
Surveillance of ramification of alternate therapy and yoga on the health of employees' suffering with high BP and sugar: empirical study on the physical and mental fitness

Sheelu Sagar

Amity International Business School,
Amity University,
Noida, UP, India
Email: ssagar@amity.edu

Vikas Garg

Amity Business School,
Amity University,
Uttar Pradesh, Noida, UP, India
Email: vgarg@gn.amity.edu

Rohit Rastogi*

Department of CSE,
ABES Engineering College,
Ghaziabad, UP, India
Email: rohitrastogi.shantikunj@gmail.com
*Corresponding author

Abstract: This manuscript provides information associated with physiological, health benefits of yoga, pranayama and aerobic exercise. The yoga practice helps to control blood sugar level, helps to improve the cardio vascular functioning, systolic and diastolic blood pressure can be maintained at a normal level, digestive system works well, muscular strength can be gained and one gets rid of from muscular stiffness resulting in a state of happy mind with a flexible body. The investigation aims to examine physiological health of young employees with the benefits of yoga, pranayama, meditation and light aerobic exercise. The study was done on employees of PPS International engaged in manufacture of high tech equipment's for Indian railway and metro trains situated at Greater Noida (UP) India. Founder and promoter of PPS International gave his permission for practical investigation the employees of his company for this research study. The researcher randomly selected 120 subjects with age group of 40-50 years. On the recorded data, computational analysis was done to establish the result.

Keywords: yoga; health; meditation; blood sugar; blood pressure; employees.

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Biographical notes: Sheelu Sagar is a research scholar pursuing her PhD in Management from Amity University (AUUP). She graduated with a Bachelor degree of Science from Delhi University. She received her Post Graduate degree in Master of Business Administration with distinction from Amity University Uttar Pradesh India in 2019. She is working at a post of Assistant Controller of Examinations, Amity University, Uttar Pradesh. She is associated with various NGOs in India. She is an Active member of Gayatri Teerth, ShantiKunj, Haridwar, Trustee – ChaturdhamVedBhawanNyas (having various centres all over India), Member Executive Body – Shree JeeGauSadan, Noida. She is a social worker and has been performing Yagya since last 35 years and working for revival of Indian Cultural Heritage through yagna (Hawan), meditation through Gayatri Mantra and Pranayama. She is doing her research on Gayatri Mantra.

Vikas Garg is the Director of Executive Programs Management at Amity University Uttar Pradesh India, Greater Noida Campus. He is an UGC NET qualified with 15+ years of academic experience. His areas of specialisation are accounting and finance. He has major interest in Financial Markets, Financial Reporting and Analysis. He is a Lifetime Member of Indian Commerce Association, Indian Accounting Association, and Indian Management Association. He is certified in Customer Relationship Management from IIM, Bangalore. He has published numerous research papers in various Scopus and ABDC indexed international and national journals. He has many books, copyrights and patents to his credit. He has organised many national and international conferences. He is associated with several universities as an external guide for research conducted many workshops in institutions of repute.

Rohit Rastogi received his BE from C.S.S. University, Meerut in 2003. He has a Masters degree in CS of NITTTR-Chandigarh from Punjab University. He obtained his Doctoral degree from the Dayalbagh Educational Institute in Agra, India. He is an Associate Professor in the CSE Department of ABES Engineering College, Ghaziabad, India. He has won awards in a several of areas, including improved education, significant contributions, human value promotion, and long-term service. He keeps himself engaged in various competition events, activities, webinars, seminars, workshops, projects and various other educational learning forums.

1 Introduction

An individual spends maximum number of hours in a day at his/her workplace therefore it is essential to maintain balance between work lifestyle and health for enhancing efficiency at work place (Tiwari, 2014). In recent times it is seen that there is major change in role of HR. The top management are focusing and implementing wellness programs like yoga to help employees enjoy their work as well as keep their physical and mental health fit, this is one of the best practices of corporate strategies (Osterman, 2000). Most of the organisations are implementing various procedures so that their

employees remain in good health and enjoy doing their work with a positive approach, zeal and enthusiasm (Edem et al., 2017). It may be correctly stated that HR and corporate strategies are better aligned with each other. In an age of globalisation, technical progress and intense competition, development of HR strategic welfare practice in an organisations can play an important role to gain an edge over their competitors (Coleridge and Cooper, 2014).

Yoga is a powerful tool for human resource development and it acts as a catalyst for achieving an optimum level of mental and physical health leading to an optimal experience and excellence in operations, which is an essential ingredient for bringing out the best in an individual (Adhia et al., 2010). Meditation ensures alertness in every activity with particular reference to operations. It has been possible to achieve an unparalleled performance level with dedication and commitment among all employees' and they are rightly proud of their achievements. A sound mind in a sound body is the sine qua non for such an attitude (Karimi et al., 2019).

Maharishi Patanjali one of the seven most reverend rishis/sages of India is the founder of *Yoga Philosophy and Practices*. More than 4,000 years ago Maharishi Patanjali explained how keep our physical body, physiological functions of organs and mental health in perfect condition and live happily for more than 100 years of age in the classic text known as 'Patanjali Yoga Sutras', popularly acknowledged globally as the authoritative text on yoga (Vivekananda, 2015).

The employees' who engage themselves in yoga practice are reported to show better performance at work and are at least stress level. Such employees' enjoy good health and experience other benefits like normal blood pressure, increased in vitality, clarity in thinking, relaxed feeling in action and are balanced decision makers (Bhandari et al., 2010).

1.1 Meditation for satisfying results

From Latin word meditary, meditation is derived which means to review one-self, word meditation also comes from Greek and Latin root with meaning medicine. The other researchers have described meditation as a distinct state of thoughtful mindfulness (Manocha, 2000).

Walsh and Shapiro (2006) has defined meditation as cognitive and psychological perspective to voluntary control self-regulation practices and thought processes by focusing attention on any one word like OM.

Meditation techniques are tools that are gateway for highest stage of consciousness experiencing deep sense of sleep (samadhi) while mind is awake (Georg, 2008).

Meditation is the supreme form of yoga, it is essential for mental hygiene, meditation stimulates concentration of mind, clarity of thoughts, peaceful mind and self-reflection, energises the physical body (Hussain, 2010).

As per Goleman (1978), there may be many forms of meditation however four popular categories of meditation practices globally identified are:

- a mantra meditation (chanting of Vedic mantra like OM, Gayatri mantra, etc., relaxation of mental and physical response)
- b mindfulness meditation (comprising vipassana, Zen Buddhist meditation, mindfulness-based stress reduction, and mindfulness-based cognitive therapy)

- c yoga (Indian yogic tradition developed by Maharishi Patanjali done with body postures, breath control and meditation)
- d Tai Chi (Chinese martial art done with various slow rhythmic movements that emphasise force and complete relaxation. It has been also known as meditation in motion.

1.2 Om mantra and chanting techniques

Om has been considered as a cosmic sound. Aum has three letters A, U and M an has been considered to be the first letter of the universe. Now the science is proving that the origination of universe and matter has been done by sound and that is the first syllable group Aum. NASA has also recorded the sound of sun which was very much resembling to Aum. Now, Aum is the first essential reflection and start section of every mantra of scriptures and Indian Vedic literature. It has been widely accepted in different variations almost in all the religions and beliefs of the world as prayer. The normal repetition of Aum with deep breathing has been found very much impactful in the cure of anxiety, depression, tension and sleeplessness. Its advised by yoga scientists and doctors of mental fitness to subjects suffering for indecisive disorder and suicidal tendencies (Vivekananda, 2015; Harme et al., 2019).

2 Literature review

Gopinath and his team conducted study on physical activity and successful aging. The analysis was done on adults of 49+ years who were not the patients of blood sugar, cancer or coronary artery disease for over ten years. The information was gathered from the participants through interviewer-administered questionnaire on the performance of yoga exercise and walking fast or moderate. The team authors further determined the total metabolic equivalents (METs) minutes of activity per week. The result showed absence of: symptoms of depression, disability, cognitive impairment, respiratory symptoms and systemic conditions (e.g., cancer, coronary artery disease). 15.7% participants out of 249 candidates with mean age (59.9) were recorded for maintaining sound health as they were performing Yog and walk exercises. For maintaining sound health, yoga and walking exercise are the best techniques. Physiological organ disorders results in high blood sugar and abnormal blood pressure in human body. This arises due to lack of physical exercise (Gopinath et al., 2018; Raghuwanshi et al., 2016).

Yoga is being practiced in India since ancient times. With the help of yogic techniques mind and body can be controlled and helps the practitioners' to achieve higher degree of self-realisation by change in diet and mental attitude. In order to promote holistically; healthy employees' well-designed corporate yoga is necessary for performance management system hence directing focus for attainment of goals and objectives of the organisation (Uggerud, 2017).

Rath carried research study 31 subjects of similar age, height and weight, to assess blood pressure and pulmonary function through Bikram yoga. No difference was found ($P > 0.05$) were found between group of resting blood pressure and peak VO₂ (Rath, 2016).

To control hypertension is a major global challenge today. According to behavioural approach blood pressure level is directly proportional to stress level, and is inversely proportional to exercise and healthy dietary habits. Yoga plays a beneficial effect in reducing blood pressure. Dhungana and team did investigation study on 140 hypertensive participants from seven districts of Aayurved health centres in Nepal. It was a randomised, two-armed, non-blinded, pragmatic trial. The intervention consisted of five days of yoga training, health education session on healthy lifestyles and self-practices of yoga daily. The researchers found significant decrease in systolic diastolic blood pressure (Dhungana et al., 2018).

In a study on beneficial effects of yoga on blood glucose levels in normal and T2DM volunteers it was found by Chimkode and all other researchers that there was reduction in the mean values of fasting blood sugar (FBS) and post-prandial blood sugar (PPBS) after six months. It was highly significant ($p < 0.001$) in both the groups when comparison was done with the mean values before and during (three months) yoga practice. This was highly significant in T2DM group when compared with mean values before yoga ($p < 0.001$), but it was insignificant ($p < 0.05$) in control group. The results of study showed that yoga is very effective in reducing the blood glucose levels in patients with T2DM (Chimkode et al., 2015).

Experiments results on stress and tension type disorders done by Rastogi shows that the mental health or stress level is directly related to biofeedback alternate therapies. Biofeedback is a process is to reduce stress and tension type disorders by self-control (Rastogi et al., 2018).

According to Verma et al. (2017), hath yoga practice plays an important role in the enhancement of positive general wellbeing in the adults.

The effects of yoga interventions are beneficial on various components of mental and physical health, however yoga intervention programs requires an active participation of the individuals. It is seen in many life style diseases, that patients must change attitudes and behaviour in order to successfully treat these diseases (Büssing et al., 2012).

According to Jayasinghe (2004), it is safe to suggest yoga as a beneficial supportive adjunct treatment in the primary and secondary prevention of cardiovascular disease.

According to Ved Murti Pt. Sri Ram Sharma Acharya (1995), author of Gayatri Maha Vigyan states that ancient Vedic therapies like pranayama helps to improve physical and mental health condition of an individual to a great extent.

The present research has been planned to evaluate if century age old yoga practice can improve the functioning psychological organs of working professionals irrespective of gender and age.

3 Study structure and methodology

3.1 Objectives

- 1 To find out the impact of yogic exercise on selected physiological variables.
- 2 To study the effect of yogic exercise in controlling blood pressure level of diabetes patients.

3.2 *Hypothesis*

It was hypothesised that:

- a There would be no significant difference in the mean of selected yogic exercise on selected physiological variables.
- b There exists no significant effect of yogic exercise in controlling blood sugar level of diabetes patients.

3.3 *Subject selection and registration*

This investigation aims at fitness program with light aerobic exercise, yoga and meditation on two physiological health related variables on working young employees all males during COVID-19 pandemic situation.

For this study employees of private sector company PPS International at Greater Noida (UP) India were selected. Most of the subjects selected were mechanical and electrical engineers engaged in manufacturing of high tech equipment's for Indian railway and metro trains.

- a Researchers randomly formed two investigational groups:
 - group A 40 subject's age group of 40 to 50 years for testing fitness with light aerobic exercise
 - group B 40 subject's age group of 40 to 50 years for testing fitness with yoga and meditation
 - group C controlled group did not participate in any fitness program.
- b Training was given for light aerobic exercise, yoga pranayama and meditation.
- c Duration for investigation was six days/week for four weeks during December 2020.
- d For the study pre and post test was done on all subjects.
- e The scores were collected with the help of three assistants in the presence of researcher.

3.4 *Selection of variables*

According to the literature survey, researchers' individual understanding and advice of guides following physiological, related variables were selected.

- a blood sugar
- b systolic BP
- c diastolic BP.

3.5 *Measurement of variables*

For measurement and assessment of physiological variables following criterion were selected.

Table 1 Criterion for measurement of variables

<i>Physiological variables group A age 30–40 years</i>		
<i>Variable</i>	<i>Measuring instrument</i>	<i>Units</i>
Blood sugar	Glucometer gluco one Dr. More Pen	Mg dl
Systolic BP	Sphygmomanometer	mm Hg
Diastolic BP	Dr. More Pen Bp02 automatic blood pressure monitor	

Measuring instruments to measure the blood sugar and blood pressure with units are denoted (as per Table 1).

3.6 Statistical techniques

To study and investigate the effect of Yoga and light aerobic exercise as fitness program on selected physiological health related variables descriptive statistics (mean, SD and range) were taken, for analysis of variance ANOVA was used, for analysis of co-variance (ANCOVA) was used at 0.05 level of significance. For comparison of adjusted mean score of experimental group and controlled group with least significant difference post hoc test was used if F-value was found significant in ANCOVA.

3.7 Protocol for yoga

The intervention schedule was designed for one month six days a week. The module for each day was in practical form ranging from 45 minutes to one hour from 4:00 PM to 5:00 PM at least three hours after lunch.

3.8 Yogic exercise program

Brief module for yoga asana, pranayama and meditation for maximum time period of one hour is given (as per Table 2).

Table 2 Yoga intervention module

<i>Title</i>	<i>Activity</i>	<i>Time</i>
Prayer	Chanting of Gayatri mantra	2 minutes
Warm up/chalan kriya	Movement of neck, shoulders waist and knee	6 minutes
Yoga posture/yoga asana		20 minutes
Standing posture	Tarasan, vrkshasana, padhastasana, ardha – chakrasana, trikonnasanna	
Sitting posture	Bhadrasana, vajrasana, ardha-ushtraasana, shashaasana, uttanamandukasana, vajrasana	
Prone lying posture	Makarasana bhujangasana, salabhasana	
Spine lying posture	Setubandhasana, uttanapadasana, ardhahalasana, pavanmukasana, savasana	
Pranayama		8–10 minutes
Kapal bharti	Fast inhale and exhale exercise	3–5 minutes

Table 2 Yoga intervention module (continued)

<i>Title</i>	<i>Activity</i>	<i>Time</i>
Anuloma viloma pranayama	Three times	
Sheetali pranyama	Two times	
Bhrahmari pranayam	Two times	
Bhastrika pranayama	Two times	
Meditation/dhayana		8–10 minutes
Shanti paatha		2 minutes

4 Results and discussion

4.1 Blood sugar experiments

Insulin is a hormone produced by pancreas islet cells present in liver; insulin controls the glucose level in bloodstream and stores excess glucose in liver. Insulin regulates metabolism of carbohydrates, fats, and proteins. When pancreatic islet cells stop producing insulin in required quantity, the blood glucose level rises, showing symptoms of hyperglycaemia known as diabetes. This disorder may occur abruptly at any age or may develop in a gradual process by increasing age as per hereditary history.

In group B out of 40 normal employees there were six diabetic patients identified. These patients were undergoing allopathic treatment for diabetes for past few months but the disorder still persisted. For this experiment, yoga as intervention therapy for achievement of holistic health was used.

Figure 1 Graphical representation before and after yoga intervention on random blood sugar fasting (see online version for colours)

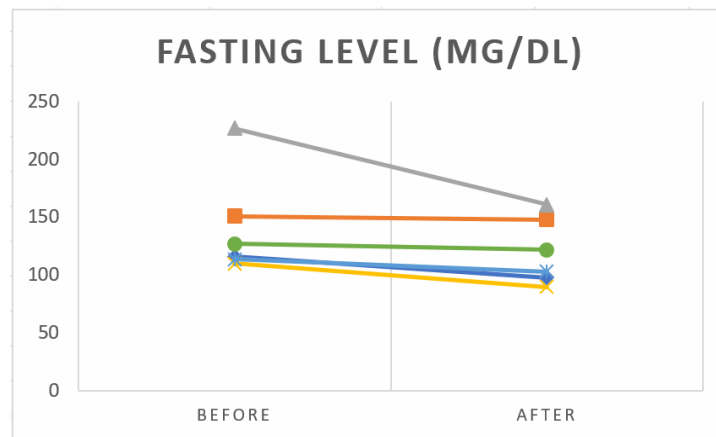


Table 3 Pre and post intervention of yoga blood sugar and body weight readings

Subjects	Random fasting level (mg/dl)		Difference	PP level (mg/dl)		Difference	HbA1C level (mmol/mol)		Difference	Regularity in therapy	Attendance in 25 sessions	Body weight before	Body weight after
	Before	After		Before	After		Before	After					
1	116	98	18	193	147	46	7.5	5	0.4	Regular	25	65	60
2	151	148	3	211	150	61	7	5	0.4	Regular	25	66	60
3	227	161	66	303	160	143	8	5.5	0.3	Regular	25	89	80
4	110	90	20	193	160	33	7	6	0.2	Regular	25	73	68
5	114	103	11	219	154	65	7	6	0.1	Regular	25	79	70
6	127	122	5	294	170	124	8.1	6.5	0.1	Regular	25	80	75

Before the intervention of yoga, random blood sugar fasting shows above normal range ($\leq 100-120$ mg/dl) whereas after the yoga intervention the random sugar fasting was lowered (as per Table 3). PPBS after the intervention of yoga lowered normal range is $\leq 120-140$ mg/dl with difference from 23 mg/dl to 30 mg/dl. Bodyweight reduced by 5 Kgs. HbA1c reading was relatively lowered.

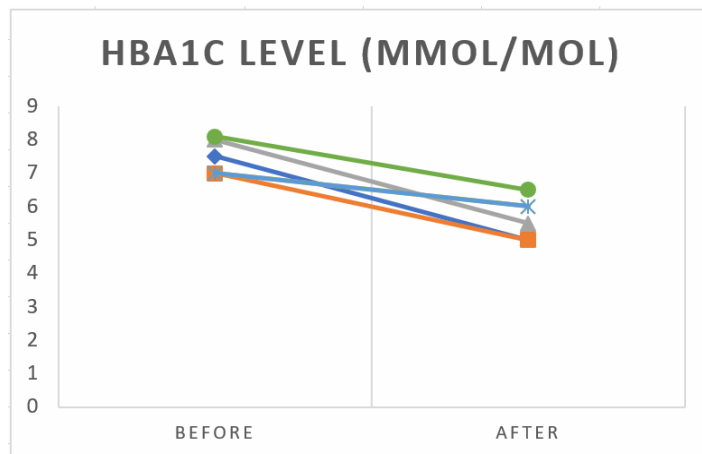
Before the intervention of yoga, random blood sugar fasting shows above normal range ($\leq 100-120$ mg/dl) whereas after the yoga intervention the random sugar fasting relatively lowered (as per Figure 1).

PPBS after the intervention of yoga relatively lowered normal range is $\leq 140-150$ mg/dl (as per Figure 2).

Figure 2 Graphical representation before and after yoga intervention on PPBS (see online version for colours)



Figure 3 Graphical representation before and after yoga intervention on HbA1c (see online version for colours)



HbA1c after the intervention of yoga was relatively lowered normal range is 7 mmol/L (as per Figure 3).

In the USA, the HbA1c levels are expressed in percentage of the diabetes control and complications trial units (as per Table 4).

European countries Australia and Asian countries HbA1c levels is expressed in as mill moles per mole, as recommended by International Federation of Clinical Chemistry (IFCC) (Sherwani et al., 2016).

Table 4 HbA1c as an indicator of diabetes control (see online version for colours)

BLOOD GLUCOSE		STATUS	HbA1c	
mmol/L	mg/dL		%	mmol/mol
5.4	97	Normal	5	31
7	126		6	42
8.6	155	Pre-diabetes	7	53
10.2	184	Diabetes	8	64
11.8	212	Diabetes	9	75
13.4	241		10	86
14.9	268	Diabetes	11	97
16.5	297		12	108

Note: HbA1c as an indicator of diabetes control.

4.1.1 Result

Yoga intervention showed encouraging results showed that for subject 3 random fasting differences was 66 which was highest and for subject 3 PP difference was 143 this was highest among all the participant. Subject 2 random fasting differences were three recorded lowest. All subject HbA1c reduced from diabetic to normal. By regularly doing yoga the blood sugar level as well as body weight is reduces significantly.

4.2 Blood pressure (systolic and diastolic)

The blood pressure was measured using sphygmomanometer an instrument, typically consisting of an inflatable rubber cuff which is applied to the arm and connected to a column of mercury next to a graduated scale, enabling the determination of systolic and diastolic blood pressure by increasing and gradually releasing the pressure in the cuff.

Figure 4 Sphygmomanometer automatic blood pressure monitor (see online version for colours)



Reading was taken on sphygmomanometer twice; second reading was recorded as the score of the variable (as per Figure 4). The units of the reading were in millimetres of mercury (mm Hg). Pre and post-test on yoga exercise and light aerobic exercise was done before the measurement for blood pressure (systolic and diastolic).

Table 5 Descriptive statistics of pre-test and post-test in systolic BP for experimental group A&B and controlled group C

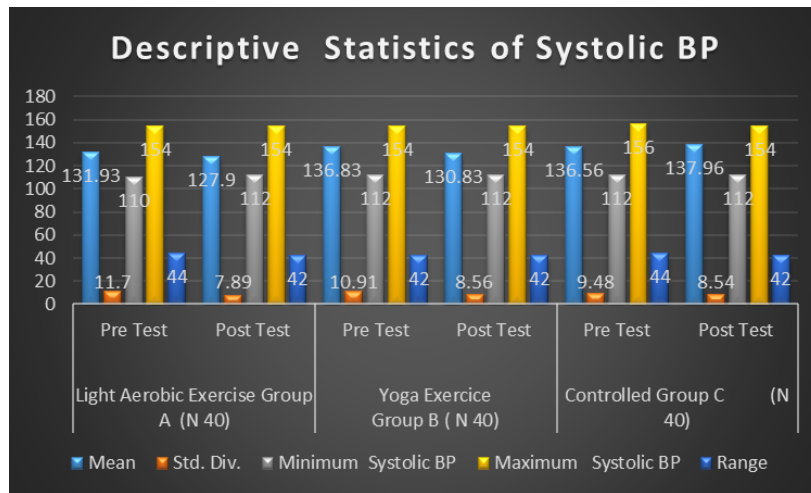
Group	Test	Mean	Std. div.	Minimum systolic BP	Maximum systolic BP	Range
Light aerobic exercise group A (N 40)	Pre test	131.93	11.7	110	154	44
	Post test	127.9	7.89	112	154	42
Yoga exercise group B (N 40)	Pre test	136.83	10.91	112	154	42
	Post test	130.83	8.56	112	154	42
Controlled group C (N 40)	Pre test	136.56	9.48	112	156	44
	Post test	137.96	8.54	112	154	42

For systolic blood pressure, shows that group A (with light aerobic exercises) pre mean score is 131.93 and std. div. 11.7 which is lowest (as per Table 5).

In group B (yoga intervention) pre mean score is 136.83 highest and standard deviations 10.91 among three groups.

Post mean score of 127.90 and standard deviation 7.89 was recorded lowest in group A whereas for group C post mean score was recorded as 137.96 and standard deviation 8.54 which was lowest in controlled group among all three groups.

Figure 5 Graphical representation of descriptive statistics of pre-test and post-test in systolic blood pressure (see online version for colours)



For systolic blood pressure, shows that group A (with light aerobic exercise) pre mean score is 131.93 and std. div. 11.7 which is lowest (as per Figure 5).

In group B (yoga intervention) pre mean score is 136.83 highest and standard deviations 10.91 among three groups.

Post mean score of 127.90 and standard deviation 7.89 was recorded lowest in group A whereas for group C post mean score was recorded as 137.96 and standard deviation 8.54 which was lowest in controlled group among all three groups.

Table 6 Descriptive statistics of pre-test and post-test in diastolic BP for experimental group A and B and controlled group C

Group	Test	Mean	Std. div.	Minimum diastolic BP	Maximum diastolic BP	Range
Light aerobic exercise group A (N 40)	Pre test	91.5	8.33	79	112	33
	Post test	86.3	5.77	76	102	26
Yoga exercise group B (N 40)	Pre test	95.86	9.93	70	115	45
	Post test	89.2	6.17	75	105	30
Controlled group C (N 40)	Pre test	90.23	8.29	78	108	30
	Post test	91.93	6.16	80	106	26

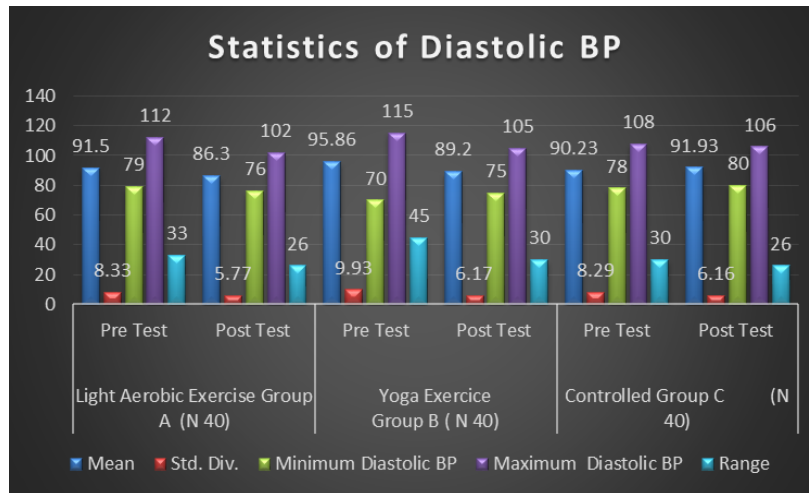
As per Table 6 shows that group B (yoga intervention) pre mean score is 95.86 with standard deviations 9.93 is highest.

In group C (controlled group) pre mean score is 90.23 standard deviation 8.29 is lowest for diastolic blood pressure among all groups.

Post mean score 91.93 with standard deviation 6.16 is highest in group C.

Post mean score 86.30 with standard deviation 5.77 is lowest in group A.

Figure 6 Graphical representation of descriptive statistics of pre-test and post-test in diastolic blood pressure (see online version for colours)



As per Figure 6 shows that group B (yoga intervention) pre mean score is 95.86 with standard deviation 9.93 is highest.

In group C (controlled group) pre mean score is 90.23 standard deviations 8.29 is lowest for diastolic blood pressure among all groups.

Post mean score 91.93 with standard deviation 6.16 is highest in group C.

Post mean score 86.30 with standard deviation 5.77 is lowest in group A.

4.2.1 Result analysis

Shows that group B (yoga intervention) pre mean score is 95.86 and standard deviation 9.93 which is highest where as in group C (controlled group) was found to have lowest (90.23 mean and 8.29 std. deviation) diastolic blood pressure among all groups.

5 Novelties

In the COVID-19 era, where human race has also entered the era of hope and transformation. The whole world attention has focused towards promotion of sound health. People are motivated to adopt a healthy lifestyle and build an environment for healthy living (Pandya, 2001).

In this paper, author team has tried to check the fitness of young working engineering professionals and effect of yoga practices on human health as its major novelty.

Figure 7 Yoga and meditation training given to the employees by the researcher (see online version for colours)



Researcher and author gave training to the employees, as the mental wellbeing of an individual depends on his/her physical fitness, thoughts, behaviour, emotions hence the employees were motivated to adopt healthy food habit, to do light aerobic exercise for ten minutes every day to control their body weight, and practice yoga for happy and healthy life ahead (as per Figure 7).

6 Recommendations

Mahatma Gandhiji's famous quotation is worth mentioning here, "wealth without health; pleasure without conscience; knowledge without character; commerce without morality;

science without humanity; religion without sacrifice; and politics without principle will lead to sinful acts disturbing peace and happiness.”

It is recommended that similar type of study may be done on female employees’ with larger number of different variables.

It is also directed that such investigation may be done on post retired persons to keep them happy and healthy.

It is also recommended to introduce fitness program like light aerobic exercise, yoga, pranayama or meditation under employees’ welfare activity in the HR department of all private and government sector companies to maintain balance between stressful job and happy healthy life style.

7 Future research directions and limitations

This research has been undertaken to study fitness program of young employees with practice of yoga asanas, meditation, pranayama, yet the result of blood sugar and blood pressure seems less conclusive hence it is recommended that future design can be of more stronger interventional research design.

At the initial research design stage it was not determined that which posture of yoga, pranayama or light aerobic exercise will be effective to control blood pressure or blood sugar it was done as holistic health approach. For future research selection of yogic postures can be more specific and data enumerators may be well trained well or be a medical person.

8 Conclusions

In view of the result obtained following conclusion are drawn from the experiment:

- as a fitness program yoga and light aerobic exercise both are very beneficial for a healthy life
- significant increase in systolic and diastolic blood pressure was seen as a result of yoga and aerobic exercise
- significant reduction of blood sugar level and body weight was observed as the experimental intervention of yoga and aerobic exercise
- all the subjects were much more cheerful after the yoga intervention.

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Appendix

Practical training for yoga and meditation given by the researcher (pl. refer Figure A1 to Figure A9).

Figure A1 Practical training for yoga and meditation given by the researcher (see online version for colours)



Figure A2 Postures of yoga asana set-1, (a) *tadasatia* (b) *konasana* (sideways bending) (see online version for colours)



Figure A3 Postures of yoga asana set-2, (a) *paschimkmasana* (bending forward) (b) *ardha haksana* (c) *yogamudta* (d) *bhujangasana* (cobra pose) (see online version for colours)

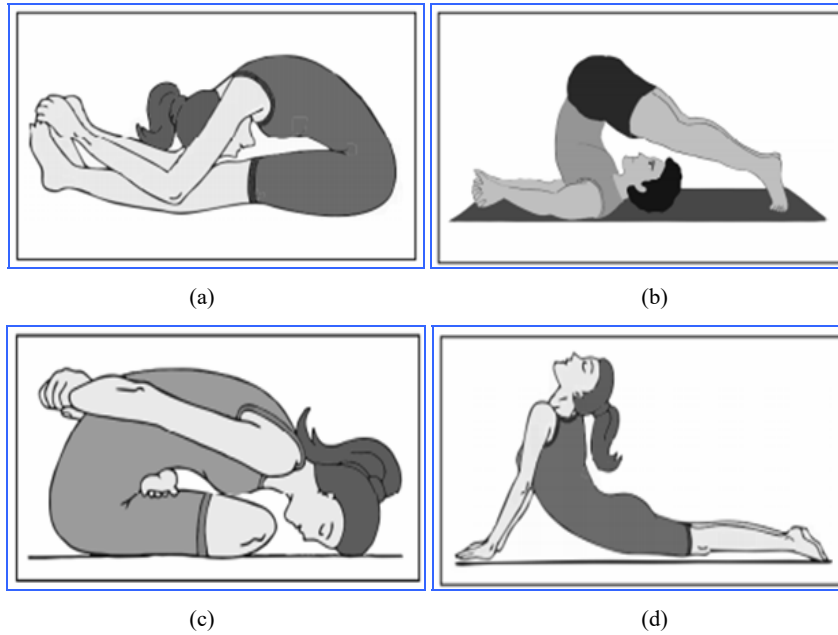


Figure A4 Vajrsana (see online version for colours)



Figure A5 Tadasana (see online version for colours)



Figure A6 Vrikshasana (see online version for colours)

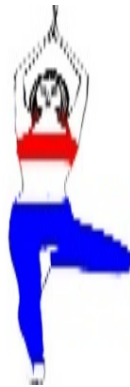


Figure A7 Padhastasana (see online version for colours)

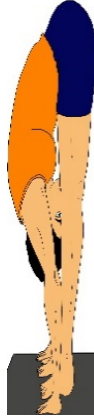


Figure A8 Ardha chakrasana (see online version for colours)



Figure A9 Trikonasana (see online version for colours)



Key terms and definitions

Yoga

Yog is much more old and scientific. In very simple words, giving care to your body, mind and breath is yoga. Derived from the Sanskrit word 'yuj' which means 'to unite or integrate', yoga is a 5,000-year-old Indian body of knowledge. Yoga is all about harmonising the body with the mind and breath through the means of various breathing exercises, yoga poses (asanas) and meditation.

Mantra

A mantra (Sanskrit: मन्त्र, romanised: mantra, English pronunciation/'mæntɹə, 'mɑ:n-, 'mʌn-/) is a sacred utterance, a numinous sound, a syllable, word or phonemes, or group of words in Sanskrit believed by practitioners to have religious, magical or spiritual powers in Hinduism. Some mantras have a syntactic structure and literal meaning, while others do not. The earliest mantras were composed in Vedic Sanskrit in India, and are at least 3,500 years old. Mantras now exist in various schools of Hinduism, Buddhism, Jainism and Sikhism. In Japanese Shingon tradition, the word Shingon means mantra. Similar hymns, antiphons, chants, compositions, and concepts are found in Zoroastrianism, Taoism, Christianity, and elsewhere.

Fitness

Maintaining a good level of physical fitness is something that we should all aspire to do. But it can be difficult to determine what fitness entails. According to the United States Department of Health and Human Services, physical fitness is defined as "a set of attributes that people have or achieve that relates to the ability to perform physical activity."

Maintaining physical fitness can help prevent some diseases. With exercise, body composition can change without changing weight. Athletes' hearts show different changes dependent on their chosen sport. Muscle strength increases by fibre hypertrophy and neural changes. Stretching to increase flexibility can ease a number of medical complaints.

Physical health

Definition

Physical fitness is one's ability to execute daily activities with optimal performance, endurance, and strength with the management of disease, fatigue, and stress and reduced sedentary behaviour.

Description

Physical fitness has multiple components and is conceptualised as either performance- or health-related. The specificity of performance-related fitness regarding one's athletic skill best relates to an individual's athletic performance. Conversely, health-related fitness is generalised to health status and is affected positively or negatively by one's habitual

physical activity habits. Given the complexity of physical fitness and the epidemiological analysis taken presently, health-related fitness will be the focus of this discussion. There are five major components of health-related fitness: morphological, muscular, motor, cardio respiratory and metabolic (see below), with muscular.

- *Quality of life*: WHO defines quality of life as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.

Quality of life, the degree to which an individual is healthy, comfortable, and able to participate in or enjoy life events. The term quality of life is inherently ambiguous, as it can refer both to the experience an individual has of his or her own life and to the living conditions in which individuals find themselves. Hence, quality of life is highly subjective. Whereas one person may define quality of life according to wealth or satisfaction with life, another person may define it in terms of capabilities (e.g., having the ability to live a good life in terms of emotional and physical well-being). A disabled person may report a high quality of life, whereas a healthy person who recently lost a job may report a low quality of life. Within the arena of healthcare, quality of life is viewed as multidimensional, encompassing emotional, physical, material, and social well-being.

- *WHO-QoL-questionnaire*: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3395923/#:~:text=The%20WHOQOL%20DBREF%20is%20a,QOL%20and%20general%20health%20items.>