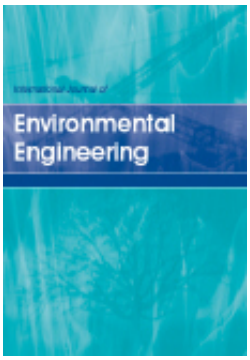

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Effects of herbal woods in Homa therapy on air quality: experiments amidst unlocking the society in pandemic challenges

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Effects of herbal woods in Homa therapy on air quality: experiments amidst unlocking the society in pandemic challenges

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Abstract: In pandemic, the economic crises and health issues have brought the whole human race in unprecedented situation. UN, WHO, World Bank, WFO and all other responsible organisations are indicating towards the global crisis of health. Pandemic is not a single reason of health crisis, poor air quality is also a great threat for increasing mortality rate in the world. In Nation Capital Region (NCR), India and nearby areas, the time period of months of September to December is very much crucial every year as due to many social, cultural, ecological and known-unknown reasons, the quality of air is degraded below threshold level causing threats to human health and lives. Present manuscript is a trial for analysis of air quality of Indian capital region amidst global pandemic and effect of Ancient Yagya and Homa science on curbing the pollution.

Keywords: Healthcare 4.0; AI; machine learning; sensor and IoT; Vedic science; Homa; Yajna; Mantra; sensors.

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Mamta Saxena is the Director General at Ministry of Statistics, GoI. She has completed her PhD in Yajna Science from Central Pollution Control Board (CPCB). She has keen interest to revive our ancient culture and science through modern instruments. She is a scientist by thought and working on the study of the effect of Yajna, mantra and yoga on mental patients, patients suffering with various diseases like diabetes, stress, arthritis, lever infection and hypertension, etc. with joint collaboration with different organisations AIIMS, NIMHANS, NPL, etc.

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Neeti Tandon is a research scholar in Fundamental Physics at Vikram University Ujjain. She is a keen researcher in Yagyopathy. She is a scientist by thought and working on the study of effect of Yajna, mantra and yoga on mental patients, patients suffering with various diseases like diabetes, stress, arthritis, lever infection and hypertension. She is also an active volunteer of Gayatri Parivaar and Thought Transformation Movement. She keeps herself engaged in many philanthropic activities like plantation, slum area kid education and anti-addiction movement. She is a gold medallist and honours throughout in her education and obtained graduation and post-graduation in physics science.

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Bhavna Singh is an Ayurvedic Practitioner and currently acting as the Principal in Ayurvedic College, Hapur, U.P., India. She has keen interest to study herbals and their effects on human body. She has done scientific experiments of different herbals and their vaporised state through Yajna on patient diseases. She is also fond of scientific writings and establishing Indian Vedic wisdom

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Priyanshi Garg is a student of BTech (CSE) in ABESEC which is affiliated to AKTU. She is currently working on yagyopathy where she is analysing the data and translate them. She has a keen interest in coding and cyber security. Her hobby is to watch movies. She wishes to do something for her society in coming future with her all resources. She has many research papers published in her credit in international publisher while studying in graduation. She wishes to be a successful IT engineer and develop some technical solutions for rural areas. She is ambitious and hardworking and she is very sincere and always before time to submit any task assigned. She has team spirit and polite gesture.

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Mayank Sharma is an engineering student in AKTU University. Presently, he is a BTech third year student of CSE in ABESEC, Ghaziabad. India. He is working presently on Yagya and mantra therapy and its analysis by machine learning. He has keen interest in Google surfing. His hobbies are playing badminton and reading books. He is young, talented and dynamic. He is placed in a good IT company and strong interest in data sciences. He is versatile and smart personality and wishes to serve country through IT sector. He has developed some good analysis for different data science projects.

1 Introduction

1.1 Poor life style and related threats in present time

With the present lifestyle, the immunity of people gets so weak that they can easily be infected with any disease. Lifestyle diseases are the diseases that are caused due to the lifestyle of the people. Some of the common lifestyle diseases in 21st century include diabetes, cancer, obesity, heart attack, chronic liver disease, asthma and many more. Main factors that lead to these lifestyle diseases are disturbed biological clock, very less physical activity, wrong body posture and bad food habits. The main cause of these lifestyle diseases is the advancement of technology that had made all the things so easy that there is not any need of human labour (Shatayu Ayurveda Yoga Retreat, 2018).

1.2 Yagya and mantra chanting, its effect on human body and cosmos

When mantra is uttered, it would induce the same vibrations within one's body as in mantra (Acharya, 2015; http://www.potentialsandpossibilities.com/the-science-of-mantra-chanting). The meaning of mantra has sometimes a positive affirmation or some wish, and sometimes nothing, but it hardly affects its science (Acharya, 2015).

Chanting is an action in which word or group of words is repeated over and over again it may be loudly, whispering or mental (Acharya, 2015). Chanting of mantras follows a strict procedure of pronunciation, intonation and breathing. This typical action of chanting generates electricity.

Glands are invisible passive points/centres, in the human body. Every gland has a typical power in dormant form. These centres are in code form or say in seed form of whatever is, present in the universe (Acharya, 2015). These glands are awoken by vibrating continuously through chanting of mantra. Continuous chanting creates friction on that point and so the heat and in turn these points are charged due to electrostatic (Wu et al., 2017).

All the words that come out of the mouth are pronounced by different divisions of the throat, palate, denture, Jivha root, etc. In this pronunciation period, the pulse fibres of the parts of the mouth from which the sound comes out are spread to different parts of the body. The pronunciation of various words affects different points known as glands (Acharya, 2013).

Our universe is filled with waves of different acoustic waves and their energy (Acharya, 2015). There are many ways to tune a person's frequency with that of cosmic frequency, mantra chanting is also a one technique out of them. Corresponding every passive gland in the human body there is a source of power in the universe. Passive points of human body when activated through chanting, they can catch the cosmic signals or we can say when the frequency of human body is synchronised with the frequency of particular field of universe, practitioners get experiences of benefits of cosmic energy (Acharya, 2013).

1.3 Different application of Yagya and mantra

There are vast applications of Homa therapy in Indian mythology and scriptures and now they are being scientifically proved. Some of them are briefly discussed in below sections.

1.3.1 Benefits of Agnihotra: Ayurvedic dimensions

In the Yagya process, we are required to sacrifice our ego, selfishness and our material attachments and encourage us to adopt rational thinking, compassion and welfare wishes for all creatures are the fundamental ingredients for the best Yagya which must be performed by all human beings.

The carbon dioxide produced in Havan is at very slow pace and then the produced smoke is rich with the aroma of all ingredients burnt in fire and acts like a stimulant to the brain and the same carbon dioxide used by the plants as well. The oxidation of hydrocarbons produces formic acid and acetic acid which are used to preserve food materials and fruits. The smoke of Havan works like an inhalation therapy derived from Ayurveda which is helpful in relaxing the mind and heals the body. It has positive effects spiritually due to the holy mantras chanting during the Hawan (Yoga India Foundation, 2020).

1.3.2 Benefit of yajna: curbing the pollution

The use of jaggery in the Yagya kills the germs of typhoid fever. Cow ghee is also a very important ingredient in Yagya. Cow ghee also referred as an antidote to the poison in Vedas and the atmosphere gets purified by the help of its fragrance. The fat particles of the cow ghee get mixed with the dust particles in the atmosphere and again come back in the form of rain. This process helps to nourish the vegetation and helps to control the pollution. This also reduces the level of poisonous gases like SO_2, etc. (Jain, 2017; Singh and Deepika, 2017).

1.3.3 Benefits of Yagya and disease control

Yagya cures pulmonary diseases as regular oral and nasal inhaling of phyto medicines produced during Yagya, which occurs due to regular deep breath and chanting of certain Vedic hymns during Yagya, which contributes to the effective pulmonary management of phyto medicines. This administered drug goes up to the Shringatakamarma, extent all over the head, area of eyes, ears, nose and throat, and removes vitiated Doshas (problems) from there (Srivastava et al., 2019).

1.3.4 Benefits of Yagya: dimension of organic farming

So, the organic farming is the method which can do so, But the ashes prepared for manure by igniting fires in an ordinary manner is polluting the atmosphere that`s why Homa organic farming/agnihotra farming is introduced to clear all the aspects and in a sustainable way.

Homa organic farming is a way which improves the soil quality and also improves the atmospheric balance. It gives the higher yields in less investment. But proper discipline and guidelines must be used to gain the proper and best results of Homa organic farming. One has to perform Homa twice daily at the sunset as well as sunrise with the chanting of some mantras. Every aspect of Homa is important which is to be done in a proper manner. The cow dung cakes and the cow`s ghee (clarified butter) should be used in preparing the fire in an inverted pyramid shape vessel of copper and unbroken grains of rice are also used. This practice should be carried out daily at the farmlands. Then the ashes which produced can be used as manure by mixing them with other organic manure.

The measured part of water mixed with agnihotra ash can be used as a pesticide. By using such techniques as our daily routine, we can produce more gains with least investment by ensuring improvement in various environmental aspects by using this Vedic science technique (Lahoty and Rana, 2013).

1.3.5 Benefits of Yagya: dimension of ecological balance

Some harmful organisms present in our atmosphere interfere with the plant's growth, but the aromatic substance during Yagya offers protection to plants against harmful organisms as these aromatic substances get diffused in the air. Yagya's ash and atmosphere is also used as natural farming for growing plants. It is a holistic method of growing healthy plant using Yagya's ash as fertiliser.

As Yagya is a slow combustion process, small quantities of oxygen get utilised and carbon dioxide is released in air. But this carbon dioxide is mixed with aromatic oils and antiseptic products. These aromatic fumes when inhaled cure many mental disorders.

It has been examined by doing experiments on rabbits and mice that fumes of Yagya have strong antibiotic properties. Also, the fumes of Yagya refresh the environment and make us feel stress free. The fumes of Yagya also help in eradicating illness causing microbes from the environment.

So, it can be concluded that in some or other ways, Yagya and its fumes help us and improves our surroundings, therefore helping in maintaining ecological balance (Srivedmata Gayatri Trust, 2011).

1.4 Technology and Healthcare 4.0

1.4.1 Applications of sensors and IoT to record experimental data

There are various sensors used in the hospital such as biosensors, pressure sensors, temperature sensors, image sensors, etc. These sensors are light weight, small and are compatible with body mass and require very little power for correct operation. Sensors are used to get complete view of the body of patient which helps in surgery and finding the diagnosis (Perkins, 2015).

There are several IoT devices such as Bluetooth enabled blood labs, connected inhalers, connected contact lenses and many more. These IoT devices has increased the satisfaction of patients by allowing more interaction with the doctors (Strate School of Design, 2016).

1.4.2 Application of ML algorithm and AI

Artificial intelligence in healthcare refers to use of some of the software and complex algorithms in order to do the comprehension of the medical and healthcare data that is quite complex. It also reduces the complexity of the process to emulate human cognition in the medical analysis. Some of the examples of application of artificial intelligence in healthcare include digital consultation, virtual nurses or robots, precision medicine, drug creation, treatment design, medication management and many more (Novatio, 2017).

2 Literature survey

In their manuscript, Vandana Srivastava and her team founded that one of the core elements of the ancient Indian culture ever since the Vedic era has been Yagya, and it is also an effective therapeutic procedure. This review explores the applicability of Yagya in the present time, the procedures, the principle, the mode of action of Yagya, the importance of Aayurved medicines and medicinal herbs in the management of various diseases etc. It also illustrates the ancient Ayurvedic perspective and also the management approach of Yagya. The feeling of 'giving' is inherently associated with Yagya.

Thus, Aayurved restores the natural equilibrium of the body, mind and soul, because of which the vitality of an individual is restored, and the disease-causing elements like virus, bacteria, etc. become ineffective (Srivastava et al., 2020).

Dr. Vandana and team applied the methodology that Yagya aims to acquire the Prana (vital life force) from the cosmos, and regulate its flow in the body, for overall wellbeing. Aayurved medicines and therapies. Thus, Yagya therapy (Yagyopathy) presents a multi-modal approach for the treatment of diseases. An advisory titled 'Aayurved advocacy for management of Nipah Virus (NiV) infection' is available on the website of Central Council for Research in Aayurved Sciences (CCRAS), Ministry of AYUSH, Government of India.

The limitation in their study were

1 the mantras that are used in Yagya may not be understood by people of other religions

2 the people having hearing aid may also face problems.

They concluded their work with remarks that Yagya has been one of the core elements of the ancient Indian culture ever since the Vedic era, and is also an effective therapeutic procedure. If a community may be heterogeneous in respect of the constitution, etc., of its individual members, there are other common factors (described above), which being adversely affected, will cause simultaneous outbreak of diseases having similar symptoms.

It is these that devastate whole populations. The feeling, understanding and acknowledging that a person is an inseparable constituent of the nature and society, has immensely benefited from these throughout life, and hence, it is the duty of the person to give a part of one's compassion, feelings, endeavours, resources, etc. for the betterment of the nature and society; this sense of responsibility significantly contributes to the positive restructuring of the psyche of the person, leading to an all-round physical, mental and emotional wellbeing; also, the nature reciprocates these feelings, which further contributes to the overall betterment of the person and this is associated with Yagya (Srivastava et al., 2020).

In his paper to study the Yagya effect on adolescent and PragyaYog, Manoranjan Tripathy observed the effect of practicing PragyaYog with chanting Gayatri Mantra on the aggression level of the male adolescents. This study highlighted the holistic approach of yoga practices with the droning of Gayatri Mantra to reduce aggression. The study insists that if one keeps on rehearsing the specific asanas along with prañayamas and Gayatri chanting, consistently at early morning, he would definitely get the benefits at physical, and mental levels.

The facts and benefits of the Pragya yoga and Gayatri Mantra is well explained in this study. Droning of Gayatri Mantra makes a defensive shield for the chanter and may bring large benefits to its life. Pragya Yoga is comprised of specific 16 Asanas, i.e., Tadasan, PadaHastasan, Vajrasan, Ushtrasan, Yogamudra, ArdhTadasan, Shashankasan, Bhujangasan, TiryakBhujangasan (left and right), ArdhTadasan. Some are repeated for two times like Tadasan, PadaHastasan and Shashankasan. Each asan is performed with the droning of shrinade of the specific word of Gaytri Mantra like it starts with the droning of shrinade of Om then first asanTadasan performs with the droning of shrinade of Bhuh and it going on with each asan and thus it is said Pragya yoga.

To perform PragyaYog the lungs are discharged of pollutions and stale air and subsequently the body and cerebrum get rejuvenated by the additional supply of oxygen they get. The Pragya yoga adjusts bio-plasmic vitality and expels blockage in the nadis (Tripathy, 2018).

Mr. Tripathy applied the research methods of collecting sample and sampling: a sample consisting of 30 intermediate and undergraduate students under the age group of 14–18 years from Bhawanipatna Central School, Kalahandi (Odisha), was taken. Direction was given to each and every subject of the sample to practice PragyaYog with Gayatri Mantra chanting for a period of 30 days regularly. In this research, pre-post single group design has been applied. He adopted the tools that a questionnaire named as 'aggression scale' (A-scale), was given to each participant for measurement of aggression score. For statistical study paired samples t-test was applied.

The post intervention mean was statistically significantly lower than the pre-intervention mean. So, it can be concluded that the practice of PragyaYog with chanting Gayatri Mantra is decreasing the aggression level of adolescents.

He explored the future scope that Youth is the future of a nation. They need proper care and guidance. But today we find that a large number of school and college students are misguided, they have no aim and ideology in their life. Stress, anxiety, depression and cases of suicide are increased. Adolescent age is full of emotions and high energy levels. If a proper guidance and nurture is given then they may be very fruitful and beneficial for society and nation. Pragya yoga may be a good and approachable tool to nurture the youth. It is not only helpful to reduce aggression but it also helpful to give a virtuous shape. Along this Pragya yoga is also beneficial to treat psychological disorders which are very common in adolescents.

He defined the limitation of this study, that only single-group pre-post design was applied, there is no control group. The findings of the current study are limited as the population of the current sample was small and from one institution. He concluded that the present study shows a significant result, it proves that the practicing of PragyaYog with Chanting of Gayatri Mantra is helpful to reduce the level of aggression in adolescent students and keeps them away from tension, stress, and anxiety (Tripathy, 2018).

3 Methodology and experimental setup

3.1 Diseases control and pollution control

Different sensors were setup for collecting the data. The readings for different AQI parameters were captured in a fixed time interval to measure the AQI, PM 2.5, PM 10, CO_2 and humidity and temperature, etc. data.

The Airveda device was used to measure the readings and in the time interval of every half an hour, the readings were captured.

The data was arranged in a tabular format and some suitable data analytics tool was used to visualise the graphical analysis to know the effect of technique on the environmental conditions.

3.2 Dataset and algorithm used

Therapeutic efficacy of various Ayurvedic interventions:

1 Uncomplicat edchronic sinusitis – Tribhuvankirti rasa (Tablet) 250 mg BD with Adrakswaras (juice of ginger) should be taken. The overall clinical efficacy was 96.6% and no side effects were reported.

2 Chronic sinusitis (dushtapratishyaya) – TrayodashangaKwatha with Madhu given orally (45 days) should be taken for group A. PradhamanaNasya with Trikatu + TriphalaChurna (seven sittings, on alternate days) should be taken for group B. Initially PradhamanaNasya (seven sittings, on alternate days), followed by oral administration of TrayodashangaKwatha with Madhu (45 days) should be taken for group C. There is more than 75% relief in symptoms.

3 Allergic rhinitis (pratishyaya) – 6 gm of Haridrakhanda (orally) twice a day should be taken. There is more than 75% relief in symptoms. Pippalyaditaila (Nasya), Haridrakhanda (orally) (Pippalyaditaila 4–8 drops in each nostril, three sittings of 7 days each with one week interval) should be taken. There is more than 50% relief in symptoms.

4 Allergic rhinitis (anurjatajanitapratishyaya) – ShunthitailaNasya for 14 days, followed by internal drug SudhaHaridra ,2gm TDS for 21days should be taken for group A. PradhamanaNasya with Katphalchurna till samayakashuddhilakshana obtained, followed by internal drug ShuddhaHaridra, 2 gm TDS for 21 days should be taken for group B. Oral drug SudhaHaridra, 2 gm TDS for 21 days should be taken for group C. Symptoms like sneezing, rhinohorrea, headache, itching were almost completely relieved in all the groups.

5 Acute bronchitis (kaphajakasa) – Haritaki tablet with Usnajala BD, for 7 days should be taken for group A. SaindhavaLavanaCurna with Usnajala BD, for 7 days should be taken for group B. Haritaki, SaindhavaLavana (in equal quantity) with Usnajala BD, for 7 days should be taken for group C.There is more than 90% relief in the symptoms in group C.

6 Chronic bronchitis – 10 g of Vyaghriharitakiavaleha twice a day with lukewarm water, before meals, should be taken for 12 weeks. Significant relief in wheezing, chest pain, sore throat, nasal congestion, dyspnoea and productive cough was observed.

7 Tamaka shvasa (bronchial asthma) – Puskaramooladichoorna (powder) – including Sati (Hedichumspicatum, Rose), Puskaramoola (Innularacemosa, Linn), and Amalaki (Emblicaofficinalis, Gaertn) should be taken, 9 gm powder was given in three divided doses with honey. There is significant improvement in the pulmonary function.

8 Bronchial asthma – Shirishadi Ayurvedic nebuliser, 2.5 mg (2.5 ml) twice in a day for first 15 days, should be taken. There is significant improvement in the pulmonary function with regards to dyspnoea.

9 Tamakashvasa (bronchial asthma) – treated with Ghanasattva of Tamalaki (Phyllanthusfraternus Webster), 500 mg, thrice daily, orally, for 45 days should be taken.There is significant improvement in breathlessness.

10 Tamaka shwasa (bronchial asthma) – Nithyavirechana with Erandathaila (castor oil) in a dose of 15–30 ml, once a day, for the first 7 days should be taken. There is significant improvement in breathlessness.

11 Tamaka swasa (bronchial asthma) – herbal Padmapatradi yoga [including Padmapatra (Puskaramula) (Inularecemosa hook), Bharangi (Clerodendrumserratum), Malaya Vacha (Alpiniagalanga), Shati (HedychiumSpicatum), Pippali (Piper longum)] – Administered four tablets (500 mg each) or 2 g per day in two divided doses, with lukewarm water, for 1 month should be taken. It reduces the severity of attack.

12 Tamaka shwasa – this is a review article about the efficacy of different formulations of Vasa (Adhatodavasica Linn.) for Tamakashwasa. There is significant improvement in symptoms of breathlessness, cough, wheezing, rhinitis, throat pain, etc.

13 Tamaka shwasa (bronchial asthma) – Vasa avaleha [including Vasa (AdhatodavasicaNees), Sharkara (sugar candy), Go-Ghrita (cow ghee – clarified butter), Pippali (Piper longum Linn.), Madhu (honey)] should be taken for group A. Granules of Vasa avaleha, dose – 6 g twice a day with lukewarm water for the duration of 28 days should be taken for group B. There is significant increase in peak expiratory flow rate.

14 Rajayakshma (pulmonary tuberculosis) – administration of Bhringarajasava as complementary drug along with directly observed treatment short should be taken. 30 ml with equal quantity of water, thrice a day, half an hour after food should be taken.It provides better, safer, and faster relief.

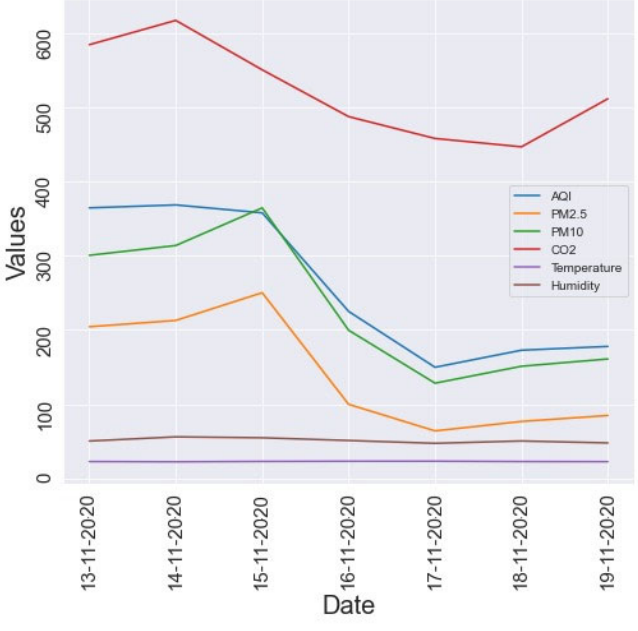
Effectiveness of Yagya therapy – Yagya therapy is useful in several diseases like pulmonary tuberculosis, Crohn's disease, acute myeloid leukaemia (AML), breast cancer (BC), mouth cancer (MC), chronic myeloid leukaemia (CML), epileptic seizures, obsessive compulsive disorder (OCD) and poly cystic ovarian disease (PCOD), osteoarthritis (OA) of the knee, sub-clinical hypothyroidism (SCH), etc.

Activity: measurement of air quality was done for Yagya therapy was after every day (every half an hour by Air Veda instrument which was equipped with air particle measurement sensors). The sensors recorded the data from 10 September to 10 October 2020 continuously in fixed time interval and gathered the readings of air particles from the atmosphere. The agnihotra was done in a semi ventilated atmosphere so that, the effect of Homa can sustain for longer duration.

4 Result analysis and discussion

The author team first tried to visualise the parameters individually. After this critical action, efforts were made to see whether any pattern is visible, but it was not.

Figure 1 Pattern visualised for different air particles in last months of 2020, when lockdown opened and after Deepawali Festival in India (see online version for colours)



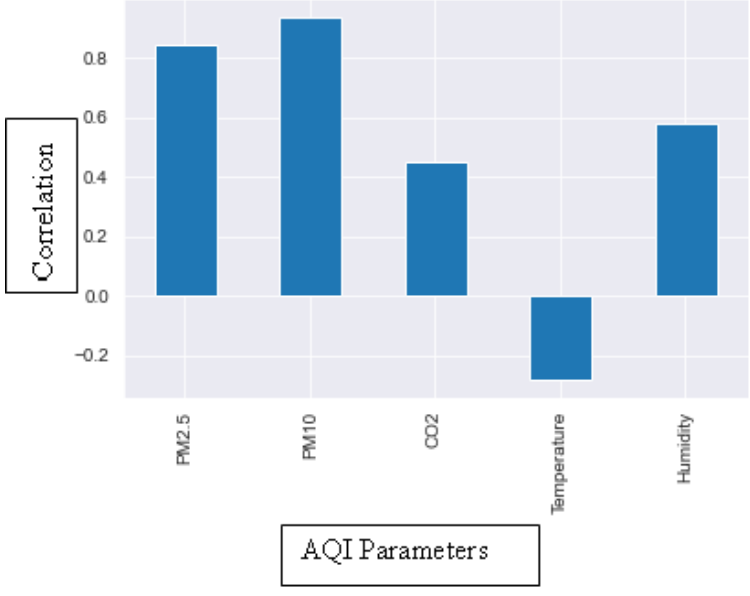
So, all the data was grouped with respect to the date of experiment and used mean as the aggregate function and applied this function with respect each date and after that, it was tried to find out the pattern visible as in Figure 1. The visible change is that initially the AQI started to decrease in the course of experiment, but there is an observable decrease in all these.

It was observed that Air quality was improved and presence of polluting particles were reduced after festive occasion as in this time the traffic, shopping, crackers and other dominant factors are there which affect the AQI.

Observations: from data collected, it can be seen that on 13–17 November, the mango wood was used but on 18 and 19 November, banyan wood was used as Samidha. It can be clearly observed that banyan wood was better performing than mango in all the parameters for which graph has been generated, i.e., for AQI, PM 2.5, PM10, CO_2, temperature and humidity, in all parameters, it depicted improvement. Parameters that affect the quality of air possible due to performing Havan with inclusion of mango wood and bargad (banyan) wood.

Figure 2 Correlation analysis of different AQI factors (see online version for colours)

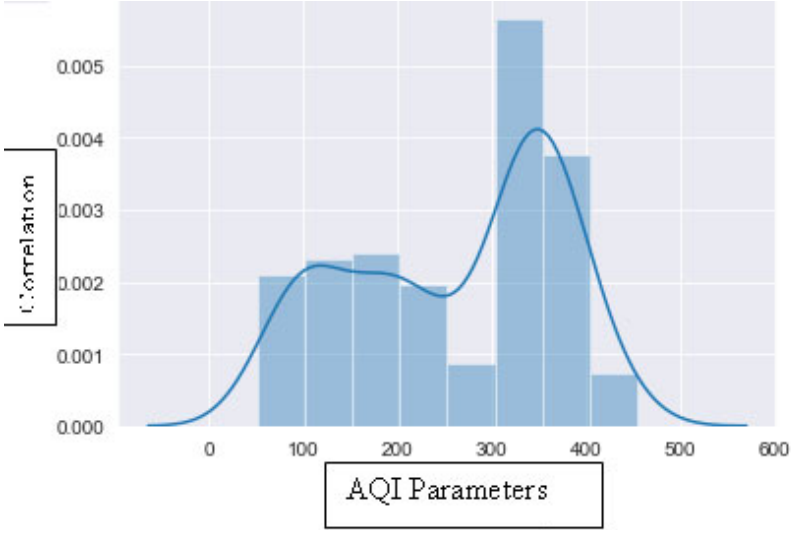
Figure 3 Establishment of high correlation of PM 2.5 and PM 10 with AQI (see online version for colours)



After that we tried to find out the correlation with respect to various factors in Figure 2. And also, we tried to plot the correlation with respect to AQI as we have to mainly focus on that. So, in these graphs we realised that PM 2.5, PM 10 are highly correlated to AQI as it can be seen in Figure 3. So, the focus and attention of study was done on AQI that we also used for forecasting as well. So, it was tried to forecast this using LSTM which is RNN architecture, which has application for prediction and

forecasting. Before direct application, data has to be known in detail. For this, normality test was used to find if data set is well-modelled with normal distribution/Gaussian distribution. After performing the statistics test, we obtain the value 204.516. So, we find out data does not look Gaussian and hence null hypothesis is rejected as we can also observe in Figure 4.

Figure 4 Data does not found Gaussian as per curve, so null hypothesis rejected (see online version for colours)



Dickey-Fuller test was then applied to check whether the data is stationary or not which is determined by unit root or not. The p value we obtained is 0.4693 so the data has a unit root and is non-stationary as it can be seen in Figure 5. After doing all this necessary experiment, LSTM model was built.

Figure 5 Rolling mean and standard deviation curve and counting p-value (see online version for colours)

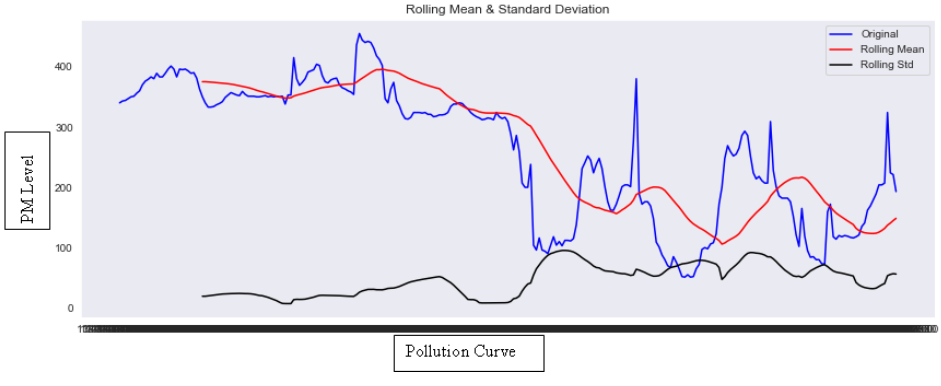


Figure 6 The constituent layers in LSTM model shown (see online version for colours)

Layer (type)	Output Shape	Param #
lstm_1 (LSTM)	(None, 100)	52400
dropout_1 (Dropout)	(None, 100)	0
dense_1 (Dense)	(None, 1)	101

Total params: 52,501
Trainable params: 52,501
Non-trainable params: 0

The loss we choose is 'mean squared error' and we chose 'Adam' optimisation.

Figure 7 Loss per epochs and 'Adam' optimisation (see online version for colours)

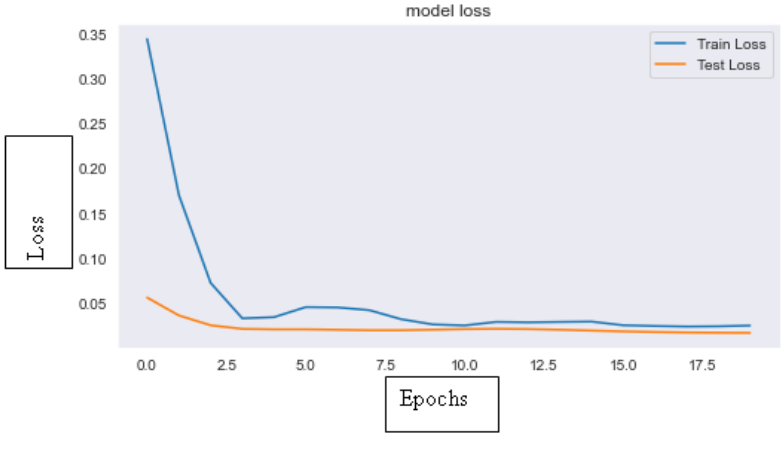
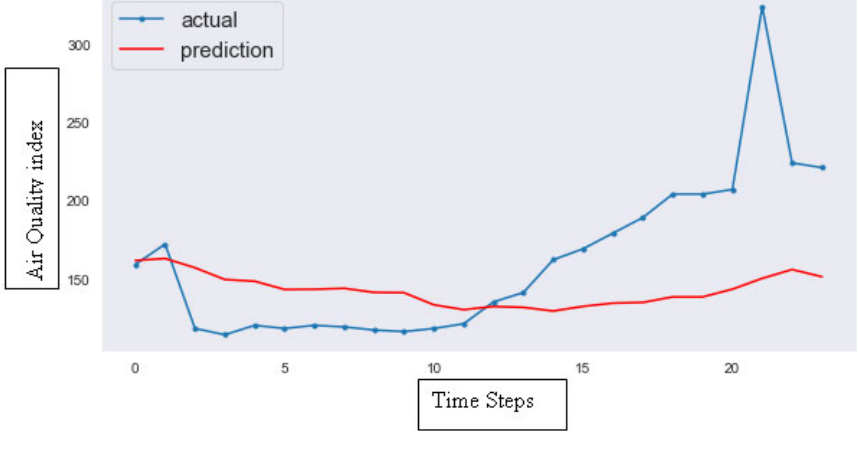


Figure 8 Visualisations for prediction vs. actual values of AQI with respect to various time steps (see online version for colours)



Please refer to Figures 6, 7 and 8 and they discuss the different aspect of output visualisations. Figure 6 explains the constituent layers of LSTM Model. Figure 7 discusses in detail the loss per epochs and Adam optimisation through graphical visualisations and Figure 8 defines visualisations for prediction vs. actual values of AQI w.r.t various time steps.

5 Recommendations

'Yagya and mantra' is not only beneficial for the health sector, it has a great power to revive our environment including air, water, land. Yagya and mantras are the sources of gaining cosmic energy. Yagya helps in raining, its ash is good fertiliser and it has the power to increase productivity. It not only works on productivity but quality as well. As all we know that poor quality of grain, i.e., due to chemicals are the main cause of diseases like diabetes, heart disease, kidney stone, kidney failure, skin disease, allergic disease and various else. In this changing world, with unique challenges that threaten the health and well-being of the population, Yagya is the definite solution. Yagya and mantra have lots of benefits, but some limitations also exist there. This process is not so convenient to follow daily practice of Yagya therapy.

6 Future research directions and limitations

'Yagya and mantra therapy' has the power to treat different lifestyle disorders like diabetes, heart disease, skin disease, asthma, etc. In the age of resistance of various types of microbial, established antibiotics are failing then Yagya and mantra therapy may be a good replacement. It is observed that fumes of herbal medicine with particular Yagya Samgri have an enthusiastic effect to reduce different kinds of bacteria, viruses, fungus and other microbes. It also relieves the symptoms of deadly disease like AIDS and cancer. Thus 'Yagya and mantra therapy' have a bright future in the field of healthcare. But there is a need to put some more efforts to establish in a scientific manner. A great problem which seems to conduct scientific study is managing the process of Yagya in an appropriate manner. Second problem is insufficient data due to the lack of interest of the science community and skilled faculties.

The team showed the future scope as the Yagya is applicable in all these fields. It has various aspects and also has a wider scope in all these fields in future (please refer to Figures 6, 7 and 8).

7 Novelty of our work

The easy approach and its vast benefits attract the young and old equally, for the old its painless treatment by adding the specific dried herbs (special Havan samagri) in a proportionate way and offering as oblations (Ahutis) with Gayatri Mantras that kindles the power within. This mantra has from time immemorial maintained its supremacy and unique features of sound energy and is able to ward off deadly diseases. The next we give oblations of MahaMrityunjay Mantras, which reduces the severity of our action's reaction.

The young generation loves this for all materials used in this is easily portable, can carry wherever we go, and most appealing part is it's time consumption. Hardly it takes 10 to 15 minutes to complete the whole process. Then sit and inhale the mild fumigations with sweet herbal fragrance that enters your respiratory system and reaches each and every cells. Feels completely stress free and energetic.

8 Concluding remarks

The above results, discussions and analysis presented is sufficient to reveal the fact that presented Yagyopathy is effective in curbing the pollution.

It has been clearly reflected in the visualisations that AQI parameters are reduced after the Yajna than the original and predicted value is also reflected less after this ceremony. It clearly validates the ancient Vedic sciences that AQI parameters are drastically reduced after the experiment and it can be considered as effective alternate therapy for the global problem of increasing pollution (please refer to Figures 6, 7 and 8).

Different epochs and Adam optimisation show that training and testing loss is least and rolling mean and rolling standard curve justify that pollution was curbed with this activity, but not by natural weather environment.

The outlook of our work as manifested here is that health is considered as ever functional, enthusiastic, energetic and productive way of life for self and the society. As normal human considers health as absence of ailments.

Technological aspect of Yagyopathy is its simpler form of Kund in which Yagyas performed with medicinal herbs in very small quantity. It's the subtler form that gives powerful impact on health and environment. Offering of medicinal herbs with Vedic mantras (the mystic syllable of sound energy) chanting produces the necessary changes in the mental plain of the doer in higher level. Change of thoughts is shift in reality through which they found creative path for business, study or endeavours in any aspects of life, move towards in righteous path, uplifting self and the society.

Sound energy can alter our mood and improve our general wellbeing. Yet the key to understanding mantra lies in the relationship between our physical selves and our spiritual physiology, which many teachers of metaphysics refer to as subtle body and this body inter penetrates our physical body.

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Annex

Key term and definitions

- *Healthcare:* all the activities whose primary purpose is to promote, restore or maintain health (The World Health Report 2000 – Health systems: improving performance).
- *Yajna:* Yajna literally means 'sacrifice, devotion, worship, offering', and refers in Hinduism to any ritual done in front of a sacred fire, often with mantras. Yajna has been a Vedic tradition, described in a layer of Vedic literature called Brahmanas, as well as Yajurveda. The tradition has evolved from offering oblations and libations into sacred fire to symbolic offerings in the presence of sacred fire (Agni).
- *Mantra:* a mantra is a sacred utterance, a numinous sound, a syllable, word or phonemes, or group of words in Sanskrit believed by practitioners to have psychological and/or spiritual powers. Some mantras have a syntactic structure and literal meaning, while others do not.
- *Jap:* Jap is the meditative repetition of a mantra or a divine name. It is a practice found in Hinduism, Jainism, Sikhism, Buddhism, and Shintoism. The mantra or name may be spoken softly, enough for the practitioner to hear it, or it may be spoken within the reciter's mind. Jap may be performed while sitting in a meditation posture, while performing other activities, or as part of formal worship in group settings.
- *Ayurveda:* Ayurveda system of medicine with historical roots in the Indian subcontinent. Globalised and modernised practices derived from Ayurveda traditions are a type of alternative medicine. In countries beyond India, Ayurvedic therapies and practices have been integrated in general wellness applications and in some cases in medical use. The main classical Ayurveda texts begin with accounts of the transmission of medical knowledge from the Gods to sages, and then to human physicians. In SushrutaSamhita (Sushruta's Compendium), Sushruta wrote that Dhanvantari, Hindu God of Ayurveda.
- *Vedic:* the Vedic period or Vedic age (c.1500 – c.500 BCE), is the period in the history of the northern Indian subcontinent between the end of the urban Indus Valley Civilisation and a second urbanisation which began in the central Indo-Gangetic Plain c. 600 BCE. It gets its name from the Vedas, which are liturgical texts containing details of life during this period that have been interpreted to be historical and constitute the primary sources for understanding the period. These documents, alongside the corresponding archaeological record, allow for the evolution of the Vedic culture to be traced and inferred.

- *Machine learning:* machine learning (ML) is the study of computer algorithms that improve automatically through experience. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as 'training data', in order to make predictions or decisions without being explicitly programmed to do so. Machine learning algorithms are used in a wide variety of applications, such as email filtering and computer vision, where it is difficult or infeasible to develop conventional algorithms to perform the needed tasks.
- *Sensor and IoT:* the internet of things (IoT) is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. Sensors are devices that detect and respond to changes in an environment. Inputs can come from a variety of sources such as light, temperature, motion and pressure. Sensors output valuable information and if they are connected to a network, they can share data with other connected devices and management systems. They are an integral part of the IoT. There are many types of IoT sensors and an even greater number of applications and use cases.

Dataset used

AQI index readings sample – similarly for different days, data readings was captured

13.11.20	Mango	16.11.20	Mango wood	18.11.20	Bargad wood
14.11.20	Mango	17.11.20	Mango wood	19.11.20	Bargad wood
15.11.20	Mango				

Havan: 6.30–6.50 am

Created date (Asia/Kolkata)	*AQI*	*PM2.5*	*PM10*	*CO_2*	*Temperature*	*Humidity*
13-11-20 0:00	340	173	271	697	23	51
13-11-20 0:30	343	176	274	664	23	50
13-11-20 1:00	344	178	276	626	23	49
13-11-20 1:30	347	182	280	593	23	49
13-11-20 2:00	350	186	285	590	23	48
13-11-20 2:30	351	187	286	596	23	48
13-11-20 3:00	356	193	290	588	23	48
13-11-20 3:30	360	199	295	578	23	48

AQI index readings sample – similarly for different days, data readings was captured (continued)

Created date (Asia/Kolkata)	*AQI*	*PM2.5*	*PM10*	*CO_2*	*Temperature*	*Humidity*
13-11-20 4:00	370	211	305	561	23	48
13-11-20 4:30	376	219	310	562	23	48
13-11-20 5:00	379	223	312	562	23	48
13-11-20 5:30	383	228	316	575	23	48
13-11-20 6:00	380	225	315	544	23	49
13-11-20 6:30	389	236	328	536	23	49
13-11-20 7:00	383	229	318	563	22	50
13-11-20 7:30	383	228	320	533	22	50
13-11-20 8:00	389	236	336	551	22	51
13-11-20 8:30	396	245	339	543	22	51
13-11-20 9:00	401	256	350	534	22	50
13-11-20 9:30	396	245	342	557	22	51
13-11-20 10:00	383	228	326	564	23	51