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PRANA VIDYA: ANCIENT WISDOM AND ITS APPLICATIONS IN HUMAN HEALTH

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ABSTRACT

Background: *Prana Vidya*, an ancia ent yogic science deeply rooted in *Vedic*, *Upanishadic*, and *Puranic* traditions, explores the vital role of pranic energy in sustaining life and promoting holistic well-being. Classical yogic texts highlight the significance of *Pranayama* (breath regulation) and meditation in enhancing physiological, psychological, and spiritual health. Despite modern medical advancements, there is growing interest in integrating *Prana Vidya* into contemporary healthcare systems.

Objective: This study examines the therapeutic applications of *Prana Vidya*, particularly *Pranayama*, in improving respiratory function, autonomic regulation, and stress resilience. It also explores its relevance in enhancing cognitive function and emotional stability while fostering spiritual well-being.

Methods: A mixed-method approach was employed, integrating scriptural analysis with quantitative experimental research. A structured *Pranayama* regimen, including Puraka (inhalation), Kumbhaka (breath retention), and Rechaka (exhalation), was implemented among participants. Physiological parameters such as lung function, heart rate variability (HRV), and cortisol levels were measured pre-and post-intervention.

Results: The study revealed an 18.6% increase in Forced Vital Capacity (FVC), a 22.3% rise in Peak Expiratory Flow Rate (PEFR), and a 29.1% improvement in Breath-Holding Time (BHT). HRV analysis showed a significant reduction in stress indicators while, cortisol levels dropped by 23.8%, confirming reduced physiological stress. Participants also reported enhanced mental clarity, emotional balance, and improved overall well-being.

Conclusion: *Prana Vidya*, particularly through *Pranayama*, offers a scientifically validated approach to improving respiratory efficiency, stress reduction, and cognitive enhancement. Its integration into modern healthcare holds promise for holistic health and disease prevention.

Keywords: *Prana Vidya*, *Pranayama*, Yoga, Holistic Health, Consciousness, Spiritual Well-being.

INTRODUCTION

Since ancient times, *Prana Vidya*, the knowledge of the life force, has been regarded as a crucial aspect of human well-being, deeply embedded in the spiritual traditions of India.[1] The concept of *prana* (vital life force) has been extensively documented in sacred texts such as the *Vedas*, *Upanishads*, *Puranas*, and classical yogic scriptures, where it is described as the fundamental force that sustains all life forms.[2] Ancient Indian sages understood that *prana* governs the interconnected dimensions of physical health, mental clarity, and spiritual evolution.[3] This wisdom, preserved for millennia, remains highly relevant in the modern world, where lifestyle disorders, stress, and environmental pollution have led to a decline in overall health.[4] Despite remarkable advancements in medical science, contemporary treatments often focus on managing symptoms rather than addressing the root causes of diseases.[5] This has led to a growing interest in holistic healing practices, particularly those derived from yoga and Ayurveda.[6] *Prana Vidya*, through the practice of *Pranayama* (breath regulation), offers a natural and effective approach to restoring health, balancing the mind, and achieving higher states of consciousness.[7] The *Shvetashvatara Upanishad* states, "When the wind moves, everything moves; when it becomes still, everything remains motionless", illustrating the intrinsic connection between breath and mental stability.[8] Additionally, the *Brihadaranyaka Upanishad* emphasizes that *prana* is "the immortal life, while the body is mortal," suggesting that mastery over *prana* can lead to enhanced longevity and spiritual awakening.[9]

The foundational principles of *Prana Vidya* are elaborated in the ancient yogic system of *Ashtanga Yoga*, formulated by Maharishi Patanjali, where *Pranayama* is regarded as a crucial step toward attaining higher consciousness.[7] According to *Yoga Darshan*, *Pranayama* serves as a bridge between the external and internal worlds, helping practitioners purify the mind and attain higher states of consciousness.[10] Patanjali describes its effects in *Yoga Sutras*

2.52, stating, '*Pranayama* destroys the dirt, covering, and distractions of the mind and creates purity in it'.[11] The *Rigveda* acknowledges *prana* as a divine force, stating, 'A wind blows the medicine, and the wind blows the rap, for you are the messenger of the gods, the healer of the universe'[12], while the *Atharva Veda* describes it as the essence of life, declaring, "From the breath came the air".[13] These scriptures emphasize that the control of *prana* not only sustains life but also purifies the mind and body, eliminating distractions and impurities. Additionally, the *Hatha Yoga Pradipika* describes *Pranayama* as a method for cleansing the nadis (energy channels) and awakening spiritual energy, stating, "*Pranayama* destroys the impurities of metals, just as fire removes the rust of iron".[14] Through systematic breath regulation, which involves inhalation (*Puraka*), breath retention (*Kumbhaka*), and exhalation (*Rechaka*), *Pranayama* enhances lung function, stabilizes the nervous system, and fosters deep mental concentration.[15] Beyond its physiological effects, *Pranayama* also plays a pivotal role in spiritual development.[16] The *Shvetashvatara Upanishad* asserts that breath control leads to mastery over the mind, which in turn facilitates deep meditation and self-realization. Furthermore, the *Skanda Purana* states, "By practicing *Pranayama*, one can destroy all bodily impurities just as fire burns away the rust of metals", highlighting its detoxifying and rejuvenating properties.[17]

The scientific validation of *Prana Vidya* has gained significant attention, as modern research aligns with the ancient understanding of breath regulation.[18] The *Atharva Veda* states, 'This air has originated from the divine life force; prana is life,' signifying that the process of breathing is not merely a physiological function but also a fundamental mechanism that governs mental and physical stability.[19] Empirical studies indicate that *Pranayama* positively impacts cardiovascular health, reduces stress hormones, enhances cognitive function, and improves overall emotional resilience.[20] The *Kurma Purana* emphasizes the importance of practicing *Pranayama* in an appropriate setting, advising that it should be performed in a clean, peaceful environment to maximize its benefits.[21] It warns that '*Pranayama* should not be done in an ominous place, which is infested with evil people, containing mosquitoes, etc. Do not do *Pranayama* when the body is sick or when the mind is unhappy'.[22] Additionally, the *Skanda Purana* highlights the risks of improper breath control, stating, 'Suddenly stopping the breath without proper technique can lead to disorders like hiccups, coughing, and bodily imbalances.[17] These insights emphasize the necessity of learning *Pranayama* under expert guidance to prevent complications and ensure its full benefits.[23]

Given the increasing prevalence of stress-induced disorders, hypertension, diabetes, and respiratory diseases, the role of *Prana Vidya* in modern healthcare cannot be overstated.[24] By reassessing the ancient principles of *Prana Vidya* in the context of empirical scientific studies, this research aims to validate the physiological and psychological benefits of breath regulation. Through an interdisciplinary approach combining ancient wisdom with contemporary medical research, this study aspires to establish *Prana Vidya* as a scientifically validated practice that promotes a balanced, healthy, and spiritually enriched life.

MATERIALS AND METHODS

Ethical considerations

The study protocol, including the sample size, was reviewed and approved by the Institutional Ethics Committee (IEC) of the University of Patanjali. All participants provided informed consent before enrollment, ensuring ethical compliance and voluntary participation. They were briefed on the potential risks and benefits of *Pranayama* and were free to withdraw from the study at any point. The research adhered strictly to traditional yogic principles and ensured that all breath control techniques were performed safely and under expert supervision.

Study design

This prospective and interventional study on *Prana Vidya* follows a mixed-method approach, integrating qualitative scriptural analysis with quantitative experimental studies to validate the effects of *Pranayama* on human health. Primary materials for this study include ancient Indian scriptures such as the *Rigveda*, *Yajurveda*, *Atharva Veda*, *Upanishads*, *Puranas*, *Yoga Darshan*, *Hatha Yoga Pradipika*, and *Manusmriti*. These texts provide fundamental knowledge on *Prana Vidya*, including descriptions of *prana*, its physiological significance, the methods of *Pranayama*, and its spiritual implications. Secondary materials include modern scientific research, empirical studies, and scholarly articles investigating the physiological and psychological benefits of breath control techniques. By adhering to the STROBE guidelines for observational research, this study aims to enhance the transparency, validity, and reproducibility of the research findings.[25]

Participants

This study involved 21 participants (12 males and 9 females), aged between 25 and 55 years, from 14 different provinces, ensuring a diverse representation of individuals with varying levels of familiarity with *Pranayama* and yoga practices. This prospective and interventional study was conducted over 12 weeks at the University of Patanjali, Haridwar, during which

participants followed a structured Pranayama regimen under expert supervision. Selection criteria included individuals who were physically fit and willing to commit to a structured regimen of breath control exercises. Participants were provided with preliminary training to familiarize them with the fundamentals of *Pranayama* before the formal study began.

Meanwhile, the sample size was determined based on prior studies evaluating the physiological and psychological effects of *Pranayama*, ensuring adequate representation for statistical analysis. While a larger sample could enhance generalizability, the chosen sample size was deemed feasible within the study's framework. A power analysis was conducted to confirm that the sample size was sufficient to detect significant differences in key physiological parameters.

Study guidelines

All sessions were conducted in controlled environments, adhering to the classical guidelines prescribed in the *Kurma Purana*, which recommends practicing *Pranayama* in a clean, quiet, and well-ventilated space, free from distractions.[22] Participants were instructed to avoid practicing *Pranayama* in conditions such as extreme fatigue, illness, or emotional distress, as the *Skanda Purana* warns that improper practice can lead to hiccups, respiratory discomfort, and bodily imbalances.[17]

Pranayama techniques and training protocol

This study was structured in phases, beginning with introductory sessions on the foundational aspects of breath control. Participants were first familiarized with the principles of *Pranayama*, understanding its effects on the body and mind. Once they developed basic awareness, they gradually progressed to specific *Pranayama* techniques. Each technique was introduced in a step-by-step manner, ensuring correct posture, breath regulation, and awareness of physiological changes.

Puraka (Inhalation): Puraka, or inhalation, was the first technique introduced in the study. Participants were guided to take slow, deep breaths, ensuring maximum oxygen intake. The goal of this practice was to enhance lung capacity, increase oxygen supply to the cells, and promote relaxation. Special emphasis was placed on diaphragmatic breathing, which engages the lower lungs for efficient air exchange and improved respiratory function.

Kumbhaka (Breath Retention): Following inhalation, participants practiced Kumbhaka, or breath retention, to allow oxygen to be effectively absorbed and distributed throughout the body. This technique was introduced gradually, with an emphasis on maintaining comfort and control. Holding the breath for a sustained duration enhances carbon dioxide tolerance,

strengthens the respiratory muscles, and improves mental concentration. Participants were instructed to practice both internal retention (Antar Kumbhaka) and external retention (Bahya Kumbhaka), following traditional guidelines.

Rechaka (Exhalation): The next phase focuses on Rechaka, or controlled exhalation, which helps release toxins and regulates the oxygen-carbon dioxide balance in the body. Participants were guided to exhale slowly and completely, ensuring proper expulsion of stale air. This practice helps in activating the parasympathetic nervous system, reducing stress, and promoting relaxation.

Bhastrika *Pranayama* (Bellows Breath): After mastering basic breath control techniques, participants practiced Bhastrika *Pranayama*, a rapid breathing method that stimulates metabolism and energy circulation. This technique involves forceful inhalations and exhalations, which enhance oxygen delivery, cleanse the lungs, and invigorate the nervous system. Participants were instructed to maintain a rhythmic pace to prevent dizziness or discomfort.

Bhramari *Pranayama* (Humming Bee Breath): Participants were then introduced to Bhramari *Pranayama*, or the humming bee breath, which involves producing a soft humming sound during exhalation. This technique reduced anxiety, calms the nervous system, and improves focus. The vibrations created by the humming sound stimulate the vagus nerve, helping in deep relaxation and mental clarity.

Anulom-Vilom (Alternate Nostril Breathing): The final technique practiced was Anulom-Vilom, or alternate nostril breathing, which balances the left and right energy channels (Ida and Pingala). Participants followed a systematic breathing pattern, alternating between nostrils to ensure harmonization of brain activity, improved respiratory function, and enhanced mental focus.

All participants practiced these techniques for a minimum of 30 minutes daily under the supervision of trained instructors. The instructors ensured proper execution, posture alignment, and breath retention timing. The study followed traditional methodologies to maximize benefits while preventing any adverse effects due to improper practice.

Physiological and psychological assessments

To measure the impact of *Pranayama* on health, the study incorporated both qualitative and quantitative assessments. Participants maintained self-reported journals documenting changes in mental clarity, emotional balance, and physical energy levels. Additionally, lung function tests, including forced vital capacity (FVC) and peak expiratory flow rate (PEFR),

were conducted to evaluate respiratory efficiency. Heart rate variability (HRV) analysis was used to assess autonomic nervous system regulation, while cortisol level measurements tracked reductions in stress-related biomarkers.

Data analysis and interpretation

Quantitative data collected from physiological assessments were subjected to statistical analysis to determine the significance of the observed changes. Results were compared with existing scientific literature to validate traditional yogic claims using modern medical research. Qualitative data from participants' experiences were analyzed using thematic coding, identifying patterns related to enhanced focus, reduced anxiety, and increased vitality.

Statistical methods

The statistical analysis in this study utilized descriptive statistics (mean ± standard deviation) to summarize numerical data. Paired t-tests were applied to assess significant differences between pre- and post-intervention values. One-way ANOVA was used to analyze variations in HRV and cortisol levels, ensuring a robust comparison of physiological changes. To minimize statistical errors, a Bonferroni correction was applied for multiple comparisons. All statistical analyses were conducted using SPSS software to ensure the accuracy and reliability of the results.

RESULTS AND FINDINGS

Physiological and Psychological Assessments

Pranayama's impact on physiological and psychological health was systematically assessed using a combination of qualitative self-reports and quantitative physiological tests. Participants maintained daily self-reported journals, documenting their personal experiences related to mental clarity, emotional stability, physical energy levels, and overall well-being. Many participants reported experiencing enhanced focus, reduced stress, improved mood, and better sleep quality. These observations align with ancient yogic principles, which suggest that *Pranayama* helps regulate nervous system function, increases oxygenation, and fosters mental tranquillity.

Lung Function Analysis

The primary physiological assessments conducted in this study were the evaluation of lung function parameters, including Forced Vital Capacity (FVC), Peak Expiratory Flow Rate (PEFR), and Breath-Holding Time (BHT). The statistical analysis revealed a significant

improvement in pulmonary function following the structured *Pranayama* intervention. The mean FVC increased from 3.10±0.42 to 3.67±0.38 L, reflecting an 18.6% enhancement in lung capacity ($p<0.05$). Similarly, PEFR improved from 420.3±35.6 L/min. to 514.6±42.1 L/min., indicating a 22.3% increase in expiratory efficiency ($p<0.05$). The most significant improvement was observed in Breath-Holding Time (BHT), which increased from 32.4±5.2 seconds to 41.8±4.8 seconds, showing a 29.1% enhancement ($p<0.01$). These findings suggest that *Pranayama*, particularly techniques such as Puraka (inhalation), Kumbhaka (breath retention), and Rechaka (exhalation), significantly enhances alveolar expansion, increases pulmonary compliance, and strengthens diaphragmatic control. The increase in breath-holding capacity further supports the hypothesis that *Kumbhaka* improves carbon dioxide tolerance, a crucial factor in optimizing oxygen utilization and overall respiratory efficiency. The statistical significance of these improvements was confirmed using paired t-tests, demonstrating a consistent post-intervention increase across all lung function parameters.

Table No. 1 Pre- and Post-*Pranayama* Statistical Analysis of Lung Function Parameters

Lung Function Parameter	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	% Changes	p-value
Forced Vital Capacity (FVC) (L)	3.10 ± 0.42	3.67 ± 0.38	+18.6%	<0.05*
Peak Expiratory Flow Rate (PEFR) (L/min)	420.3 ± 35.6	514.6 ± 42.1	+22.3%	<0.05*
Breath-Holding Time (seconds)	32.4 ± 5.2	41.8 ± 4.8	+29.1%	<0.01**

(*$p<0.05$ indicates statistically significant difference; **$p<0.01$ indicates highly significant difference)

The post hoc Bonferroni correction further validated these findings by minimizing the risk of false positives due to multiple comparisons, ensuring the robustness of the statistical analysis. When compared with existing literature, these findings align with prior studies that demonstrated *Pranayama's* role in improving forced expiratory volume (FEV1) and oxygen uptake efficiency in individuals with compromised respiratory function.

Heart Rate Variability (HRV) and Autonomic Nervous System Regulation

Another key physiological measure in this study was Heart Rate Variability (HRV), which serves as a marker for autonomic nervous system function and stress regulation. The statistical analysis revealed a significant improvement in HRV parameters, particularly in the LF/HF ratio (low-frequency to high-frequency power ratio), which is a crucial indicator of sympathetic versus parasympathetic nervous system balance. The LF/HF ratio showed a significant decrease from 2.47±0.68 to 1.63±0.54 ($p<0.01$), indicating reduced sympathetic dominance and enhanced parasympathetic activity. Additionally, the resting heart rate (RHR) decreased from 78.6±6.3 bpm to 71.4±5.2 bpm ($p<0.01$), reflecting a shift towards a more relaxed physiological state and improved cardiovascular efficiency. These results demonstrate that *Pranayama* promotes autonomic balance, reduces cardiac workload, and enhances circulatory efficiency. The interpretation of One-Way Analysis of Variance (ANOVA) confirmed that the observed changes in HRV and heart rate parameters were statistically significant, eliminating the possibility of random fluctuations in data. This statistical validation further supports the ancient yogic claim that *Pranayama* helps in stabilizing autonomic nervous function, promoting homeostasis, and reducing cardiovascular stress markers.

Table No. 2 Pre- and post-*Pranayama* statistical analysis of HRV and cardiac parameters

HRV & Cardiac Parameters	Pre-Intervention (Mean±SD)	Post-Intervention (Mean±SD)	p-value
LF/HF Ratio	2.47±0.68	1.63±0.54	<0.01**
Resting Heart Rate (bpm)	78.6±6.3	71.4 ± 5.2	<0.01**

**($p<0.01$ indicates highly significant difference)

These findings correlate with previous studies in psychophysiology, which demonstrated that *Pranayama* leads to increased vagal tone, reduced heart rate variability, and enhanced stress resilience in clinical populations.

Cortisol and stress biomarker analysis

To assess the neuroendocrine effects of *Pranayama*, serum cortisol levels were measured before and after the intervention. The results showed a statistically significant decrease in

cortisol levels from 19.4±2.8 ng/dL to 14.8±2.1 ng/dL ($p<0.01$), representing a 23.8% reduction in physiological stress markers.

Table No. 3 Pre- and post-*Pranayama* statistical analysis of cortisol levels

Stress Biomarker	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	Percentage Change	p-value
Serum cortisol (ng/dL)	19.4 ± 2.8	14.8 ± 2.1	-23.8%	< 0.01**

**($p<0.01$ indicates highly significant difference)

Participants practicing Bhramari *Pranayama* (humming bee breath) reported the highest levels of relaxation, correlating with lowered cortisol levels, supporting its neuromodulatory impact on the limbic system and vagus nerve activity.

All the above statistical findings from this study strongly validate the efficacy of *Pranayama* in improving respiratory function, autonomic balance, and stress modulation. The significant improvements in FVC, PEFR, and BHT suggest that breath control techniques enhance lung capacity and oxygen utilization efficiency. The reduction in LF/HF ratio and lower resting heart rate confirms that *Pranayama* reduces sympathetic overactivity, making it an effective tool for stress and cardiovascular regulation. Furthermore, the 23.8% reduction in cortisol levels provides strong evidence that *Pranayama* is a natural and scientifically backed stress management practice. By integrating yogic wisdom with modern scientific validation, this study reinforces that *Pranayama* has therapeutic potential in preventive healthcare, clinical rehabilitation, and psychological well-being. Future studies should explore the long-term effects, neurophysiological mechanisms, and clinical applications of *Pranayama*, ensuring its integration into evidence-based medical practices.

DISCUSSION

The findings of this study strongly validate the physiological, psychological, and neurological benefits of *Pranayama*, providing scientific evidence for its therapeutic applications in modern healthcare. The significant improvements in lung function parameters, including FVC, PEFR, and BHT, demonstrate that *Pranayama* enhances pulmonary efficiency by increasing lung compliance, alveolar gas exchange, and diaphragmatic control. This aligns with traditional yogic wisdom, as described in the *Hatha Yoga Pradipika*, which emphasizes that breath regulation purifies the nadis (energy channels) and strengthens respiratory

endurance. The observed increase in BHT by 29.1% ($p<0.01$) suggests that Kumbhaka (breath retention) enhances oxygen retention and carbon dioxide tolerance, optimizing metabolic efficiency and improving overall respiratory function. These findings are particularly relevant for individuals suffering from asthma, chronic obstructive pulmonary disease (COPD), and post-COVID lung function impairments, as *Pranayama* offers a non-invasive, cost-effective respiratory therapy that complements conventional treatments. Additionally, the *Atharva Veda* (11.4.17) mentions that breath control promotes cellular rejuvenation and strengthens the life force (Prana), a concept now supported by research indicating that controlled breathing can enhance mitochondrial function and cellular detoxification.

Beyond respiratory benefits, this study also confirmed the profound impact of *Pranayama* on autonomic nervous system regulation and stress modulation, as evidenced by HRV analysis and cortisol level reduction. The observed decrease in the LF/HF ratio from 2.47±0.68 to 1.63±0.54 ($p<0.01$) suggests a shift from sympathetic dominance (stress response) to parasympathetic activation (relaxation response), confirming that *Pranayama* effectively reduces physiological stress and promotes emotional balance. This is further supported by the 7.2 bpm reduction in resting heart rate ($p<0.01$), indicating improved cardiovascular efficiency and reduced cardiac workload. From a yogic perspective, this finding aligns with the *Shvetashvatara Upanishad (2.9)*, which states that "breath control leads to mind control, just as a charioteer controls a wild horse", highlighting the connection between autonomic stability and mental calmness.[8] Furthermore, the 23.8% reduction in serum cortisol levels ($p<0.01$) validates the ancient claim from the *Atri Smriti*, which describes *Pranayama* as a powerful tool for cleansing mental and physiological toxins. The neuromodulatory effect of Bhramari *Pranayama* (hummingbee breath) on the vagus nerve provides further insight into how breathwork techniques influence the hypothalamic-pituitary-adrenal (HPA) axis, reducing stress hormones and enhancing emotional resilience. These findings are significant in the context of mental health management, particularly for individuals suffering from anxiety disorders, depression, and chronic stress-related conditions.

In addition to respiratory and autonomic nervous system regulation, this study highlights the cognitive and neurophysiological benefits of *Pranayama*, with participants reporting improved mental clarity, focus, and emotional stability. Neuroimaging studies support these qualitative findings, demonstrating that controlled breathing increases

cerebral blood flow, enhances prefrontal cortex activity, and improves executive function. The *Chhandogya Upanishad (7.15.1)* states that "Prana is the purifier and guide of the mind," emphasizing that conscious breath regulation optimizes brain function and emotional regulation.[26] This suggests that *Pranayama* may have potential applications in cognitive enhancement therapies, mindfulness training, and neurocognitive rehabilitation for conditions such as attention deficit hyperactivity disorder (ADHD), age-related cognitive decline, and post-traumatic stress disorder (PTSD). The integration of yogic wisdom with modern scientific research demonstrates that *Pranayama* is not merely a breath control technique but a transformative practice influencing multiple physiological and neurological processes simultaneously.

The broader implications of these findings suggest that *Pranayama* can be effectively integrated into preventive healthcare, corporate wellness programs, stress management interventions, and clinical rehabilitation settings. The *Skanda Purana* (41.87) mentions that consistent *Pranayama* practice purifies the body's energy channels within three months, leading to enhanced vitality and well-being, which aligns with the study's findings indicating that regular breathwork practice leads to progressive physiological and psychological benefits.[17] Additionally, breath is the foundation of life and should be cultivated for optimal health, reinforcing the idea that *Pranayama* serves as a holistic tool for disease prevention, longevity, and overall wellness.[12] Future research should focus on long-term effects, neurophysiological mechanisms, and the potential integration of *Pranayama* into evidence-based medical practices. By combining traditional yogic knowledge with empirical scientific validation, this study confirms that *Pranayama* is a scientifically backed, holistic health practice capable of significantly enhancing human well-being at both the physiological and psychological levels.

CONCLUSION

In conclusion, this study provides strong empirical evidence for the benefits of *Pranayama*, demonstrating its positive impact on respiratory function, autonomic regulation, and stress reduction. The statistical analysis revealed an 18.6% increase in FVC, a 22.3% rise in PEFR, and a 29.1% improvement in BHT, indicating enhanced pulmonary efficiency. Additionally, a 23.8% reduction in cortisol levels confirmed decreased physiological stress, supporting the role of *Pranayama* in mental and emotional well-being. These findings align with both traditional yogic wisdom and modern scientific research, reinforcing *Pranayama's* potential as a natural and effective tool for holistic health. The study highlights the need for further

long-term research with larger sample sizes and neurophysiological assessments to strengthen these conclusions. All data visualizations have been clearly labelled to ensure accuracy and readability. By integrating ancient knowledge with contemporary evidence, this study emphasizes the relevance of *Pranayama* in modern healthcare, particularly for respiratory health, stress management, and cognitive enhancement.

STUDY LIMITATIONS

Certain limitations must be acknowledged, while the results are promising. First, the study's limited duration necessitates further investigation through extended follow-up studies to assess the long-term effects of *Pranayama*. Second, although statistical analysis revealed significant improvements, a larger sample size would strengthen the reliability and generalizability of the findings.

CONFLICT OF INTEREST

The author confirms that there are no conflicts of interest related to this study.

AVAILABILITY OF DATA AND MATERIALS

The data generated and analyzed during this study are available from the author upon reasonable request. Due to ethical considerations and institutional policies, access to raw data may be restricted to maintain participant confidentiality.

AUTHOR CONTRIBUTION

SD: Study conception & design, data collection, analysis & interpretation, authored, reviewed and approved the final version of manuscript.

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