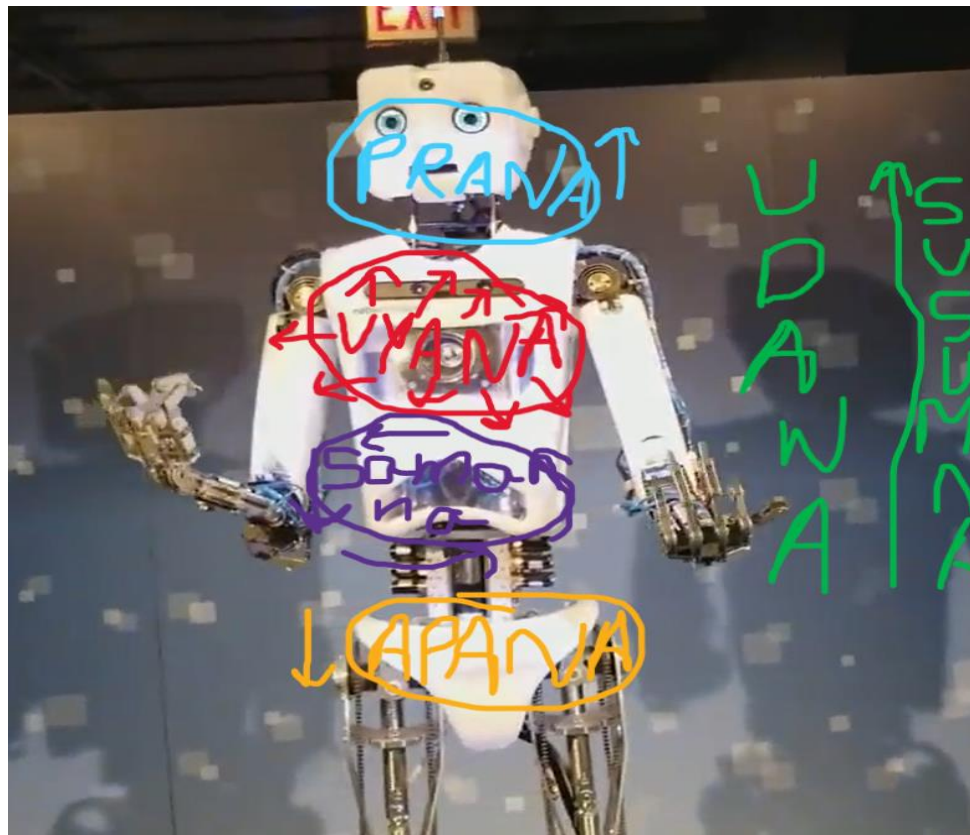


# Pranmaya Kosha disturbances and its role in the correction of Adhija Vyadhis



# Pranmaya Kosha

- Taittiriya Upanishad- Panchkosh
- Panch Prana



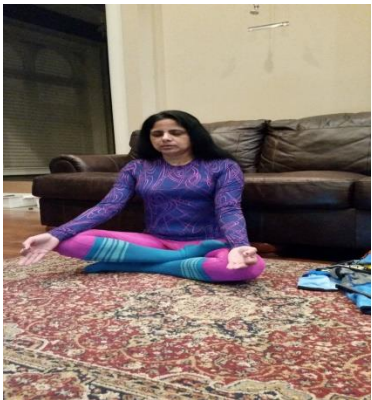
# Pranmaya kosha Disturbances

- Stress
- Manomaya kosha disturbance
- Pranmaya kosha disturbance
- Annmaya kosha disturbance
- Adhija Vyadhis



# Corrective practices

1. Breathing practices
2. Cleansing breaths
3. Kriyas
4. Pranayam



# Publications

- Dhansoia, V., Majumdar, V., Manjunath, N. K., Gaharwar, U. S., & Singh, D. (2022). Breathing-Focused Yoga Intervention on Respiratory Decline in Chronically Pesticide- Exposed Farmers: A Randomized Controlled Trial. *Frontiers in medicine*, 9.
- Nagendra, H. R. (2019). Exploration of Prana: The future of yoga research. *International Journal of Yoga-Philosophy, Psychology and Parapsychology*, 7(2): 27.

# Dhanyavad



**Bharti Raizada**

- Breathing-Focused Yoga Intervention on Respiratory Decline in Chronically Pesticide-Exposed Farmers: A Randomized Controlled Trial
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- **Background:** Occupational exposure to pesticides has been associated with lung and cognitive function exacerbations. In the present study, we tested the effectiveness of breathing focused yoga intervention on alleviation of adverse respiratory and cognitive effects associated with chronic pesticide exposure in farmers.
- **Methods:** We undertook a parallel, two-armed randomized controlled trial with blinded outcome assessors on a chronically pesticide-exposed farming population. The study was conducted at district Panipat, State Haryana located in the Northern part of India from November 2019 to August 2020. A total of 634 farmers were screened, and 140 farmers were randomized to breathing-focused yoga intervention (BFY,  $n = 70$ ) and waitlist control arms ( $n = 65$ ). BFY was delivered weekly in 45-min group sessions over 12 weeks followed by home-based practice. The primary outcome was the change in spirometry-based markers of pulmonary function from baseline expressed as raw values, Global Lung Initiative (GLI) percent predicted (pp), and GLI z-scores after 24 weeks of intervention. Secondary variables were Trail making tests (TMT A and B), Digit symbol substitution (DSST), and WHO Quality of life-BREF (WHOQOL-Bref). Analysis was by intention-to-treat. Mediation analysis was done considering oxidative stress markers as potential mediators.
- **Results:** At the end of 6 months of intervention, the overall follow-up in the participants was 87.85% ( $n = 123$ ); 90% ( $n = 63$ ) in the control group, and 85.71% in the yoga group ( $n = 60$ ). The mean age of the study cohort ( $n = 140$ ) was 38.75 (SD = 7.50) years. Compared with the control group, at 24 weeks post-intervention, the BFY group had significantly improved status of the raw and z scores markers of airway obstruction, after adjusting for confounders, FEV1, FVC, FEF25-75 [z score-adjusted mean differences (95% CI); 1.66 (1.10–2.21) 1.88 (1.21–2.55), and 6.85 (5.12–8.57), respectively. A fraction of FEF25-75 change (mediation percentage 23.95%) was explained by glutathione augmentation. There were also significant improvements in cognitive scores of DSST, TMT-A and TMT-B, and WHOQOL-Bref.
- **Conclusion:** In conclusion, regular practice of BFY could improve the exacerbations in the markers of airway obstruction in chronically pesticide-exposed farmers and cognitive variables. A significant mediating effect of glutathione augmentation was also observed concerning the effect of the intervention on FEF25-75. These findings provide an important piece of beneficial evidence of the breathing-based yoga intervention that needs validation across different farming ethnicities.
- **Clinical Trial Registration:** [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov), identifier: CTRI/2019/11/021989.
- Introduction
- Pesticide use is an integral measure for agricultural sustainability, one of the primary objectives of the sustainable development goals (SDG-2) (1). However, the large-scale use of pesticides has surfaced as a double-edged sword associated with a varying range of detrimental health outcomes (2–15). Prevention of work-related respiratory disease constitutes the primary focus of the National Institute of Occupational Safety & Health (NIOSH) (16). Though the modifiability of occupational exposures through educational strategies has grabbed some clinical interest as a preventive measure for further exacerbations including chronic obstructive pulmonary disease (COPD), and chronic bronchitis (17). However, these interventions require changing the behavior of farmers which has been notified as a difficult outcome to achieve given the observation that many protective recommendations are never adopted by farmers (17).
- Adverse respiratory consequences expressed as reductions in spirometric variables [forced expiratory volume in 1 s (FEV1), forced vital capacity (FVC), and their ratio percentage FEV1/FVC%] are the most widely reported health concerns of chronic pesticide exposure (3–9). These manifestations are the established risk factors for fixed airway obstruction including chronic obstructive pulmonary disease (6). Several lines of evidence support the beneficial effects of yoga-based interventions on the respiratory system in various non-clinical and clinical settings exacerbations such as COPD and asthma (18–25). The improved efficiency of respiratory function associated with yoga practice has been attributed to various factors including enhanced ventilatory functions, increased forced vital capacity, FEV1, maximum breathing capacity and breath-holding time, maximal stretching of respiratory muscles, efficient use of diaphragmatic and abdominal muscle, blunting of excitatory pathways regulating respiratory systems, etc. (20, 22–25). Explicitly there is a particular indication of the limited effectiveness of the yoga-based intervention to its breathing-focused practices as compared to yoga postures against critical manifestations such as COPD (19). These respiratory exercises are relatively simple, low cost, and could be incorporated into the daily lives of farmers. However, there is no clinical trial report available addressing the effectiveness of these practices in pesticide-exposed farmers with adverse respiratory manifestations. Further, given the notion that the efficacy of yoga-based interventions depends on the fitness levels of the individuals (21), the generalisability of findings from different subject populations is limited.
- Cognitive impairment is another major health exacerbation of chronic pesticide exposure. It is a risk factor for neurodegenerative diseases (13, 14) and could underline the reduced well-being of farmers directly linked to the sustainability of agriculture (26) and hence, calling for clinical attention. Several studies support role of yoga as an effective intervention to enhance cognitive function (Hedges'  $g = 0.33$ , standard error = 0.08, 95% CI = 0.18–0.48), with the strongest effects reported for attention and processing speed ( $g = 0.29$ ,  $p < 0.001$ ), followed by executive function ( $g = 0.27$ ,  $p = 0.001$ ) and memory ( $g = 0.18$ ,  $p = 0.051$ ) (27, 28). Importantly, these domains of cognition also intersect with pesticide exposure-induced cognitive decline, we thereby hypothesized that farmers with pesticide exposure will benefit cognitively through yoga-based interventions.
- In view of the lack of available studies focused on the management of adverse chronic health effects in pesticide exposed farmers, we conducted a randomized clinical trial to test if 24 weeks of regular breathing-focused yoga practice could alleviate their adverse respiratory and cognitive manifestations against a wait-list control group.
- Over recent years, there has been increased recognition of the importance of evaluating hypothesized mediating mechanisms in clinical trials (29). Oxidative stress is one of the unanimous pathological mechanisms underlying pesticide-induced toxicity of various pesticides (30–32), with lipid peroxidation and GSH depletion being the critical modulators of airway damage in obstructive lung diseases (33). Alleviation of imbalances in oxidative stress parameters has been one of the mechanistic insights obtained from yoga-based clinical research (34–36). Hence, the present trial also aimed to test the mediating role of the oxidative stress markers underlying the effectiveness of the breathing-focused yoga intervention on the

- Science developed in the western part of the globe has grown to a great height in fathoming reality of the physical world. Starting from the classical Newtonian mechanics featured by determinacy to the Quantum mechanics characterized by probabilistic features attempts to explain various dimensions of the universe. The famous equation  $E = mc^2$ , which portrays the underlying unity between matter and energy, is nothing less than a great awe for humanity. In a sense, we have fathomed the complete knowledge about the physical universe, and hence, we have had great success in all challenges related to the physical world. This has made science and technology acceptable to one and all. However, is that all we had to fathom or anything else still remains enigmatic for us, which calls our attention?

The modern multidimensional challenges of stress, noncommunicable diseases, etc., which are unresolved, have necessitated deeper understanding of our universe. It is in this context that the ancient texts of the Indian philosophy (*Upanishads*) and Yoga are attracting the attention of the top contemporary scientists and researchers. As Capra wrote, a time has come to go beyond to understand the deeper and subtler dimensions of our universe.<sup>[1]</sup> Hence, we are in a transition phase to go beyond the physical world, grounded on the matter-based paradigm by turning our tables toward consciousness-based paradigm as mentioned by Prof. Goswami.<sup>[2]</sup>

Science has moved slowly and steadily over centuries to unfold the deeper and deeper secrets of our physical world and trying to understand more and more about other physical worlds such as planets, stars, and galaxies through various powerful instruments such as ultramodern telescopes and space satellites. Science is also trying to understand the functioning of microscopic particles through sophisticated microscopes. Using these instruments, biological systems starting with a single cell are being studied, trying to understand how they have the capacity to move and replicate by themselves without any external interventions, marking the beginning of life processes. While probabilistic mechanics brought to light the fact that the laws of subtle world of molecules and atoms do not follow the laws of classical mechanics, we need to find out the laws and the structure that govern the life entities which do not appear to follow all the physical laws.

In India, having a tradition of thousands of years, the ancient seers and sages were not only able to track the structure and laws of biological systems but also the dimensions of human systems, superhuman beings until they found the Reality in its purest form going beyond Space-Time and Causation having infinite power, freedom, bliss, and knowledge. We discuss here in our editorials, the key features of those dimensions as found and written in ancient books of Yoga (*Patanjali Yoga Sutras*) and Philosophy (*Upanishads*) which fathom the dimensions of Parapsychology and beyond too.

Just as we have found energy as the basic fabric of everything in the physical world, Yoga texts call *Prana* as the basic fabric of all biological systems as mentioned in *Prashnopanishad*.<sup>[3]</sup> Then, what is the difference between energy and *Prana*? *Prana*, in contrast to energy, can change by itself by the processes of expansion and contraction (*svayameva prasarati svayam sankocameti*) as postulated in *Yoga Vasishtha*.<sup>[4]</sup> While the electromagnetic field spreads all over the physical world, *Pranic* field spreads over all biological entities (*Pranamaya Kosha*) as mentioned in *Taittiriya upanishad*.<sup>[5]</sup> We may call it a bioplasmic field. This field forms the basis of all the physiological processes that happen inside the body, and it can also be modulated by the mind. Hence, this bioplasmic field forms a crucial link between mind and body. However, how such a fundamental factor escaped the attention of modern scientists and still this is not a subject of exploration in mainstream science, is really surprising. Is it for the want of knowledge or suitable means of investigation?

Science always progresses with technological tools that help in measurement and quantification. It is important to have suitable tool to empirically elucidate *Prana*. Is it possible to measure *Prana* as we measure energy? How do we photograph *Prana* as we do with the physical systems using modern gadgets? *Prana* being very subtle and intangible in nature, its measurement is indeed a great challenge. However, its manifestations at physical and near-physical levels may be measured and quantified. The earlier works of the Kirlians is considered a seminal work in this area, where they demonstrated coronal discharge due to the application of high-frequency and high-voltage electric pulse around various objects.<sup>[6]</sup> Later, more sophisticated equipment such as Gas Discharge Visualization<sup>[6]</sup> was developed to photograph these coronal discharges of various animate and inanimate objects, and they were also extensively correlated with health status of human systems.<sup>[7]</sup> Some works have also attempted to replicate one of the strongly critiqued phantom leaf effects.<sup>[8]</sup> Continuous development of such equipment is going on to discover more and more features of biological systems. The rationale behind assuming that these Kirlian-based images can possibly measure manifested effects of *Prana* is that these images are formed due to the electronic excitation of surface and near-inner surface of the study objects. Since electrons and photons form the most fundamental aspect of physical measurement, we can assume that these images obtained during this process of electronic excitation can give the best estimate of *pranic* activities as well. Some efforts to catch such aura round the physical and living entities are pursued using infrared camera. Here, it is assumed that the change in temperature gradient around a body is a function of the *pranic* activity.

In this context, it is worth mentioning that the ancient Yoga masters were able to feel the aura around a body by their refined mind and sharpened sense of touch. Some were able to see the aura around the leaf and even human bodies by sensitizing their eyes beyond the normal range of vision. However, they all are considered as subjective experiences and strongly critiqued by scientists, on the one side, and admired by supporters of such phenomena, on the other side. This mixed emotion around this unconventional and gray area of research will remain in the future too. Need of the hour is an amalgamation of insights from intuitive experiences of subtle phenomenon and empirical investigation of such phenomena using the best available tools with strict control over confounding factors. This calls for tremendous grit, skill, and intuitive insights in researchers working in this area of *pranic* research. This is an area which has tremendous scope to answer some of the unresolved mysteries of modern science. More research is needed to understand several dimensions of *Prana* in biological systems starting from plants, animal world, human beings, and the possible unknown superhuman systems. We invite all such experiments and theoretical dimensions as articles in this journal.