stage, a total of 60 patients with CHD, aged 40-60 years, participated in the study. Based on their willingness to engage in regular practice, participants were assigned to one of three groups: Group I,

Vipassana meditation (n=20); Group II, yoga (n=20); and Group III, control (n=20). The experimental groups engaged in their respective interventions for six months, while the control group received no such intervention. The anger scale (2017) and the forgiveness scale (2021) were used to collect data from participants.

Results: The findings indicated significant improvement in forgiveness ($p=0.01$) and reductions in anger ($p=0.01$) among participants in both intervention groups. Specifically, Vipassana meditation demonstrated significant efficacy in reducing revenge-related tendencies ($p=0.01$) and enhancing both self ($p=0.01$) and other-forgiveness ($p=0.01$). Yoga was found to have a broader impact, significantly improving the emotional, cognitive, and trait dimensions of forgiveness. No significant changes were observed in the control group.

Conclusion: The study concluded that regular engagement in yoga or Vipassana meditation is significantly helpful in promoting forgiveness and in reducing anger in patients with CHD. These practices show potential as accessible, non-pharmacological approaches for enhancing emotional well-being and may also contribute to cardiovascular health.

Keywords: Cardiovascular diseases, Holistic health, Mind-body therapies

INTRODUCTION

Modern materialistic life is very competitive and has become the cause of numerous problems related to physical and mental health. Coronary Heart Diseases (CHDs) are emerging as a major cause of concern in India. An estimated 17.9 million people died from CHDs in 2016, representing 31% of all global deaths. Of these deaths, 85% were due to heart attack and stroke. There are some fatal behavioural risk factors of heart disease and stroke such as unhealthy diet, physical inactivity, tobacco use and harmful consumption of alcohol, anger and holding grudges [1]. Apart from practising unhealthy activities, the most common and serious causes of cardiovascular diseases are stress and anxiety [2-4]. Stress influences behaviour and elevates the risk of heart disease by increasing blood pressure and cholesterol. Anger, a natural human instinct, varies in intensity among individuals and involves an intentional harm to others. While moderate anger is normal, excessive levels can lead to serious physiological and psychological problems for the aggressor as well as others [5,6].

On one side, anger and lifestyle cause the physiological problems; on the other hand stable and peaceful mind regulates the balanced bodily functioning. In the present research, the effectiveness

of Vipassana meditation and yoga was studied on anger and forgiveness. In Vipassana meditation the mind is brought to rest, stays focused only on one thing. When the process is completed, a state of tranquility arises. It is the process of self-purification by self-observation [7]. Apart from meditation, yoga also helps in developing healthy body and healthy mind. The art of yoga is documented for over 2,000 years [8]. In ancient India, yoga was a traditional method of meditation developed by Indian saint. Indian saints practiced yoga to control their mind which is the aim of meditation also. Modern science also rediscovered and confirmed the existing facts and knowledge [9]. The compilation of these experiences and knowledge has provided valuable, practical instructions for the body, breath, concentration, relaxation and meditation. The effectiveness of yoga on physical, mental, social and spiritual health is already proven [10]. In general term, yoga can be defined as an exercise that combines movements through a series of postures with regulated breathing [11] and mindfulness meditation.

The present study examined the effectiveness of yoga and meditation on anger and forgiveness among CHD patients. While previous research [12-14] has shown that anger is a risk factor for CHD, limited studies [15,16] have explored the role of holding

grudges or the protective role of forgiveness. Forgiveness not only reduces anger but also fosters positive emotions. Few empirical studies [13,14] have analysed anger in diagnosed CHD patients, and the comparative effects of Vipassana meditation and yoga on different dimensions of forgiveness (self, others, and situational) remain underexplored. The present research addressed this gap by comparing these two ancient Indian mind-body practices in a controlled design, focusing on reducing negative tendencies (anger, revenge) and enhancing positive psychological resources (forgiveness) to promote well-being among clinical populations.

Study objectives:

- To study the effectiveness of Vipassana meditation in improving forgiveness and in reducing the anger among subjects.
- To study the effectiveness of yoga in improving forgiveness and in reducing the anger among subjects.

Hypotheses:

- Vipassana meditation is effective in improving forgiveness and in reducing the anger among subjects.
- Yoga is effective in improving forgiveness and in reducing the anger among subjects.

MATERIALS AND METHODS

In the present research, a prospective interventional study design was used where two intervention groups (Vipassana meditation and yoga) and one control group were formed. The research was conducted over a period of six months (September 2024-February 2025) in Agra, Gwalior and Firozabad cities of India. The study adhered to ethical guidelines of declaration of Helsinki. Before participation, subjects provided informed consent. Confidentiality and anonymity were maintained throughout the study, and participants were informed of their right to withdraw at any point without penalty.

Inclusion criteria:

- Adults aged 40-60 years.
- Diagnosed with CHD within the past 1-5 years.
- Willingness to commit to regular practice (yoga or meditation) for a period of six months.

Exclusion criteria:

- Individuals with severe psychiatric conditions or cognitive impairments.
- Those already engaged in regular yoga or meditation practice prior to recruitment.
- Patients with physical limitations that prevented participation in yoga or meditation.

Sample size selection: A total of 230 individuals were approached through personal and social networks. Of these, 74 consented to participate, and 60 eligible participants were finally enrolled. Participants were then assigned to one of three groups (n=20 in each group) based on their willingness to engage in either Vipassana meditation or yoga. While no formal sample size calculation formula was applied (as this was an exploratory study with feasibility constraints), the limitation of not conducting an a priori power calculation has been explicitly acknowledged in the manuscript.

Group I (Vipassana meditation, n=20): Participants practiced Vipassana meditation at least 5 days per week, for a minimum of 20 minutes daily, over six months.

Group II (yoga, n=20): Participants practiced yoga at least 5 days per week, for a minimum of 30 minutes daily, over six months.

Group III (control, n=20): Participants did not engage in any structured yoga or meditation practice during the study period.

Study Procedure

Researcher joined the intervention sessions online or in person depending on the availability of participants, in the first week of intervention. After that, subjects practiced meditation and yoga on their own. To support adherence, the researcher conducted the practice sessions at least once per week, either online or in person considering the convenience of participants. Most of the participants who opted to join neighbourhood yoga or meditation centres were permitted to do so. On average, participants completed 124 Vipassana sessions and 128 yoga sessions during the intervention period.

Anger scale: Anger Scale [17] which was 3 point scale, was used to measure the anger among subjects. This scale consisted of three dimensions 1. Physical expression of anger, 2. Psychological expression of anger, 3. Social expression of anger. Physical anger is the one in which individual causes harm to himself/herself. There were 30 items in the scale, out of 30 items 7 were related to physical expression of anger, 13 were related to psychological expression of anger and 10 were related to social expression of anger. The minimum score was 0 and the maximum score was 60. A higher the score represented a higher level of anger among subject. The Test-retest Reliability of the scale (with a time gap of 25 days) was 0.86. The scale reported high construct validity that was 0.85. Validity of this scale was established with the help of scores on EEG.

Forgiveness scale: To measure forgiveness, a self-constructed forgiveness scale [18] was used. It was a five-point scale response ranging from strongly disagree to strongly agree. Five points was assigned to strongly disagree, four points to disagree, three points to neutral, two points to agree and strongly agree response was awarded one point. In reverse items the scoring pattern was also reverse. The maximum score was 205 and the minimum score was 41. Higher score represented the lower forgiveness. There were eight dimensions in this scale 1. Revenge, 2. Emotional forgiveness, 3. Cognitive forgiveness, 4. Behavioural forgiveness, 5. Trait forgiveness, 6. Situational forgiveness, 7. Self-forgiveness, 8. forgiveness for others. The number of items in each sub-scale were different. In revenge and cognitive forgiveness sub-scale there were 6 items each, forgiveness for others had only 4 items while remaining 5 sub-scales i.e. emotional forgiveness, behavioural forgiveness, trait forgiveness, situational forgiveness and self-forgiveness had 5 items each. There were 11 reverse items in the scale. The scale had high reliability and validity. Cronbach Alpha was 0.78 and Test-retest reliability was 0.82. The convergent validity of the scale was 0.77 and discriminant validity was 0.71.

STATISTICAL ANALYSIS

Data were analysed using Statistical Package for Social Sciences (SPSS) (Version 25). Descriptive statistics were computed, and inferential analysis was performed using the Wilcoxon Mann-Whitney U test for within-group comparisons. A p-value of <0.05 (two-tailed) was considered statistically significant. Additionally, the Kruskal-Wallis test was used for intergroup comparisons (Meditation vs. Yoga vs. Control) were conducted for all parameters at both pretest and post-test levels.

RESULTS

The study sample (N=60) consisted of predominantly male participants (68.3%) with females constituting only 31.7%. The mean age of participants was 51.05 years (SD=6.18), with the majority (29,48.33%) falling in the 51-60 years age group, indicating that middle-aged adults formed the largest segment of the sample [Table/Fig-1].

As shown in [Table/Fig-2], participants in the Vipassana group showed a significant reduction in anger after six months of practice (p<0.01). the improvement was also observed across all forgiveness dimensions, with decreases in revenge tendencies and

Variables		n (%)	
Age (years), Mean (SD)		51.05 (6.18)	
Gender			
Male		41 (68.3%)	
Female		19 (31.7%)	
Age			
40-45		13 (21.66%)	
46-50		18 (30%)	
51-60		29 (48.33%)	

[Table/Fig-1]: Summary of demographic variables (N=60)

Measures	Pretest scores (n=20)		Post-test score (n=20)		'U'	p-value
	Mean	SD	Mean	SD		
Anger	23.1	2.77	18.1	5.65	74.5	0.01
Revenge	19.1	2.82	12.85	3.77	35.0	0.01
Emotional forgiveness	17.4	2.5	14.95	3.96	113.5	0.01
Cognitive forgiveness	18.35	2.08	13.55	2.16	26	0.01
Trait forgiveness	16.65	1.46	14.05	2.32	70	0.01
Situational forgiveness	18	1.62	15.45	2.66	89	0.01
Self-forgiveness	17.25	1.4	12.05	2.08	16.5	0.01
Forgiveness for others	16.4	1.31	12	1.86	13.5	0.01
Forgiveness	123.15	5.32	102.45	10.98	18	0.01

[Table/Fig-2]: Effectiveness of meditation on mean post test score of anger, forgiveness, and its dimensions in meditation experimental group i.e. Group I.

increases in emotional, cognitive, trait, situational, self-, and other-forgiveness. Overall, the findings indicate that Vipassana meditation has significantly reduced negative effect while enhancing positive emotional capacities. Participants who practiced yoga demonstrated significant decreases in anger and revenge and improvements in all forgiveness dimensions ($p<0.01$). Emotional, cognitive, and trait forgiveness showed particularly strong gains, highlighting the broad psychological benefits of yoga practice [Table/Fig-3].

Measures	Pretest scores (n=20)		Post-test score (n=20)		'U'	p-value
	Mean	SD	Mean	SD		
Anger	22.25	6.73	12.25	4.64	44.5	0.01
Revenge	19.21	1.57	14.35	3.84	67	0.01
Emotional forgiveness	17.95	3.36	10.8	1.83	17.0	0.01
Cognitive forgiveness	17.8	5.10	10.1	1.91	29.0	0.01
Trait forgiveness	17.0	4.13	9.9	3.02	41.5	0.01
Situational forgiveness	16.3	4.41	10.85	3.28	58.0	0.01
Self-forgiveness	15.9	3.98	10.25	3.27	54.0	0.01
Forgiveness for others	15.75	2.97	10.75	2.55	37.5	0.01
Forgiveness	119.85	18.38	77.5	10.63	22.0	0.01

[Table/Fig-3]: Effectiveness of yoga on mean pre and post test score of anger, forgiveness, and its dimensions in yoga experimental group i.e. Group II.

As shown in [Table/Fig-4], participants of the control group did not show significant changes ($p>0.05$) in anger or forgiveness measures between pretest and post-test except for trait forgiveness which was found significant at 0.05 level. This absence of improvement underlines that the positive outcomes in the intervention groups were specifically due to meditation and yoga practice.

Meditation, yoga, and control groups were generally comparable on pretest measures of anger and forgiveness, except revenge ($p<0.01$) and forgiveness for others ($p=0.03$) where a significant difference was reported [Table/Fig-5]. [Table/Fig-6] demonstrated

Measures	Pretest scores (n=20)		Post-test score (n=20)		'U'	p-value
	Mean	SD	Mean	SD		
Anger	25.8	7.3	24.75	3.90	146	0.14
Revenge	15.1	3.70	15.35	3.58	161	0.29
Emotional forgiveness	16.4	3.58	14.95	4.01	154	0.21
Cognitive forgiveness	18.1	4.47	18.6	3.77	176	0.51
Trait forgiveness	17	2.91	15.55	2.09	123	0.03
Situational forgiveness	18.2	1.82	18.2	2.66	199	0.97
Self-forgiveness	17.65	2.39	16.55	3.01	155	0.22
Forgiveness for others	17.05	1.09	16.35	2.01	158	0.25
Forgiveness	120.35	14.84	115.55	13.80	143	0.12

[Table/Fig-4]: Pre and post test score of anger, forgiveness, and its dimensions in control group i.e. Group III.

Measures	Mean Rank meditation Group	Mean Rank yoga Group	Mean Rank Control Group	H Value	p-value
Anger	29.15	28.20	34.15	1.34	0.512
Revenge	41.20	36.55	13.75	28.30	<0.001
Emotional forgiveness	31.90	34.70	24.90	3.34	0.188
Cognitive forgiveness	27.90	33.13	30.48	.895	0.639
Trait forgiveness	29.33	25.40	36.78	4.37	0.112
Situational forgiveness	32.20	25.40	33.90	2.65	0.265
Self-forgiveness	31.95	24.45	35.10	3.92	0.140
Forgiveness for others	28.10	24.93	38.48	6.58	<0.03
Forgiveness	36.40	28.60	26.50	3.56	0.168

[Table/Fig-5]: Pretest score of anger, forgiveness, and its dimensions in meditation group vs. yoga group vs. control group.

Measures	Mean Rank meditation group	Mean Rank yoga group	Mean Rank control group	H value	p-value
	Mean Rank meditation group	Mean Rank yoga group	Mean Rank control group		
Anger	26.35	17.1	48.05	33.10	<0.01
Revenge	24.65	26.33	40.53	9.97	<.007
Emotional forgiveness	37.40	12.90	41.20	30.94	<0.01
Cognitive forgiveness	30.93	11.58	49.00	45.94	<0.01
Trait forgiveness	36.05	17.30	38.15	17.28	<0.01
Situational forgiveness	29.48	16.50	45.53	27.72	<0.01
Self-forgiveness	27.78	17.13	46.60	29.21	<0.01
Forgiveness for others	24.68	19.78	47.05	27.73	<0.01
Forgiveness	30.15	11.05	50.30	50.522	<0.01

[Table/Fig-6]: Post-test score of anger, forgiveness, and its dimensions in meditation group vs. yoga group vs. control group.

that, following intervention, both meditation and yoga, participants showed significant decreases ($p<0.01$) in anger and improvements in forgiveness dimensions compared to the control group. The control group maintained higher anger and lower forgiveness scores, which highlights the effectiveness of the interventions. Particularly, yoga appeared slightly more effective than meditation in enhancing forgiveness and reducing anger.

These findings suggest that consistent yoga practice positively influenced participants' emotional regulation and interpersonal attitudes. As per the scoring norms of the forgiveness scale, lower scores represent higher levels of forgiveness and its subcomponents. Therefore, the reduction in mean scores across forgiveness dimensions confirms a significant improvement in the capacity to forgive, alongside a reduction in anger, among participants who practiced yoga regularly.

DISCUSSION

The present study aimed to examine the effects of Vipassana meditation and yoga in enhancing forgiveness and reducing anger

among CHD patients. The findings showed that both practices of Vipassana meditation and yoga significantly improved forgiveness and lowered anger levels among subjects in comparison to the control group which did not participate in any of the practices. Moreover, yoga showed slightly broader and more consistent effects across various dimensions of forgiveness. Hence, both hypotheses of the study were supported.

The results of the present research show that regular engagement in mind-body practices such as Vipassana meditation and yoga can lead to improved emotional regulation and enhanced psychological well-being in CHD patients. These findings are consistent with previous researches which emphasized the significant positive contribution of meditation and yoga in managing stress-related conditions and improving overall mental well-being of subjects [19,20]. Vipassana meditation, which emphasizes self-observation and equanimity, likely reduces automatic emotional reactivity, thereby lowering down the anger and fosters forgiveness. Similarly, yoga integrates physical postures, controlled breathing, and mindfulness, which together help in regulating physiological arousal and cultivating calmness and compassion [21].

The study also supports the findings of earlier researches which show that yoga improves emotional stability and reduces hostility among individuals with CHDs [20,22]. A recent research conducted by Chauhan S and colleagues showed that regular practice of yoga significantly lowered stress and anxiety among medical students [11]. As reported Vipassana meditation promotes mindfulness and non-reactivity, which can further transform habitual anger responses into acceptance and self-regulation. This mechanism explains the significant reduction in revenge tendencies observed among participants in the Vipassana group [23].

A similar pattern of findings was observed in the research conducted by Wu CH and Mak WW, where mindfulness-based interventions significantly improved both emotional forgiveness and cognitive reappraisal among participants [24]. These results support the idea that contemplative practices foster emotional balance and empathy, leading to better interpersonal relations and healthier behavioural patterns. The current results also corroborate studies highlighting that yoga enhances parasympathetic activation, reduces blood pressure, and moderates stress hormones [25-28], all of which may indirectly reduce anger and improve forgiveness tendencies.

Moreover, the physiological benefits of yoga, such as improved oxygenation and metabolic efficiency significantly contribute to improved self-control and reduced emotional volatility [29]. The controlled synchronized breathing and movement in yoga, combined with the introspective nature of Vipassana, appears to harmonize mind-body functioning, leading to a holistic sense of calmness. As suggested, practicing yoga for the long-term may lead to higher happiness and improved mental balance, which supports the present findings that yoga cultivates positive psychological resources and pro-social emotions [30-32].

In essence, the present study demonstrates that both Vipassana meditation and yoga can be considered as effective non-pharmacological interventions [33,34] which enhance psychological well-being among CHD patients. By reducing anger and enhancing forgiveness, these practices may indirectly support cardiovascular recovery and prevent further disease progression. The integration of such mind-body interventions into cardiac rehabilitation programs can therefore be recommended as an adjunct to conventional medical treatments.

Limitation(s)

In the present research, the sample size was relatively small N=60 which limits the generalisability of findings. Group assignment was based on participant willingness which may have introduced selection bias. As the study was exploratory and feasibility-driven so no a priori power calculation was conducted which can be done

in future research to make the process more rigorous. Both the scales used in this study are constructed by the authors and need to be validated in other populations. Randomized trials with larger samples, objective adherence tracking, and follow-up assessments are recommended in the future researches.

CONCLUSION(S)

The findings highlight that both practices-meditation and yoga-significantly improved forgiveness across multiple dimensions while reducing anger. However, yoga showed slightly broader effects in comparison to Vipassana meditation practice. These results suggest that incorporating mind-body practices into the lifestyle of individuals with CHD can offer meaningful psychological benefits and potentially contribute to overall physical health. The research proposes integrating such practices into healthcare and rehabilitation programs to complement traditional medical interventions and support holistic recovery.

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