

Comparative study of Influence of Yajña and Yogāsana on stress level as Measured by Electron Photonic Imaging (EPI) Technique

Sushrutha S¹, Madhukeshwara Hegde², Hongasandra Ramachandra Nagendra³, Thaiyar M Srinivasan⁴

¹Asst. Professor, Div. Yoga-Spirituality, SVYASA Yoga University, Bangalore, India

²Research Scholar, Div. Yoga-Spirituality, SVYASA Yoga University, Bangalore, India

³Chancellor, SVYASA Yoga University, Bangalore, India

⁴Dean, Div. Yoga and Physical Sciences, SVYASA Yoga University, Bangalore, India

Abstract: Background: Vedic literature makes injunction of Yajña extensively as one of the Karmas to achieve the intended goal by performing a set of activities, maintaining synchrony with creation. Various Yajñas have been explained for removal of diseases. Electro Photonic Imaging (EPI) technique, a specially designed instrument is used to measure human stress level based on the autonomic nervous system activity. The present study is designed to explore the influence of Yajña on normal healthy individuals' stress level. Aim: To compare the influence of Yajña and Yogāsana sessions on stress level using Activation coefficient as measured by EPI. Settings and Design: In a self as active control study, 18 participants underwent one hour yoga session on the first day and Yajña session on the next day. Data were taken before and after the session of the respective event. The subjects of study were participants of YIC (Yoga Instructor Course) from different places in India who have recently gone through one month of Yoga Instructor Course at Praśānti Kuṭīram. Methods and Material: In the study participants had one hour Yoga session and on the next day, they took part in Saraswati Yajña for one hour and ten minutes. On each day, EPI data were taken before and after the session of each event. These are the two interventions in the study. Statistical analysis used: SPSS-12.00 software was used for data analysis. Paired sample t-test was used for analysis. Results: Within group differences showed significant change observed in Activation coefficient ($p < .021$) of EPI parameter in Yajña session indicating decreased stress level after Yajña session. Conclusions: Yajña brings about a larger decrease in stress level compared to Yogāsana session. The effects of Yajña which were observed could be because of the use of medicinal plants and procedure involved in Yajña. So Yajña can be performed not only as a traditional practice but also as therapy for effective stress management.

Keywords: Yajña, Yogāsana, Mantra, stress and EPI

1. Introduction

Each philosophy has certain practices that form the essence of that philosophy. Yajña (fire ceremony involving offerings selected substances) holds a supreme position in Indian culture. All the auspicious performances in Indian tradition admit worship of Agni (the sacred fire) as an important component. Selected and specified materials are offered to Agni in multifold along with chanting of Veda Mantras as appropriate to different *Devatas* (deities or cosmic centers in creation). Throughout ages, fire has been venerated as a symbol of Spirit. The first hymn in Rig Veda is related to Agni:

"I invoke and worship Agni light of life, self-refulgent lord of the universe, foremost leader and inspirer, blazing light of Yajnic creation, high-priest of cosmic dynamics, controller of natural evolution, and most generous giver of the treasure of life" (1)

Ayurveda (Knowledge of Life and Science of Living) postulates that manifestation of diseases is caused by the impressions from the previous births, environment, our relation to people and the world etc. There are multifarious methods to identify and cure diseases in Ayurveda. Diseases can be managed through Japa (repeating a sacred name of particular God), Homa (fire offering) and Surarchana (worship of God). A Mantra from Rig Veda comprehends

the result of performing Yajña with a specific note: *Yajāmahe saumanasāya devān||* (Rig Veda || 1-173-2) meaning 'We perform Yajña in favour of Devatas for sanctification and bracing the Manas (an aspect of Mind)' along with other facets of inner tools (Antahkarana) in order to reach intended goal.

2. Yajña and its basis

The Sanskrit word 'Yajña' etymologically means 'to worship', 'to unite or connect', 'to do charity unconditionally (Dāna) in right manner to the deserved (2).

Pūrva Mīmāṃsa, one of the schools of Indian philosophy, proclaims that - *Devatoddeśena dravya tyāgaḥ*) meaning for the purpose of satisfying the deities, we give oblations to them. Yajña is the procedure of offerings to deities. (3)

One of the texts explains Yajña as a combination of offerings to Devatas, recitation of Mantras from three Vedas with Ṛtviks (performers of Yajña), and Dāna (acknowledgements or respecting noble people). (4)

Yajña is a systematic process in which herbs are offered along with recitation of Mantras to accelerate the process of harmonizing the creation and human life. Smoke generated in a Yajña has medicinal value because of herbs offered into Agni; hence inhalation of the smoke brings changes in

physical structure in human. This action purifies Mahāprāṇa (5). In addition to it, Yajña influences spiritual values and life style changes (6). Chanting of Mantras produces vibrations which makes human body to resonate to Mantras' mystic powers and responds in greater manner (7). These vibrations reverberate and spread specific energy waves in the surrounding atmosphere while the oblations are offered with specific chants (6). So Yajña has physical, psychological, spiritual and social value.

The entire process of a Yajña, consisting of mantra chanting, lighting the sacrificial fire and offering *Havis* to the gods in the

form of ghee, *Vanaspati* (materials from plants and trees) and other objects, purifies the environment significantly. In fact, Yajñas have been successfully performed even in modern times to induce rainfall, to check spread of epidemics, and for various mundane and spiritual purposes.

With reference to Yajña, Śrī Kṛṣṇa says in Bhagavad-Gita, "The devotees of the Lord are released from all kinds of sins because they eat food which is offered first in sacrifice. Others, who prepare food for personal sense enjoyment, verily eat only sin." [Bhagavad Gita 4.31] "Serve the gods through Yajña and let the gods be gracious to us. Thus, each serving the other selflessly will attain the highest good." [Bhagavad Gita 3.11] (8) "Through Yajña, deities went to heaven, enmity transforms to friendship, so Yajna is considered to be the greatest performance one can deliver as an action. Oblations given to Agni reach the Sun, which in turn transforms that into clouds through vaporization resulting in rainfall and gives back in the form of food grains which is the base for human progeny." [Manu Smriti 3.76] (9)

3. EPI Electron Photonic Imaging, also known as GDV (Gas Discharge Visualization)

EPI was developed by Professor K. G. Korotkov on the basis of Kirlian effect. EPI is an instrument, which measures human energy field. It is computer registration and analysis of 'Gas Discharge Glow' (GDV-images) of any biological object placed in a high intensity electric field. EPI studies involve placing the object on a glass electrode and an electronic circuit provides a high-intensity electric field (with duration 10 microseconds applied with frequency 1024 Hz). As a result of impulse effect a sequence of gas discharge is formed during the specified exposure time. Spatial distribution of the glow emitted by the discharge is registered with a light-sensitive CCD matrix (a charge-coupled device) situated directly under the glass electrode.

3.1 EPI Parameter

Several parameters are derived from the image obtained in the EPI instrument. These parameters are related to functioning of physiological systems of the body. Overall activity of the body mind complex to stress inputs and balances in energy could also be calculated. We present here one parameter of importance, known as Activation Coefficient the details of which are presented below.

3.2 Activation Coefficient

It is one of the EPI parameters to analyze the level of a person's involvement to stress-adaptation. This also provides the level of stress and balance of activity of sympathetic and parasympathetic nervous systems work. Table 1 gives the values of Activation Coefficient and the observed psycho-emotional states (10).

Table 1: Activation Coefficient Level and its interpretation

S. No	Activation Coefficient	Condition
1	0 to 2	Calm balanced condition meditator, slow / deferred response, sluggishness
2	2 to 4	Normal level of stress reaction, compensated, active emotional
3	4 to 6	Emotional excitement (driving, surgeons)
4	6 to 8	High emotional excitement, emotional overload
5	8 to 10	Psychological problems; inadequate state

4. Methodology

4.1 Aim

To compare the influence of Yajña and Yogāsana practice on the Activation Coefficient of GDV diagram in normal healthy individuals.

4.2 Objectives

- To study the impact of Saraswati Yajña at psycho-emotional level of Yajña participants,
- To study the psycho-emotional level in Yogāsana group, and
- To compare the psycho-emotional level of Yajña group and Yogāsana group.

4.3 Hypothesis

- Null Hypothesis:
Ho=There is no difference of impact of Yajña and Yogāsana on psycho-emotional level of healthy volunteers.
- Alternative Hypothesis:
Ha=There may be some impact of Yajña and Yogāsana on psycho-emotional level of healthy volunteers.

4.4 Research Design

Day 1

Pre EPI test -----Yogāsana ----- Post EPI test

Day 2

Pre EPI test -----Saraswati Yajña---- Post EPI test

Design of the study was one group comparative study, between Yoga session and Yajña session; the two interventions were provided on two consecutive days.

EPI – grams were captured for all ten fingers of the subjects without filter and with filter in succession using EPI equipment. Then subjects practiced one hour of yoga taught by experienced instructors. Yoga session includes *Sūryanamaskāra*, *Pranayama* and Deep Relaxation Technique (DRT 5 minutes). After the practice, once again

EPI parameters were recorded. Next day morning subjects were made to attend Yajña session. Yajña procedure includes *Gaṇapati Pūja*, *Puṇyāha Vācana*, *Kalaśa Pujā* and *Varuṇa Pūja*, invoking and worshipping *Saraswati* in *Kalasha*, chanting of particular Mantras, offering oblations with Mantra chanting and *Prārthana* or prayer. EPI parameters were recorded before and after the Yajña session recorded.

4.5 Sources of Subject

Participants were from various countries who recently went through one month of YIC (Yoga Instructor Course) at Praśānti Kuṭīram, SVYASA Yoga University, Bangalore. Sample size (n) is 18 (6 females, 12 males).

4.6 Inclusion Criteria

- Willing to participate in the study
- Both male and female subjects were selected for the study.

4.7 Exclusion Criteria

- Participants with missing fingers
- Females during their menstrual cycle and pregnancy,
- Those who have cardiac, neurological and psychological problems.

4.8 Ethical considerations

- Signed Informed consent of the respondents were obtained before the start of the intervention,
- The participants in the study were explained about the nature of the study in detail

4.9 Interposition / Intervention

For Experimental session:

Saraswati Yajña was designed referring to the classical texts. The Yajña program (70 minutes) was as follows:

1. Prātasmarāṇa stotra (morning prayer) (3 minutes)
2. Gaṇapati puja (worship of Ganapati to remove obstacles) (4 minutes)
3. Puṇyāha vācana (selected Mantras for auspiciousness) (10 minutes)
4. Kalaśa pujā and Varuṇa puja (installation of deities in copper pot and worship) (10 minutes)
5. Sthalaśuddhi and Agnisthapāna (cleansing the place and installation of Fire) (10 minutes)
6. Chanting of Saraswati Mantra 108 times (20 minutes)
7. Offering holy sticks along with Saraswati mantra (10 minutes)
8. Prārthana or prayer (concluding prayer) (3 minutes)

The Yoga session (60 minutes) is as follows:

1. 10 minutes loosening practice
2. 10 minutes breathing practice
3. 10 minutes Sūryanamaskāra
4. 10 minutes Pranayama, and
5. 20 minutes deep relaxation technique (DRT)

4.10 Data Collection

On the first day subjects were asked to come at 05.00 A.M. in the morning on empty stomach. GDV-grams were

captured for all ten fingers of the subjects first without filter and then with filter using GDV-camera. After the practice, once again GDV parameters were recorded. Next day morning subjects were asked to come at 05.00 A.M. on empty stomach and participated in a Yajña session. GDV parameters were recorded before and after the Yajña session.

4.11 Data Analysis

All variables were expressed as mean ± standard deviation. A paired sample t-test was used for analysis of pre-post changes in the two groups. Statistical significance was set at $p < 0.05$, and all the analyses were performed using SPSS 12.00 software.

5. Results

Shapiro-Wilks test was used for normality test. The data were normally distributed with $p > 0.05$. To assess the impact of session (pre-post assessments) paired sample t-test was used within the group. The results are tabulated in the tables below.

Table 3: Yajna and Yoga Session pre-post recordings

	Pre		Post		p value
	Mean	SD	Mean	SD	
Yoga session	2.82	.97	3.65	1.98	105
Yajña session	4.09	1.88	3.19	1.47	0.021*

* $p < 0.05$ comparing the pre and post scores using the Paired sample t-test

Changes are observed in both groups but Yajña showed statistically significant result compared to Yoga session. Significant reduction in Activation Coefficient, [$p = 0.021$] was seen in Yajña session but not in Yogāsana session.

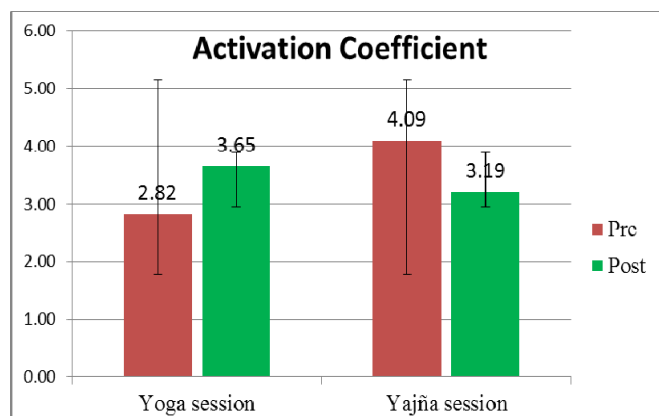


Figure 1: Comparison of Activation Coefficient of Yoga and Yajna sessions, pre and post

6. Discussion

The result shows that P-value is statistically different when two groups are compared to each other. Mean and standard deviation of Activation Coefficient changed more in Yajña session indicating the influence of reduction in stress level during Yajña.

- 1) Yajña involves a set of performances. The deity on which Yajña is being performed is meditated on deeply by all who are gathered there. The process of pondering upon one subject (deity or ritual in the context of Yajña) makes mind to concentrate and slow down breathing, subsequently influencing the state of the mind. Hatha Yoga Pradīpika provides strong relation between breath and mind; if mind is roving the breath is unsteady, meaning breathing pattern is highly disturbed and if the breathing is disturbed so is the mind.
- 2) Ayurveda incorporates Dhūmapāna (inhalation of prescribed smoke) in dinacarya (daily routine) for many diseases as a therapeutic practice. Smoke emanating during Yajña facilitates body to be energized through inhalation of the specific ingredients that are offered to fire. Thus it is hypothesised that stress level could come down. (11).
- 3) A recent paper has shown unequivocal increase in brain blood flow when there is oxygen deficit in the brain. The deficit comes about when a person suspends breathing for as short a time as 15 seconds. MRI shows increase in brain blood flow in wide areas of the brain due to increased CO₂. In case of reduced intake of oxygen, a similar response could be visualized whereby there is a gradual increase in arterial PCO₂. "Carbon dioxide is a cerebral vasodilator; therefore, an elevation in PCO₂ will subsequently increase whole-brain cerebral perfusion, resulting in a decrease in the deoxyhaemoglobin concentration of the cerebral blood and ultimately a whole-brain increase in the fMRI signal". Thus, Saraswati Homa smoke from fire wood could cause better brain blood flow through internal feedback mechanism leading to reduced stress level indicated by Active Coefficient.
- 4) Participants were asked to chant Mantras related to one of the deities, Saraswati. Recitation of Mantra in particular – which has an emotional component – could influence the person to calm down and hence bring down stress level. Subjects were educated about Mantras and the connected Devata of Mantra which made them focus towards recitation. This focus could also have caused reduction in stress level.
- 5) Though there is an increase in Activation Coefficient in Yogāsana session, these tend to bring balance in autonomic functions, including sympathetic and parasympathetic nerves in the optimal range indicating normal stress level, at eustress level. Hence it is inferred that stress level increase from Yogāsana are balancing than aggravating.
- 6) It has been shown that the physiological benefits of Yoga could have a dose-response behaviour. In other words, the more one practices Yoga, the more are the benefits seen [13]. Thus, a short session of Yoga could be only a start of a long process and may not indicate beneficial effects as seen in this study. To have a good comparison, at least three months of yoga practice is required before we could say with any certainty if one procedure is better than another.
- 7) Yagna, if performed properly needs special persons who could chant the Sanskrit verses with correct intonation and style. It is also expensive to perform a yagna. Thus, performing yagna at home or in a temple is a consorted effort, needing resources that are usually kept for special

occasions only. Yoga on the other hand is a self-help procedure and could be easily learned and performed anywhere in the world. Regular practice of Yoga could help in many areas, including in the management of stress.

- 8) It is possible that 'meditative component' is strong in Yagna and not as much in this particular practice of yoga. Effectiveness of meditative components in reducing stress through central processing of information has been demonstrated in studies [14]. Yoga, as practiced here, has no specific meditative component whereas Yagna is based on dharana or withdrawal of the senses and concentration on mantra and the devata. Thus, it is not surprising that Yagna is more effective in reducing stress-related components in EPI.
- 9) Thus, while short term benefits are seen in Yagna performance, practicality of learning and practicing Yoga along with meditation is an important adjunct in the management of stress in individuals.

7. Conclusion

Yajña, a spiritual practice mentioned in various ancient texts of Indian philosophy, showed therapeutic effects which are also mentioned in texts. Medicinal plants and ghee are the main materials for Yajña. This study has shown that one hour of Yajña can reduce stress level more efficiently than one hour yoga session as measured by Activation Coefficient of EPI- gram. Thus, Yajña can also be practiced for more effective results for stress management programs. However, it is also be noted that Yoga practice can be useful in balancing the energy system in a person.

8. Acknowledgements

We thank the participants of YIC-143 who agreed to become subjects for the research. We thank Kuldeep, Dr. Vijay Kumar, Dr Ramachandra Hegde, Bhagat, Sanjay, Viswajit, Anusha and Shailesh for giving the precious time to collect data, without who it would have been impossible to accomplish this study. We thank the coordinators of the YIC and Yoga & Consciousness course who have given this opportunity.

References

- [1] R. Tulsi, "Rigveda Vol. I," 1st ed. Vijaykumar Govindram Hasanand, Delhi; 2013. p. 1
- [2] S. Gyanashruti, S. Srividya. "Yajna A Comprehensive Survey". Yoga Publications Trust, Ganga Darshan, Munger, Bihar, India.; 2006. p. xv + 370.
- [3] Bheemacharya. "Nyaya Kosha." 3rd ed. Chaukamba Surabharati Prakashana; 2011. p. 665.
- [4] S.R.S. Acharya. Yajna ka Jnana Vijnana. 2nd ed. Brahmavarchas, editor. Akhanda Jyoti Samsthana, Mathura, 1998.
- [5] R. K. Murti, "Veda and Yajña in Indian tradition," Indian Journal of Traditional Knowledge, 6(4), pp. 687–91, 2007.

- [6] R. Surendra, H. R. Nagendra. "Effect of Aphoryama yajna on people and environment,". Indian Journal of Traditional Knowledge, 6(3): pp. 412–416, 2007.
- [7] B. Yogitha, R. Nagarathna, E. John, H.R. Nagendra, "Complimentary effect of yogic sound resonance relaxation technique in patients with common neck pain," International Journal Of Yoga, 3(1), pp. 18-25, 2010.
- [8] Shreeharikrishnadasa Goyandaka. "Shrimad Bhagavad-Gita, Shankara Bhashya". 28th ed. Geeta press, Gorakhpur, 1988.
- [9] Sheshanavartna. "Manusmriti". 3rd ed. Samaja Pustakalaya Shivaji Beedi, Dharavad; 2011.
- [10] K. Korotkov. "Human Enargy Field,". Backbone Publishing Co., Fair Lawn, NJ, USA, pp. 360, 2002.
- [11] Ranade S, "Natural Healing in Ayurveda," Motilal Banarasidass Publication, Varanasi, pp.158, 2001.
- [12] L.C. McKay, L. Adams, R. Frackowiak, D. Corfield, "Bilateral cortico-bulbar network associated with breath holding in humans, determined by functional magnetic resonance imaging," Neuroimage, 40 (4). pp. 1824-1832, 2008.
- [13] N. Moliver, E.M. Mika, M.S. Chartrand, S.W.M. Burrus, R.E. Haussmann, S.B.S. Khalsa, "Increased Hatha yoga experience predicts lower body mass index and reduced medication use in women over 45 years," International Journal of Yoga, 4(2), pp. 77-86, 2011.
- [14] Debbie L. Cohen et. al, "Cerebral Blood Flow Effects of Yoga Training: Preliminary Evaluation of 4 Cases," The Journal Of Alternative And Complementary Medicine, 15(1), pp. 9–14, 2009.
- more than 90 research papers on Yoga and its applications and is author of over 30 books in the field of yoga.

Author Profile



Sushrutha S is Asst. Professor, Div. Yoga-Spirituality, SVYASA Yoga Unvesrity, Bengaluru, His area of interest is ancient sciences to make them socially relevant and applicable for universal harmony. He is working on Yajna and rituals to find out the scientific basis.



Madhukeshwara Hegde is a research scholar in the division of Yoga-Spirituality, SVYASA Bengaluru, India. His area of interest is performing Yajna and finding out the science of them.



Prof. T. M. Srinivasan is Dean, Division of Yoga and Physical Sciences S-VYASA, Yoga University, Bengaluru, India. He is the founder member and past president and editor of the International Society for the Study of Subtle Energies and Energy Medicine. He has edited two books: Sense Perception in Sciences and Sastras and Energy Medicine around the World. His area of expertise is Biomedical Engineering, yoga, acupuncture, Tai Chi, Energy Medicine, developing medical devices for holistic health.



Prof H. R. Nagendra is Chancellor of S-VYASA, Yoga University, Bengaluru. He has developed many scientifically proven special techniques to manage modern day lifestyle ailments. He is a former Scientist of NASA, and Harvard University Consultant. Presently, he is a Member of the Planning Commission on Health, Govt. of India and Member of NIMHANS Society. He is the present President of VYASA and Chairman of VYASA International. He has published