

# A COMPARATIVE STUDY ON THE EFFECT OF BHRAMARI PRANAYAMA AND MUSIC THERAPY ON CHITTODVEGA W.S.R TO TEST ANXIETY.

Dr. Nikita Lande<sup>1</sup>, Dr. Sanjay Chopkar<sup>2</sup>

1.MD Scholar, Department of Swasthavritta and Yoga, Vidarbha Ayurved Mahavidyalaya, Amravati, Maharashtra

2.Professor and HOD, Department of Swasthavritta and Yoga, Vidarbha Ayurved Mahavidyalaya, Amravati, Maharashtra

## ABSTRACT

*Anxiety or Stress i.e. Chittodvega is mentioned in Manasika Vikara. Chittodvega refers to a state of anxiety, fear and agitation. Test anxiety is another name for exam stress. Extreme worry, anxiety, and discomfort are symptoms of a physiological condition that occurs before, and/or during an exam. Studies reveal that 25–40% of pupils suffer from test anxiety. High levels of anxiety in students may affect their accomplishments, working memory, reasoning skills, self-esteem, and academic performance. Even though there are various psychotherapies and strategies available for test anxiety management. Both music therapy and Bhramari pranayama can also be effective in subjects suffering from Test anxiety. The 90 days study carried out on 300 students diagnosed with Test Anxiety by Westside Test Anxiety scale, divided into two groups for bhramari pranayama and other for music therapy (Raga desi todi). Pranayama is the most effective procedure that affects the physical and mental physiology of mankind in many ways. Practicing pranayama regularly has a positive effect on cardiovascular and respiratory functions, it improves the autonomic nervous system towards parasympathetic dominance. The original ragas of the Indian classical music are created according to the deep knowledge of harmonious consonance between the seven swaras and chakras. This is why classical music compositions are found to have significant positive effects on mind and body system and have potential to awaken the dormant faculties. The aim of this research was to compare both therapies and allow investigation of how relieved anxiety affects the exam preparation and performance and also which one of the therapies has more effect.*

**Keywords :- Test Anxiety, chittodvega, exam stress, Bhramari Pranayama, Music Therapy**

## INTRODUCTION:

In the ancient traditions of Ayurveda and Yoga, known as the oldest sciences for healing and life balance, holistic health is prioritized. Yet, the modern, competitive environment often pulls people away from these foundations, leaving them vulnerable to stress, anxiety, and even depression. This phenomenon is particularly prominent among students, who face immense pressure to meet the expectations of their parents and society, as well as the demands of academic success. The added intensity of competition in examinations exacerbates these pressures, making students especially susceptible to heightened anxiety and stress. This state, known in Ayurveda as *Chittodvega* (anxiety and stress), falls under the broader category of *Manasika Vikaras* or mental disorders. In Sanskrit, *Chitta* means "mind," while *Udvega* refers to "anxiousness," collectively capturing a state marked by fear, agitation, and worry.<sup>1,2</sup> Stress is widely acknowledged as a leading concern among students, particularly during exams, which are pivotal in shaping their academic and future career trajectories. However, the growing burden of examination stress negatively impacts students' performance, risking potential harm to their academic progression and overall well-being. Exam stress, often referred to as test anxiety, comprises a spectrum of emotions that students experience in the days leading up to and during examinations. These include physiological symptoms such as over-arousal, physical tension, fear of failure, dread, and even catastrophizing potential outcomes.<sup>3</sup> This condition creates a physiological state marked by extreme worry, discomfort, and distress before and/or during exams, all of which present substantial obstacles to effective learning and optimal performance.<sup>4</sup>

Scientific studies reveal that the heightened emotional discomfort associated with test anxiety is closely linked to lower academic performance and higher dropout rates, suggesting that unmanaged anxiety contributes significantly to both individual and systemic educational challenges.<sup>4,5,6</sup> Additionally, the adverse effects of exam anxiety extend beyond academic outcomes, potentially impairing students' emotional, social, and behavioral development, as well as affecting their self-esteem and perception of school.<sup>7</sup> When test-related anxiety becomes severe, students can experience notable academic setbacks; data indicates that students with intense test anxiety

score approximately 12 percentile points lower than their less-anxious peers, highlighting the profound academic impact of this psychological burden.<sup>8,9,10</sup>

Globally, test anxiety is a common phenomenon in the student population. Research on this topic dates back to the early 1950s with foundational work by George Mandler and Seymour Sarason, which brought test anxiety into academic focus.<sup>11,12,13</sup> Subsequently, Irwin G. Sarason expanded on these early investigations, establishing connections between test-specific anxiety and general anxiety.<sup>14</sup> *Test anxiety*, alternatively known as *anticipatory anxiety*, *situational anxiety*, or *evaluation anxiety*, is understood as a natural psychological response that can sometimes be beneficial, helping students stay mentally and physically alert.<sup>15</sup> However, when the anxiety response becomes excessive, it may result in physical distress, difficulty concentrating, and emotional unease. Research suggests that the impaired academic performance due to test anxiety is not necessarily a reflection of intellectual shortcomings or inadequate preparation. Instead, it results from a perception of the test environment as threatening, which then disrupts cognitive functions like attention and memory.<sup>16,17,18,19</sup>

Students grappling with test anxiety often find themselves distracted, struggling with basic instructions, and facing challenges in recalling relevant information.<sup>20</sup> Factors contributing to test anxiety include ineffective study habits, last-minute cramming, inadequate review of materials, and emotional distress compounded by irrational thoughts about exams.<sup>21,22</sup> Together, these insights emphasize the need for addressing test anxiety in a way that balances academic expectations with students' mental well-being, potentially integrating ancient practices like Ayurveda and Yoga to restore harmony in a highly stressful academic landscape. Even though there are various psychotherapies and strategies available for test anxiety management. Both music therapy and Bhramari pranayama can also be effective in subjects suffering from Test anxiety. Also, these are interesting, cost less and less time-consuming aids to prevent and release test anxiety.

*Pranayama* is the most effective procedure that affects the physical and mental physiology of mankind in many ways. Practicing *pranayama* regularly has a positive effect on cardiovascular and respiratory functions, it improves the autonomic nervous system towards parasympathetic dominance.<sup>23</sup>

The original *ragas* of the Indian classical music are created according to the deep knowledge of harmonious consonance between the *seven swaras* and *chakras*. This is why classical music compositions are found to have significant positive effects on mind and body system and also have potential to awaken the dormant faculties.<sup>24</sup>

*Raga Desi Todi* is a sort of slow-paced music that consists of a series of repetitive notes or beats played on a flute. Such a slow paced and repetitive music can induce a meditative state of relaxation.<sup>25</sup> The *raga desi todi* is prescribed as anxiety reliever.<sup>26</sup>

Hence, the aim of this research was to compare both therapies and allow investigation of how relieved anxiety affects the exam preparation and performance and also which one of the therapies has more effect.

## METHODOLOGY

In this Interventional clinical Study 340 participants of Test Anxiety were registered, among them 40 participants dropped out. This study was an open labeled double arm prospective Randomized clinical trial; here participants were divided into two groups and intervened with *Bhramari pranayama* and Music Therapy (flute instrumental music of Raga Desi Todi) for 15 minutes in the morning (7am-10am) for 90 days. Effectiveness of both therapies is then compared statistically.

### Sample Size Calculation:

$$\text{Sample size (n)} = z^2 \times p(1-p)/E^2$$

$$p = \text{Estimated proportion prevalence} = 0.25$$

$$E = \text{Desired precision of estimate} = 0.05$$

$$\text{Confidence level} = 0.95$$

$$\text{Using Epitool software Sample size} = 288 \sim 300$$

150 in each group.

### Test anxiety is operationally defined as:

1. Cognitive symptoms: Difficulty concentrating, forgetfulness, mental blockage, and difficulty recalling information.

2. Emotional symptoms: Feelings of anxiety, fear of failure, apprehension, irritability, and frustration.
3. Physiological symptoms: Rapid heartbeat, sweating, trembling, nausea, and headaches.
4. Behavioral symptoms: Avoidance behaviors, procrastination, fidgeting, restlessness, and escape behaviors.

Measurement Criteria:

1. Frequency: Number of times test anxiety is experienced.
2. Intensity: Severity of test anxiety symptoms.
3. Duration: Length of time test anxiety persists.

Assessment Tools:

Westside Test Anxiety Scale (WTAS)<sup>27</sup> with score between 2.5 to 5.0

#### **Group A: BHRAMARI PRANAYAMA**

- No. of students- 150
- Dose - Starting with 5 rounds gradually increasing up to 20 rounds
- Time - Early Morning
- Duration - 90 days
- Follow up - 0,15, 30, 45, 60,75, 90 days

Demonstrated procedure of Bhramari Pranayama at screening and provided recorded video suggesting proper step by step procedure and advised to do at home early morning every day. For compliance taken follow up after every 15 days.

#### **Group B: MUSIC THERAPY-FLUTE INSTRUMENTAL MUSIC OF RAGA DESI TODI** <https://www.youtube.com/watch?v=Wjyiv4hwdm0>

- No. of students- 150
- Dose - Listening to recorded music of 15 min once in a day.
- Time - Early Morning
- Duration - 90 days
- Follow up - 0,15, 30, 45, 60,75, 90 days
- Provided Audio clip of 15 min of flute instrumental music of Raga desi todi by Pandit Hariprasad Chaurasia and also provided YouTube link in alternative form.

### **RESULT & DISCUSSION:**

#### **DISCUSSION ON INTRA GROUP ANALYSIS:**

In this interventional clinical study, the Wilcoxon signed-rank test was used to evaluate the effects of two different interventions—Bhramari Pranayama (Group A) and Music Therapy (Group B)—on the participants' outcomes before and after treatment. Group A, practicing Bhramari Pranayama, showed a highly significant improvement, as indicated by the positive ranks for all 150 participants, with no negative ranks or ties. The mean rank of 75.5 and a Z-value of -3.441 (p-value < 0.05) suggest that the intervention consistently benefited all participants, leading to significant overall improvements. In contrast, Group B, which underwent Music Therapy, showed a similar trend, with 149 participants experiencing positive changes and one participant experiencing a slight negative outcome, indicated by one negative rank. The Z-value of 3.395 and p-value < 0.05 confirmed a significant positive effect of the intervention. However, while both groups demonstrated statistically significant improvements, Group A (Bhramari Pranayama) exhibited a more consistent and higher level of positive change compared to Group B (Music Therapy), as evidenced by the absence of any negative outcomes in Group A. This suggests that Bhramari Pranayama might be a more robust intervention for the participants in this study.

Group	Parameter		N	Mean Rank	Sum of Ranks	Z-value	P value
A (BP)	Final Test Anxiety Score	Positive Rank	150	75.5	11325.0	-3.441	(< 0.05) 2.1607809340231 415e-26
		Negative Rank	0	0.00	0.00		
		Ties	0	0.00	0.00		
		Total	150				
B (MT)	Final Test Anxiety Score	Positive Rank	149	75.5	11175.0	3.395	(<0.05) 4.3702948166252 e-25
		Negative Rank	1	-	-		
		Ties	0				
		Total	150				

Comparison of Scores Before and After Treatment for Groups A and B

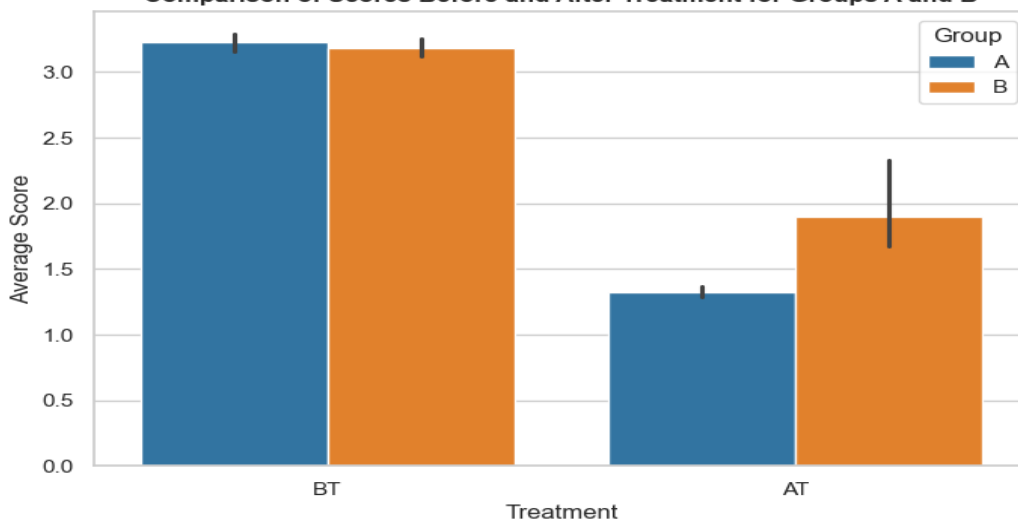


figure: Comparison of Score Before and After Treatment in Bhramari Pranayama (Group A) and Music Therapy (Group B)

**Mann Whitney U test**

**DISCUSSION ON INTER GROUP ANALYSIS:**

**Comparison between Group A and Group B:**

The Mann-Whitney U test compares the effectiveness of Bhramari Pranayama (Group A) and Music Therapy (Group B) in reducing anxiety-related issues. Group A has a mean rank of 93.06 and a sum of ranks of 13,959.5, while Group B shows a much higher mean rank of 207.93 and a sum of ranks of 31,190.5. The U-value is 2634.5, with a Z-value of -11.46 and an extremely significant p-value of less than 0.05 (1.905e-30). These results indicate a statistically significant difference between the two groups. The lower mean rank in Group A suggests that participants in the Bhramari Pranayama group experienced a greater reduction in anxiety symptoms compared to the Music Therapy group, concluding that Bhramari Pranayama is more effective in managing anxiety-related issues.

Group	N	Mean Rank	Sum of Ranks	Mann Whitney U test	Z	P
Group A: Bhramari Pranayama	150	93.06	13959.5	2634.5	-11.46	< 0.05 (1.9050409577388387e-30)
Group B: Music Therapy	150	207.93	31190.5			

These results indicate a statistically significant difference between the two groups. The lower mean rank in Group A suggests that participants in the Bhramari Pranayama group experienced a greater reduction in anxiety symptoms compared to the Music Therapy group, concluding that Bhramari Pranayama is more effective in managing anxiety-related issues. Hence, null hypothesis (H<sub>0</sub>) i.e. *Bhramari pranayama* is less significant than Music therapy in the management of *chittodvega* (Test anxiety) is rejected. And thus, alternative hypothesis (H<sub>1</sub>) i.e. *Bhramari pranayama* is more significant than Music therapy in the management of *Chittodvega* (Test anxiety).

#### MECHANISM OF MUSIC THERAPY:

The cerebellum is the oldest part of the brain in evolutionary terms and plays an important part in motor control. The activation of neurons is called 'firing'. Firing is an electrical signal that releases chemical substances called neurotransmitters. It is widely accepted that increased levels of dopamine (a neurotransmitter), result in a more positive mood. Similarly, Serotonin produced in the brain stem is known to regulate mood and sleep. It is because music unconsciously triggers these neurotransmitters that it has such a powerful influence over mood states.<sup>29</sup>

Raga Desi-todi, played on flute, which activates the left and right brain. The simultaneous left and right brain action maximizes learning and retention of information. The information being studied activates the left brain while the music activates the right brain.

#### MECHANISM OF BHRAMARI PRNAYAMA:

The whole brain vibrates when you listen to Bhramari. The hypothalamus, the master gland of glands, receives impulses from the cerebral cortex's vibrations and can regulate the pituitary gland. Additionally, the sympathetic and parasympathetic nervous systems get impulses from the hypothalamus. This aids in adjusting the neuroendocrine system as a whole so that it operates in unison and harmony. Paroxysmal Gamma waves, which are linked to happy emotions, a contented attitude, and function as a natural antidepressant, are generated in the brain during the *Bhramari Pranayama*.<sup>30</sup> Slow breathing and a soft humming sound encourage relaxation and stimulate the vagus nerve, which is important in lessening the symptoms of anxiety. Thus, *Bhramari* increases the body's ability to heal by reducing stress and cerebral tension, which in turn helps to reduce anger, anxiety, and insomnia. Thus, it is possible to conclude that *Bhramari pranayama* works more significantly as it is a combination of auditory therapy and breathing therapy compared to that of Music therapy.

#### CONCLUSION:

- In Test Anxiety *causes are*, like last moment study, bad past experience, Pressure from parents/teachers, Self-induced pressure, Inferiority complex and manasika hetus are significant. A few instances in this study show unhealthy habits and lifestyle, are known predisposing factors.
- Students at their main turn of career tend to have Test Anxiety more often.
- Intervention of Bhramari Pranayama starting from 5 rounds till 20 rounds in the morning for 90 days was effective in reducing Test anxiety.
- Intervention of Music Therapy (flute instrumental music- Raga desi-todi) 15 minutes in the morning between 7am to 10am for 90 days was effective in reducing Test anxiety.
- Statistically significant results were noted in all parameters of Westside Test Anxiety Scale after intervention in both *Bhramari Pranayama* group and Music Therapy group. But *Bhramari Pranayama* group showed good improvement when compared to Music Therapy group.

- Study concludes that Bhramari Pranayama is more effective than Music Therapy.

## REFERENCES:

1. Acharya YT. Charaka Samhita, Chakrapanidatta. Reprint edi. Vidyotini, Commentary. Varanasi: Chaukhambha Sanskrit Sansthan; 2002. P.600.
2. Williams M. Sanskrit – English Dictionary. Delhi: Motilal Banarsidass publishers Pvt.Ltd. 1997; p.192.
3. Zeidner M. Test anxiety: The state of the art. Springer Science & Business Media; 1998 Aug 31.
4. Andrews B, Wilding JM. The relation of depression and anxiety to life-stress and achievement in students. *British Journal of Psychology*. 2004 Nov 1;95(4):509-21.
5. Pritchard ME, Wilson GS. Using emotional and social factors to predict student success. *Journal of college student development*. 2003; 44(1):18-28.
6. Vaez M, Laflamme L. Experienced stress, psychological symptoms, self-rated health and academic achievement: A longitudinal study of Swedish university students. *Social Behavior and Personality: an international journal*. 2008 Jan 1;36(2):183-96.
7. Salend SJ. Teaching students not to sweat the test. *Phi Delta Kappan*. 2012 Mar;93(6):20-5. 8. Hembree R. Correlates, causes, effects, and treatment of test anxiety. *Review of educational research*. 1988 Mar 1;58(1):47-77.
9. Cassady JC, Johnson RE. Cognitive test anxiety and academic performance. *Contemporary educational psychology*. 2002 Apr 30;27(2):270-95.
10. McDonald AS. The prevalence and effects of test anxiety in school children.
11. Lowe PA, Ang RP. Cross-cultural examination of test anxiety among US and Singapore students on the Test Anxiety Scale for Elementary Students (TAS-E). *Educational Psychology*. 2012 Jan 1;32(1):107-26.
12. Dalkiran E, Baltacı Hş, Karataş Z, Nacakci Z. Developing of individual instrument performance anxiety scale: Validity-reliability study. *International Journal of Assessment Tools in Education (IJATE)*. 2014 Jul 17;1(1-2).
13. Mandler G, Sarason SB. A study of anxiety and learning. *The Journal of Abnormal and Social Psychology*. 1952 Apr; 47(2):166.
14. Sarason IG. Empirical findings and theoretical problems in the use of anxiety scales. *Psychological Bulletin*. 1960 Sep; 57(5):403
15. Birjandi P, Alemi M. The impact of test anxiety on test performance among Iranian EFL learners. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*. 2010; 1(4):44-58. 16. Sarason IG. Test anxiety, general anxiety, and intellectual performance. *Journal of Consulting Psychology*. 1957 Dec; 21(6):485.
17. Sarason IG. Intellectual and personality correlates of test anxiety. *The Journal of Abnormal and Social Psychology*. 1959 Sep; 59(2):272.
18. Sarason, I.G. "Test anxiety and intellectual performance". *The Journal of Abnormal and Social Psychology*. 1963, 66: 73–75.
19. Saklofske DH, Zeidner M, editors. *International handbook of personality and intelligence*. Springer Science & Business Media; 1995 May 31
20. Zeidner M. Test anxiety: The state of the art. Springer Science & Business Media; 1998 Aug 31.
21. Hashmat S, Hashmat M, Amanullah F, Aziz S. Factors causing exam anxiety in medical students. *JOURNAL-PAKISTAN MEDICAL ASSOCIATION*. 2008 Apr; 58(4):167.
22. Singh I, Jha A. Anxiety, optimism and academic achievement among students of private medical and engineering colleges: a comparative study. *Journal of Educational and Developmental Psychology*. 2013 Apr 15; 3(1):222

23. Dr. Balaji Deekshitulu P.V. stress Relaxation through Ayurveda, international journal of Ayurvedic and Herbal medicine 3:4(2013)1246-1252

24. VP Singh, V Rao, Prem V, Sahoo RC, and Keshav Pai K. Comparison of the effectiveness of music and progressive muscle relaxation for anxiety in COPD—A randomized controlled pilot study. Chronic Respiratory Disease. 2009, 6(4) 209–216.

25. Gupta U. B.S. Gupta. Psychophysiological responsibility to Indian instrumental music. Psychology of Music. 2005, 33(4): 363-372.

26. J Sarkar, U Biswas. An effect of Raga Therapy on our human body. International Journal of Humanities and Social Science Research. November 2015; Volume 1; Issue 1; Page No. 40-43.

27. [www@amtaa.org/westsidescale.htm](http://www@amtaa.org/westsidescale.htm)

28. <https://www.youtube.com/watch?v=Wjyv4hwdm0>

29. <http://www.musicworksforyou.com/news-and-charts/news/177-how-our-brainsprocess-music>.

30. VIALATTE, F. B., BAKARDJIAN, H., PRASAD, R. & CICHOCKI, A. 2009. EEG paroxysmal gamma waves during Bhramari Pranayama: a yoga breathing technique. Consciousness and cognition, 18, 977-988.

