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Effects of Bhramari and Nadi-Shodhan Pranayama on Anxiety and Stress Levels among Industrial Employees in Agra District

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ABSTRACT:

Background: Pranayama is one practice that is effective in the physiology of mankind in many ways. In Pranayama, yogic energy is designed to control the inflow of life energy, which controls all cerebral processes in the body. Maharshi Patanjali, in his Ashtanga Yoga, emphasized the importance of pranayama for health more than Asanas.

Aim: The current investigation seeks to examine the effect of Bhramari Pranayama and Nadi-Shodhan Pranayama on the stress and anxiety levels among employees in the industrial area of Agra district.

Methods & style: The study was carried out on 64 male employees. This pre-test post-test control group design was applied by Bhramari and Nadi-Shidhan Pranayama to the age group of 25-45 years with 30 minutes, four times a week, for 8 weeks. Parameters were recorded ahead and after the inception of the Pranayama exercise. The content was taught through oral and written exercises, as well as demonstration pranayama exercises.

Result: The results showed a significant decrease in stress ($p < 0.01$) and anxiety ($p < 0.05$) levels among the experimental group participants, whereas the control group exhibited no significant changes in stress ($p = 0.83$) and anxiety ($p = 0.99$) levels over the study period.

Conclusion: In conclusion, Pranayama training emerges as a valuable tool for mitigating stress and anxiety in the workplace, contributing to a healthier and more productive work environment.

Key words: *Anxiety, Stress, Bhramari Pranayama, Nadi-Shodhan Pranayama.*

Introduction

Yoga technique is an ancient Indian legend that creates a lifestyle through various exercises. Practitioners rehearse multiple methods and patterns in the form of asanas (postures), pranayama (breath control), meditation (type of attention), etc. (Telles et al., 2007). Pranayama, a fundamental yogic practice, focuses on breath control to harness life energies (Prana). This ancient technique, rooted in Hindu scriptures like the Bhagavad Gita and Yoga Sutras of Patanjali, aims to elevate vital energy. Initially, pranayama meant holding one's breath in Hatha yoga traditions. However, modern yoga practices have evolved, differing significantly from traditional Hatha yoga pranayama techniques. The Patanjali Yog Sutra emphasizes the importance of gradual and gentle practice of pranayama to master the life force, and warns against forceful or abrupt practice that can lead to harm.

यथा सिंहो गजो व्याघ्रो भवेद्वश्यः शनैः शनैः।

तथैव सेवितो वायुरन्यथा हन्ति साधकम्॥

yathā siṃho gajo vyāghro bhavedvaśyaḥ śanaiḥ śanaiḥ।

tathaiva sevito vāyuranyathā hanti sādhakam॥ (P.Y.S. 2/15)

Just as lions, elephants and tigers are slowly tamed (become obedient) by means of regular training, similarly the *Prana* (breath) is controlled gradually if, however, if is not tamed, prana will cause the practitioner's death (death means there is no *prana*).

The word "Pranayama" is derived from the combination of two Sanskrit words; "*Prana"*, meaning "life force", and "*Ayama"*, meaning length, expansion, or control. The word "Pranayama" refers to controlled and continuous breathing (Satyananda 2001). Pranayama means control of Prana. In Indian ideology, Prana refers to all aspects of energy in the macrocosm. Life energy is a part of this energy. The life force of the tone is represented by the breath.

That is why pranayama is often thought of as the meaning of breath control. Through pranayama, the yogi can control other functions of the body to some extent and finally control the manifestation of prana outside the body.

Pranayama as a method may be a form of breathing, but the essence of the practice is to take slow, deep breaths. Similar breathing is effective in that it reduces the air in the lungs and retains the air only at the base of the lungs (Rajesh shah et al., 2019).

Depending on the type of pranayama, these can be repeated individually or together. In human beings, breathing is a perfect link between the body and mind, and pranayama is considered to be the control of one's breathing (Chodzinski, 2000). Different types of pranayama produce physical responses, which mainly depend on the type and duration of practice (Sharma et al., 2013). Nadishodan, Savitri, Kapalbhanti, Bhastrika, Bhramari Pranayama, and so on are well known among them. Pranayama, by nonstop practice, reduces the dead space ventilation and decreases the work of breathing entire lung is voiced in discrepancy to the shallow breathing which only refreshes the base of the lung (Bijla, 2004). Practicing Pranayama regularly has a positive impact on cardiovascular, (Bhavanani et al., 2016). Respiratory functions (Shankarappa et al., 2021) and improves the autonomic system towards parasympathetic (Vagal tone) dominance (Shashikiran et al., 2015). This in turn reduces the effect of stress and strain on various systems. Hence overall physical and mental health improves. Each type of Pranayama has its unique benefits, depending on the breathing cycle, volume of flow, and other factors such as the use of the mouth and nose, attention to the muscles in the throat, and the position of the glottis. This study focuses on two specific Pranayama techniques, namely Nadishodhan and Bhramari, which were utilized as interventions in this research

Bhramari Pranayama

Bhramari Pranayama, also known as the "Bee Breath," is a yogic breathing technique that involves making a humming sound while exhaling. To practice Bhramari Pranayama, sit comfortably in a cross-legged position or on a chair with your back straight, close your eyes, and take a few deep breaths. Inhale deeply through your nose, filling your lungs completely, and then exhale while making a humming sound, like a bee buzzing, by closing your glottis and allowing the air to escape through your nose (Saraswati 2004).

Regular practice of Bhramari Pranayama has been shown to reduce stress and anxiety by lowering cortisol levels, heart rate, and blood pressure (Kox et al., 2014), improve respiratory function by vibrating the nasal passages, sinuses, and lungs (Jerath et al., 2015), enhance cognitive function by improving attention, memory, and processing speed (Zeidan et al., 2010; Stough, C., et al., 2011), and support cardiovascular health by lowering blood pressure, improving lipid profiles, and reducing cardiovascular risk factors (Mohan et al., 2011). Practice of Bhramari Pranayama for 5-10 min. continuously set off subjective feelings of thoughts refreshment and blissfulness and sometimes the subjects are believed to go to an even meditative state (Rajkishor et al., 2006), so the Bhramari Prnayama is not only a breathing practice but also a form of meditation. As compared with other pranayama, it has no breath-protecting or change nostril involvement with counting. Added to the above, the humming sound that is produced during the breathing gives more attention and interest to the subjects for practicing the pranayama. In this, it's very convenient to control and check the correctness of the sound of humming which is produced by the pranayama practitioners.

The Bhramari Pranayama technique, which involves self-prompted humming, has numerous benefits. The unique breathing pattern, characterized by prolonged exhalation and brief inhalation, has a profound impact on the body's physiological systems (Jerath et al., 2006). Regular practice of Bhramari Pranayama has been shown to effectively manage hormonal imbalances, hypertension, anxiety, and depression. Additionally, the calming effects of this technique can help reduce reliance on medication, providing a natural and comforting solution.

Nadi-Shodhan Pranayama

Nadi-Shodhan is a Pranayama technique that involves controlled breathing through the nostrils to balance the body's energy and calm the mind. Nadi-Shodhan with the two nostrils influences the sensory system, which permits the body and the brain to acclimate and become focused. This practice relaxes the mind and stops inner uneasiness or stress. Nadi-Shodhan at sunrise; makes a smooth stream and the terms of the breath are reached out until the breath tunes out to be light and unpretentious with the air drifting through the nostrils. Indeed though it's normal for one nostril to be dominant for some time, allowing the air to move more freely in that nostril, the defined inflow of air through the nostrils is a measurable sign of an energy imbalance in the body.

Nadi-Shodhan Pranayama, also known as Alternate Nostril Breathing, is a powerful breathing practice with numerous benefits. The Sanskrit words 'Nadi' (channel) and 'Shodhan' (purifying) reveal its purpose: to balance the entire system while cleansing and purifying the subtle energy channels of the mind-body organism through conscious breathing. (Vikash et al., 2019). Nadi-Shodhan Pranayama is carried out pleasantly without food; the early morning is a most beneficial time for the identical, one has to sit down with no trouble with the support of bases on the bottom pass-legged on the lowest. The spine should stay extended at the same time as the neck and head need to continue to be in a standing function at some point in the technique (Donodaran et al., 2002).

The major steps of Nadi-Shodhan Pranayama: 1. Aqurir Vishnu Mudra 2. Inhale through the left nostril, while pressing the right nostril 3. Press the left nostril and exhale from the right nostril 3. Inhale through the right nostril, while pressing the left 4. Exhale through the left nostril, while press the right nostril. Normal breathing through each nostril is a result of the dual functions of the right and left hemispheres. According to Swami Gitananda Giri, a prominent yoga master and founder of Ananda Ashram, the breath alternates in strength between the left and right nostrils in cycles. However, during the transitional phases between these cycles, a balanced flow is achieved, harmonizing all systems and awakening *Atma-Shakti*. (Self-confidence)

Nadi Shodhan Pranayama has been found to have a profound impact on both physical and mental health. Specifically, it has been shown to balance the autonomic nervous system, increasing parasympathetic activity and reducing sympathetic activity, leading to a state of relaxation and reduced stress (Brown et al., 2018; Naragatti et al. 2023). Regular practice of Nadi Shodhan Pranayama has also been linked to improved sleep quality, reduced symptoms of anxiety and depression, and enhanced overall quality of life (Sivananda, 2014). Furthermore, this pranayama has been found to increase the production of neurotransmitters such as serotonin, dopamine, and GABA, which are essential for mood regulation and emotional well-being (Jerath et al., 2015). By incorporating Nadi Shodhan Pranayama into a holistic wellness routine, individuals can experience a wide range of benefits for both physical and mental health.

In this study, the impact of these two pranayama techniques - Nadi-Shodhan and Bhramari Pranayama - on anxiety and stress levels was investigated. Studies have consistently demonstrated the efficacy of Nadi-Shodhan and Bhramari Pranayama in alleviating anxiety and stress. Regular practice of these yogic breathing techniques can yield enhanced mental and physical well-being, and may serve as a valuable complementary therapy for anxiety and stress-related conditions.

Methodology

Objectives

The purpose of this study is to evaluate the use and efficacy of Pranayama (Bhramari Pranayama and Nadi-Shodhan Pranayama) for reducing anxiety and stress symptoms in employees.

Hypothesis

H_1 There would be no significant difference between Experimental and control group of employees regarding Stress.

H_2 There would be no significant difference between Experimental and control group of employees regarding Anxiety.

Sampling

The study was conducted with purposeful sampling, and the employees were mostly from the Sikandra industrial area of Agra district (U.P.).

Research design

This study employed a pre-test post-test control group design to examine the effect of Pranayama on Anxiety and Stress.

Research Variables

- **Independent variables:** Pranayama techniques - Nadi Shodhan Pranayama and Bhramari Pranayama
- **Dependent Variables:** Anxiety and Stress

Statistical technique

To compare the means of the experimental and control groups, an independent samples t-test was conducted. The t-test was used to determine if there were significant differences in stress and anxiety levels between the two groups.

Measures

Stress Scale (1999)

The Stress Scale, developed by Vijaya Lakshmi and Shruti Narain in 1999, is a 40-item self-report tool that evaluates an individual's stress levels across physical, emotional, and behavioural domains. Higher the scores, indicating greater stress level. The scale demonstrates strong internal consistency reliability (Cronbach's alpha = 0.82) and good construct validity, correlating significantly with other stress (r = 0.72) and anxiety measures (r = 0.83). For this study, a modified version of the scale was used, with necessary permissions and formalities obtained.

Sinha’s Comprehensive Anxiety Test (1971)

The Anxiety Scale, developed by L.N.K. Sinha and A.K.P. Sinha in 1971, is a 90-item self-report measure that requires respondents to answer each item with either "Yes" or "No". The scale has demonstrated excellent reliability, with a test-retest correlation of 0.85 and a Spearman Brown coefficient of 0.92. Additionally, the scale has shown moderate validity, with a correlation coefficient of 0.62.

Administration

This study utilized an 8-week pre-post intervention design, comprising both an experimental group and a control group, to examine the effects of the intervention. Sixty-four industrial employees from Agra's Sikandra industrial area were selected through purposive sampling and provided informed consent. A camp was organized for 8 weeks, incorporating employees from four industries with working hours starting between 9:30 and 10 am. To accommodate this schedule, the study's daily sessions were held from 9 to 9:35 am, consisting of 5 minutes of instruction and 30 minutes of pranayama practice.

Before the intervention, participants' anxiety and stress levels were assessed using standardized scales. Participants then received training on Bhramari and Nadi-Shodhan Pranayama techniques from a certified yoga instructor and practiced for 30 minutes, four times a week, for 8 weeks. Post-intervention, anxiety and stress levels were reassessed using the same standardized scales. Participants' practice was closely monitored throughout the study to ensure correct technique and consistent attendance.

Table 1

Participants Received Pranayama Training, Consisting Of 30-Minute Sessions, four Times Weekly, Over A Period Of eight Weeks.

Practices	**Approximate time**
Nadi Shodhan Pranayama	15 Mints
Bhramari Pranayama	15 Mints
Total approximate time	**30 Minutes**

Result

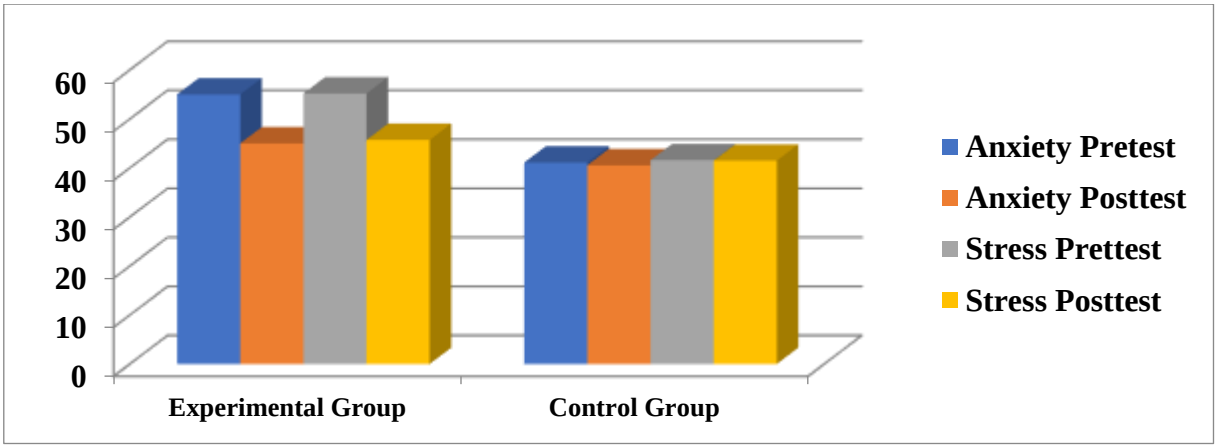
Table 2

Pre-test and Post-test Scores for Anxiety and Stress (Experimental & Control Group)

Group	**Anxiety Pretest (M ± SD)**	**Anxiety Posttest (M ± SD)**	**Stress Prettest (M ± SD**	**Stress Posttest (M ± SD)**	**t-value (Anxiety)**	**t-value (Stress)**
Experimental Group	55 ± 10	45 ± 7	55.19 ± 7.23	45.71 ± 9.23	2.63	6.49
Control Group	41.09 ± 8.31	40.55 ± 8.14	41.58 ± 7.51	41.48 ± 7.63	1.41	0.415

Fig 1

Graphical representation of *Pre-test and Post-test Scores for Anxiety and Stress (Experimental & Control Group)*



The results in Table 2 indicate a significant reduction in anxiety and stress levels among employees who participated in the Pranayama training program. In the **Experimental Group**, the mean anxiety score decreased from **55 ± 10** in the pre-test to **45 ± 7** in the post-test, with a **t-value of 2.63**, indicating a statistically significant change (**p < 0.05**). Similarly, the mean stress score decreased from **55.19 ± 7.23** to **45.71 ± 9.23**, with a **t-value of 6.49**, showing an even stronger significance (**p < 0.01**). In contrast, the **Control Group** showed negligible changes, with anxiety scores decreasing only slightly from **41.09 ± 8.31** to **40.55 ± 8.14** (**t = 1.41**, p > 0.05) and stress scores remaining nearly unchanged from **41.58 ± 7.51** to **41.48 ± 7.63** (**t = 0.415**, p > 0.05).

The null hypotheses, stating that there would be no significant difference in **stress (H1) and anxiety (H2)** levels between the experimental and control groups, **were rejected**. The results revealed significant reductions in **stress (t(100) = 6.49, p < 0.001) and anxiety (t(100) = 2.63, p < 0.01)** levels in the experimental group compared to the control group, indicating that the intervention had a significant impact on reducing stress and anxiety levels among employees.

Fig 1 the accompanying bar graph visually represents these findings, where the Experimental Group exhibits a noticeable decline in post-test scores compared to pre-test values, while the Control Group maintains relatively stable scores. This significant reduction in the Experimental Group suggests

that **Pranayama practice effectively alleviates stress and anxiety**, whereas the Control Group's unchanged results confirm that these improvements are due to the intervention rather than external factors.

Discussion

The findings of this study demonstrate the efficacy of Pranayama training in reducing stress and anxiety levels among employees. The significant decrease in stress and anxiety levels post-intervention suggests that Pranayama can be a valuable tool for managing occupational stress and promoting employee well-being.

These results are consistent with previous studies that have shown yoga and Pranayama to be effective in reducing stress and anxiety (Kox et al., 2014; Streeter et al., 2010). The current study extends this research by demonstrating the benefits of Pranayama in an occupational setting.

Research has demonstrated that Nadi Shodhan Pranayama and Bhramari Pranayama have a profound impact on mental well-being. Nadi Shodhan Pranayama has been proven to alleviate stress and anxiety by lowering cortisol levels, heart rate, and blood pressure (Rajesh et al., 2018). Additionally, it enhances emotional intelligence, fostering emotional maturity and mental health in young adults (Singh et al., 2017). This pranayama technique also improves cognitive function, boosting attention, memory, and processing speed (Kumar et al., 2019).

Bhramari Pranayama has also been shown to have a positive effect on mental health. It reduces symptoms of anxiety and depression in patients with COPD (Gupta et al., 2020) and improves sleep quality and duration in individuals with insomnia (Singh et al., 2018). Furthermore, it promotes relaxation and reduces stress in healthy individuals (Kumar et al., 2018). In conclusion, both Nadi Shodhan Pranayama and Bhramari Pranayama are valuable tools for maintaining mental well-being, mitigating stress and anxiety, and enhancing emotional regulation, cognitive function, and overall quality of life.

This study confirms that pranayama has a fine impact on mental health according to previous studies. This practice fosters a positive mind-set by eliminating detrimental thoughts, empowering individuals to navigate life's challenges with greater resilience and ease, rather than getting overwhelmed.

One of the limitations of this study was the restricted time duration, which was constrained by the working hours of the employee participants. Future studies could address this limitation by extending the time duration, allowing for a more comprehensive examination of the effects and potentially yielding more robust outcomes. Future research on Pranayama training should explore its long-term effects on stress and anxiety levels, as well as its impact on other aspects of employee well-being, such as productivity and job satisfaction. Additionally, studies comparing the effectiveness of Pranayama with other stress-reduction interventions in occupational settings would provide valuable insights. By investigating these areas, researchers can further understand the benefits and limitations of Pranayama training in promoting employee well-being and inform the development of effective workplace wellness initiatives.

Conclusion

In conclusion, this study provides evidence for the effectiveness of Pranayama training in reducing stress and anxiety levels among employees. The findings have important implications for workplace wellness initiatives and suggest that Pranayama can be a valuable tool for promoting employee well-being.

The implications of this study are significant. With the increasing prevalence of work-related stress and anxiety, employers are seeking effective strategies to promote employee well-being. Pranayama training offers a low-cost, accessible, and non-invasive intervention that can be easily integrated into workplace wellness programs.

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