ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 6| June 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

A LITERATURE REVIEW ON THE EFFECT OF DEEP BREATHING EXERCISES ON STRESS-INDUCED ANXIETY AND CARDIOVASCULAR CHANGES

Ridham Meghanathi[1*], Dr. Anjali Suresh (PT)[1], Dr. Shwetha (PT)[2]

[1]-MPT Final Year Student, Garden City University, Bangalore*

[1]-HOD and Professor, School of Health Sciences, Department of Physiotherapy, Garden City University, Bangalore

[2]-Assistant Professor-School of Health Sciences, Department of Physiotherapy, Garden City University, Bangalore

Corresponding Author: Department of Physiotherapy,Garden City University, Bangalore. Address: "Sadguru Krupa", Sardar nagar, Near Aamrakunj Society, Talala, Gujarat, India(362150)

Article DOI: https://doi.org/10.36713/epra17300
DOI No: 10.36713/epra17300

ABSTRACT

Many ailments, including somatic conditions like hypertension and pulmonary diseases additionally psychiatric conditions like anxiety and depressive disorders, benefit from using deep breathing techniques. The purpose of this literature review is to determine the effect of deep breathing on stress-induced anxiety and cardiovascular changes.

METHOD: *Search engines like PubMed and Google Scholar have been used to collect the reviews consisting of systematic reviews, randomized controlled trials, and experimental studies regarding the current evidence of the effect of breathing exercises on stress induced anxiety and related cardiovascular changes. A total of 35 articles were identified, among them 20 articles from 2007 to 2023 were selected for review.*

RESULT: *four experimental studies were identified, where they compared the experimental group with the control group. Four quasi-experimental studies tested Deep Breathing Exercises to significantly reduce stress, anxiety, and circulatory problems. One systematic review summarized the impact of breathing activities on prehypertensive and hypertensive patients whereas One author summarized the positive effect of doing daily Deep breathing exercises to lessen stress of immediate or chronic by decreasing the sympathetic activity. One pre-experimental study concluded the effect of the DBE on headache and vitals like blood pressure, pulse and temperature.*

KEYWORDS: *Anxiety, Blood pressure, Cardiovascular changes, Deep Breathing Exercise, Stress.*

INTRODUCTION

In today's societies, anxiety and the corresponding physiological stress reaction is often seen. Anxiety is a generic complaint and is typically related to a state of poor mental health on a psychological level. Furthermore, to a greater incidence of death from all medical reasons. Anxiety is characterised as a transitory psychological condition related to physiological stress reactions that arise in response to a perceived threat.[1]

Stress is an integral part of life. Stress is essential for human survival, additionally learning and innovation. Stress becomes harmful only when it becomes too much for us to handle and keeps our nervous system from reverting to its natural homeostasis. Stress overwhelms the nervous system, flooding our body with hormones designed to get us ready for "fight or flight." Evidence suggests that the most of human triumphs are achieved under stressful conditions; nonetheless, high levels of stress can lead to a range of negative consequences, including bodily and mental ailments, dysfunction, and adjustment disorders, all of which impair people's quality of life.[2]

Diaphragmatic breathing, another name for deep breathing, is a breathing method according to the notion that calming the mind and body together promotes relaxation. This technique requires the practitioner to slowly inhale and exhale while contracting their diaphragms. Taking deep breaths tends to raise blood oxygen levels, massage internal organs in or around the abdomen, and may even activate the vagus nerve. Numerous research projects have shown that deep breathing has a positive influence on a range of characteristics, including stress, anxiety, and negative effects like physiological and psychological changes of blood pressure, heart rate or depression. In one research in China, 40 healthy volunteers were hired to look into the investigate the impact of deep breathing on stress, negative affect, and attentiveness. The eight-week treatment session,

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 6| June 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

which was given for 30 minutes every other day, involved a random allocation of participants to either the experimental or control group, and assessments of both groups' attention, affect, and cortisol levels were performed both before and after. The outcomes showed that throughout the deep breathing therapy, individuals improved their ability to focus for extended periods of time, while also reduced their levels of cortisol and detrimental effects in contrast to the group under control.[3]

It is generally documented that regular breathing exercises, or pranayama, improve cardiovascular and respiratory health by suppressing sympathetic activity and promoting parasympathetic tone. Furthermore, it improves both physical and psychological wellness by eliminating the detrimental impact of stress and tension on the body. [4]

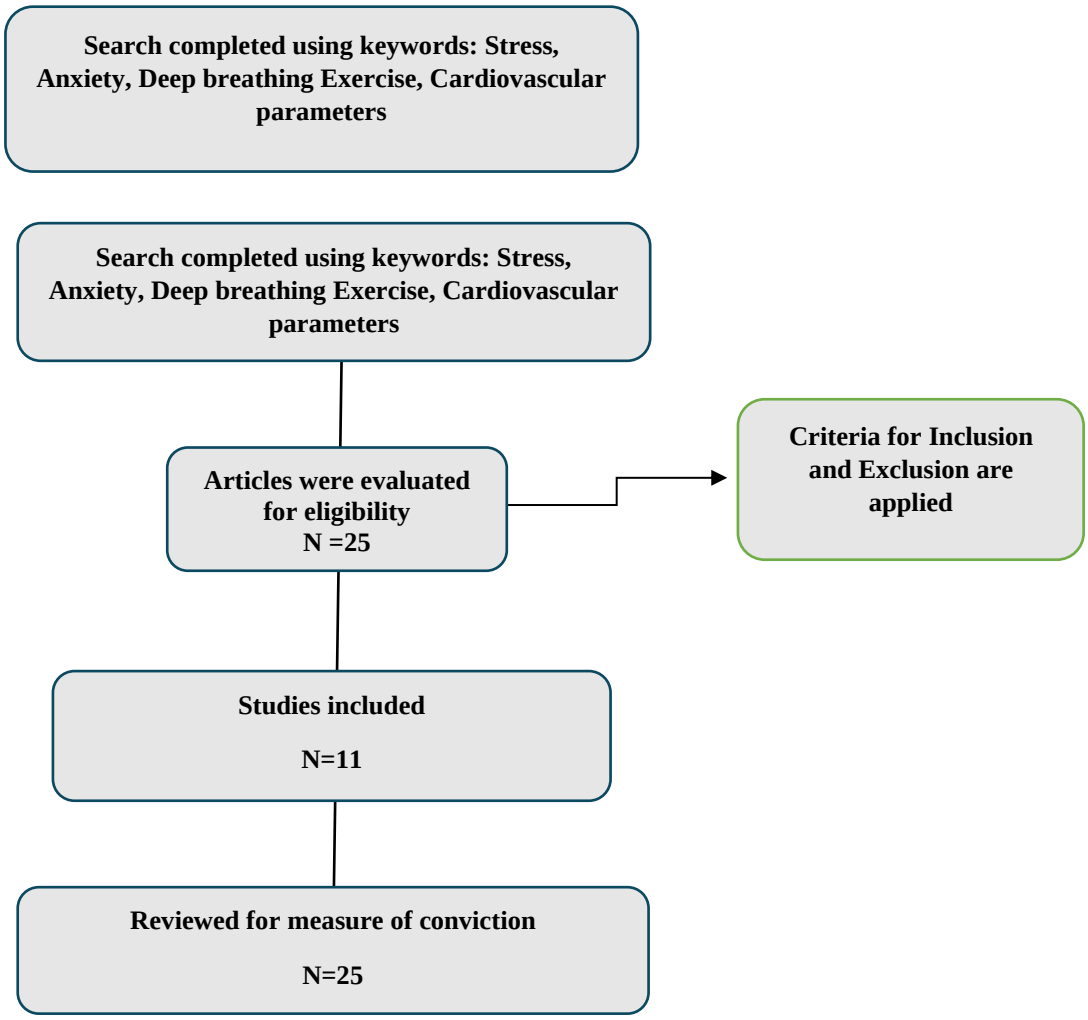
Over the last 10 years, research has demonstrated that the diaphragmatic deep breathing at 6 or 10 breaths per minute can produce arteriolar dilatation by stimulating pulmonary-cardiac mechanoreceptors while inhibiting sympathetic nerve activity and chemoreflex activation. This reduces SBP and DBP in hypertensive individuals by enhancing parasympathetic activity and baroreflex sensitivity. Two minutes of slow, deep breathing has been demonstrated in hypertensive individuals to lower SBP and DBP by 8.6 and 4.9 mmHg, respectively. It is predicted that hypertension individuals who engage in weeks of slow, deep breathing exercises would have a significant drop in both SBP and DBP in comparison to those who do not.[5]

Sr No.	AUTHOR	TITLE	DURATION OF TREATMENT	STUDY DESIGN	OUTCOME MEASURE	CONCLUSION
1.	Dallin Tavoian and Daniel H. Craighead, 2023	Deep breathing exercise at Work: Potential Applications and impact	-	-	-	Daily Deep Breathing Exercises can lower chronic stress and lessen acute stress episodes. In addition to provide positive physiological responses like decreased elevated blood pressure and sympathetic activation.
2.	Ai Cahyati et al, 2023	Deep breathing Relaxation Techniques can improve oxygen saturation value, a decrease in blood pressure and pulse rate in patients with Congestive Heart Failure	-	Quasi experimental study	Pulse rate, blood pressure, spo2	The study found that breathing exercise improves the oxygen saturation and decreases the blood pressure and pulse rate.
3.	Katherine ka-Yin Yau et al, 2021	Effects of Diaphragmatic Deep Breathing Exercises on Prehypertensive or hypertensive adults: A literature review	-	Systemic review	-	The study concluded that Diaphragmatic deep and slow breathing exercises had positive therapeutic effects on prehypertensive and hypertensive adults.
4.	Ali Gholamrezaei et al, 2021	Psychophysiological responses to various slow, deep breathing techniques	Single 2 hours session	An Experimental study	Blood pressure variability(BPV) and HR variability(HRV)	The study showed that breathing techniques were beneficial in reducing hypertension and pain.
5.	Valentin Magnon et al, 2021	Benefits from one session of deep and slow breathing on vagal tone and anxiety in young and older adults.	1 session	An experimental study	Spielberger's state Anxiety inventory scale, Heart rate variability	The researcher found that the slow DBE was effective to reduce anxiety, improve vagal tone and reduce acute

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 6| June 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

						anxiety in young adults.
6.	Novriani Husna et al, 2020	The effect of slow deep breathing exercise on blood pressure elderly in pstw sabai nan aluih, sicincin padang pariaman.	1 week	Quasi-experimental study	Blood pressure	This study found the breathing technique has positive effect in reducing blood pressure in elderly people.
7.	Yudi Herdiana et al, 2020	The effectiveness of Recitation AI-Qur'an Intervention and Deep breathing exercise on improving vital sign and anxiety level among congestive heart failure patients.	Four days	An experimental study	Oxygen saturation, anxiety level	This research concluded that both the techniques are essential to increase oxygen saturation and lower anxiety levels in people with CHF.
8.	Yanti Anggraini Aritonang, 2020	The effect of Deep Breathing exercise on Headache and Vital sign in Hypertension patient	4 days	Pre-experimental study	Blood pressure, Pulse, Respiratory Rate, temperature, Headache Scale	This study summarized slow deep breathing exercise decreases the headache severity and also affects vital signs.
9.	Rima Ambarwati et al, 2020	Slow Deep Breathing exercise on a patient's blood pressure with hypertension in the working area of Kertosari health center Banyuwangi.	1 day	An experimental study	Blood pressure	The investigation found that blood pressure significantly reduced after giving the DBE to the individuals with HTN.
10.	Reni Asmara Ariga, 2019	Decrease Anxiety among students who will do the objective structured clinical examination with deep breathing relaxation technique.	-	Quasi-experimental Study	Self-rating Anxiety scale	The study summarised that abreathing activities had a positive effect to lessen the anxiety level.
11.	Vijay Singh Rawat, 2018	A study to assess the effectiveness of Deep breathing exercises to reduce the level of stress among housewives in selected rural area of Udaipur	-	Quasi-experimental study	Holmes and rahe stress rating scale	The study found that the deep breathing exercise had a positive effect on reducing the level of stress among housewives.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 6| June 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188



MATERIALS AND METHODS

Literature Search Methodology

Virtual search engines were used to collect journals are Google Scholar, Science Direct and PubMed. The authors identified articles based on the keywords. The articles have been collected in full text. A total of 25 articles were identified, from them 10 articles were choose for review.

Study Selection

Inclusion Criteria

1. Articles discussing the effect of Deep Breathing training were included.
2. Articles published only in the English language were included.
3. Articles with full text from 2018-2023 are included.
4. Articles analysing the impact of DBE on stress, anxiety, and cardiovascular parameters.
5. Articles that identified the positive influence of breathing activities on hypertension patients.
6. Articles where deep breathing exercises were helpful for school and college students to reduce anxiety.

Exclusion Criteria

1. Articles published in other languages were excluded.
2. Articles published below the year 2018 were excluded.
3. Articles discussing different nostril breathing exercises were excluded.

RESULT

This review aimed to evaluate the effects of breathing training on stress-induced anxiety and cardiovascular changes. SDB is a kind of relaxation that is intended to control slow, deep breathing. It can increase baroreceptor sensitivity, reduce the activity of the sympathetic system and boost that of the parasympathetic nerve system (PNS). The body becomes more relaxed and less active when the PNS is activated. Regular occurrence of this condition will trigger the action of the cardiovascular control centre (CCC), resulting in a decrease in heart rate and subsequently lowering blood pressure.

A person's normal behavioural and social functions are disrupted during emotional attacks and anxious states because the ANS causes physiological variables like heart rate, respiration, blood pressure, hormonal secretion, palpitation, and gastrointestinal functions to suddenly elevate.

Some investigations compared the effects of four SDB approaches (PLB, left and right UNB, and loaded SDB) on

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 6| June 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

heart rate, blood pressure, heart rate variability, and baroreflex activity. By increasing PNS activity, diaphragmatic deep breathing has demonstrated to offer potential psychological advantages in hypertension or prehypertension people. When exposed to stressful situations for an extended period of time, the SNS generates stress hormones that affect sympathetic tone does not recover to its resting state. The basal sympathetic tone can be decreased by DDB through slower, deeper, and longer exhalations, which makes people feel calm and relaxed. Slow and deep breathing promotes the relaxation response, reducing tension and bringing serenity to the body. Women's stress levels have an impact on their health. Research shows that stress is responsible for 60-90% of illnesses. Chronic stress may be exhausting and difficult to overcome over time. Pre-test results showed that 27 (45%) housewives reported severe stress, 22 (36.67%) reported high stress, and 11 (18.33%) reported moderate stress. The majority of the post-test There were 35 housewives (58.33%) with no stress, 21 (35) with light stress, 4 (6.67%) with moderate stress, and none with severe stress.

This is a basic technique utilized in many relaxation techniques and is also used in qigong, yoga, and progressive muscular relaxation. DB interventions have been linked to improvements in fitness, concentration, and the capacity to identify ways to manage stressors. These changes include reducing BP, lowering the heartbeats, diminishing tenseness in the muscles and figuring out how to handle pressures without focusing on them and feeling relaxed. On the basis of this, a few investigators are intrigued by assessing children's anxiety levels utilising breathing-based calming methods, which ought to decline the anxiety levels of students when taking the organization's test.

In a single quasi-experimental trial, 32 type II diabetic patients underwent deep breathing training and were compared to untrained controls. Participants who had received deep breathing instruction saw a significant decline in their Hamilton Anxiety Rating Scale scores, but untrained controls showed no such decline.

CONCLUSION

This review states that Deep breathing intervention were found useful in eliminating stress and stress-related consequences in scholars and also in patients suffering from anxiety because of any surgery. The studies reviewed stated that it was effective in hypertensive and prehypertensive populations to reduce BP and HR. Thus, Deep breathing exercise helps to maintain psychophysiological function in all the populations.

CONFLICT OF INTEREST

There is no conflict of interest for the researchers.

REFERENCES

1. .Magnon V, Dutheil F, Vallet GT. Benefits from one session of deep and slow breathing on vagal tone and anxiety in young and older adults. Scientific Reports. 2021 Sep 29;11(1):19267.
2. Maharjan G, Baby L. A study to assess the effectiveness of progressive muscle relaxation on stress among nursing students in a selected nursing college, Bangalore. International Journal of Health Sciences and Research. 2019;9(11):150-8.
3. Toussaint L, Nguyen QA, Roettger C, Dixon K, Offenbächer M, Kohls N, Hirsch J, Sirois F. Effectiveness of progressive muscle relaxation, deep breathing, and guided imagery in promoting psychological and physiological states of relaxation. Evidence-Based Complementary and Alternative Medicine. 2021 Oct;2021.
4. Singh S, Katwal B, Panta PP. Slow and deep breathing exercise (Pranayama) for a stress-free life amongst medical students. Int J Res Rev. 2017;4(7):67-72.
5. Yau KK, Loke AY. Effects of diaphragmatic deep breathing exercises on prehypertensive or hypertensive adults: A literature review. Complementary therapies in clinical practice. 2021 May 1;43:101315.
6. Tavoian D, Craighead DH. Deep breathing exercise at work: Potential applications and impact. Frontiers in Physiology. 2023 Jan 12;14:23.
7. Cahyati A, Februanti S. Deep Breathing Relaxation Techniques Can Improve Oxygen Saturation Value, a Decrease in Blood Pressure and Pulse Rate in Patients with Congestive Heart Failure. In1st UMSurabaya Multidisciplinary International Conference 2021 (MICon 2021) 2023 May 13 (pp. 982-991). Atlantis Press.
8. Yau KK, Loke AY. Effects of diaphragmatic deep breathing exercises on prehypertensive or hypertensive adults: A literature review. Complementary therapies in clinical practice. 2021 May 1;43:101315.
9. Gholamrezaei A, Van Diest I, Aziz Q, Vlaeyen JW, Van Oudenhove L. Psychophysiological responses to various slow, deep breathing techniques. Psychophysiology. 2021 Feb;58(2):e13712.
10. Husna N, Johan T. The effect of slow deep breathing exercise on blood pressure elderly in pstw sabai nan aluih, Sicincin Padang Pariaman, 2020. InProceeding International Conference Syedza Saintika 2020 Oct 19 (Vol. 1, No. 1).
11. Herdiana Y, Djamil M. The effectiveness of recitation Al-Qur'an intervention and deep breathing exercise on improving vital sign and anxiety level among congestive heart failure (CHF) patients. International Journal of Nursing and Health Services (IJNHS). 2021 Feb 20;4(1):9-16.
12. Aritonang YA. The Effect of Slow Deep Breathing Exercise on Headache and Vital Sign in Hypertension Patients. Jurnal Keperawatan Padjadjaran. 2020;8(2):174-82.
13. Ambarwati R, Ariyani AD. slow deep breathing exercise on patients'blood pressure with hypertension in working area of kertosari health center banyuwangi 2020. International Journal of Social Science. 2021 Oct 2;1(3):233-40.
14. Ariga RA. Decrease anxiety among students who will do the objective structured clinical examination with deep breathing relaxation technique. Open access Macedonian journal of medical sciences. 2019 Aug 8;7(16):2619.
15. Rawat VS. A Study to Assess the Effectiveness of Deep Breathing Exercise to Reduce the Level of Stress among Housewives In Selected Rural Area of Udaipur. Asian Journal of Pharmaceutical Research and Development. 2018;6(2):93-6.
16. Singh S, Katwal B, Panta PP. Slow and deep breathing exercise (Pranayama) for a stress-free life amongst medical students. Int J Res Rev. 2017;4(7):67-72.
17. Soliman GH, Elalem SM, Elhomosy SM. The effect of relaxation techniques on blood pressure and stress among pregnant women with mild pregnancy induced hypertension. Asian Journal of Nursing Education and Research. 2017;7(3):321-9.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 6| June 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

18. *Nariyani P, Vyas H. Immediate effect of deep breathing exercise on healthy. Int. J. Physiother Res. 2017;5(5):2420-3.*
19. *Perciavalle V, Blandini M, Fecarotta P, Buscemi A, Di Corrado D, Bertolo L, Fichera F, Coco M. The role of deep breathing on stress. Neurological Sciences. 2017 Mar;38(3):451-8.*
20. *Sellakumar GK. Effect of slow-deep breathing exercise to reduce anxiety among adolescent school students in a selected higher secondary school in Coimbatore, India. Journal of Psychological and Educational Research (JPER). 2015;23(1):54-72.*
21. *Naik GS, Gaur GS, Pal GK. Effect of modified slow breathing exercise on perceived stress and basal cardiovascular parameters. International journal of yoga. 2018 Jan;11(1):53.*
22. *D'silva F, Vinay H, Muninarayanappa NV. Effectiveness of deep breathing exercise (DBE) on the heart rate variability, BP, anxiety & depression of patients with coronary artery disease. Journal of Health and Allied Sciences NU. 2014 Mar;4(01):035-41.*
23. *Tharion E, Samuel P, Rajalakshmi R, Gnanasenthil G, Subramanian RK. Influence of deep breathing exercise on spontaneous respiratory rate and heart rate variability: a randomised controlled trial in healthy subjects. Indian J Physiol Pharmacol. 2012 Jan 1;56(1):80-7.*
24. *Paul G, Elam B, Verhulst SJ. A longitudinal study of students' perceptions of using deep breathing meditation to reduce testing stresses. Teaching and learning in medicine. 2007 Jun 19;19(3):287-92.*
25. *Hopper SI, Murray SL, Ferrara LR, Singleton JK. Effectiveness of diaphragmatic breathing for reducing physiological and psychological stress in adults: a quantitative systematic review. JBI Evidence Synthesis. 2019 Sep 1;17(9):1855-76.*