

Chapter 18

Impact of Surya Namaskar Yog on QoL of Employees: An Empirical Study Following Industry 5.0 Standards

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ABSTRACT

In industry 5.0, which practices, skills, or traits of employees matter most for stress-free life? Does the observability of these features affect appropriately companies' progress? Poor quality of life (QoL) is caused by high cholesterol, hypo- and hyperthyroidism, hypertension, obesity, diabetes, and other conditions. The beginning of lifestyle illnesses is linked to a sedentary lifestyle and stress. The aim of this study was to analyse the impact of Surya Namaskar Yog on the QoL of industrial employees. Surya namaskar yog works as the smart therapeutic potential and acts as an alternate therapy. The research method used in this research is a quantitative-experimental method to determine whether survey or experiment results are significant, ANOVA test was performed. The measure for quality of life as prescribed by WHO in "WHOQoL-BREF" has been chosen as the QoL indicator in this study. This scale has been used in numerous other studies also, however none of researchers have applied it to the industry 5.0 for industrial workers.

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INTRODUCTION

Yoga is a great anti-stress remedy in the present times. One of the oldest known techniques for achieving a state of ‘flow’ is the various yoga disciplines developed in India about 1,500 years ago. Fads in exercise and modes of stress relief come and go, but yoga remains a rock of stability - more popular today than it has been in the 4,000 years of its existence (Sharma, S. K., et al., 2022) Here is an ancient system that seems to be just the right medicine for stressed-out modern people in the last decade of the twentieth century. If any of man’s philosophies and practices have stood the test of time, it is yoga. Yoga is, without a doubt, the oldest form of personal development in existence. Writes Ronald Hutchinson, founder of the magazine, *Yoga, and Health: Yoga works* (Sagar, S., et al., 2022).. Nothing which did not work could survive for so long. Its continual evolution makes it unlike religions, which tend to become fossilized around the sayings of their founders. Millions around the globe are regular practitioners of yoga which, indeed, seems flexible enough to meet a variety of needs of a variety of people. It has found abode even in the present-day corporate boardrooms. There is probably no system of physical exercise that can tone muscles and enhance flexibility with less pain, strain, and danger of serious injury. There is probably no safer way to relax and calm the mind than yogic breathing and meditation (*So-ham Ramban Kriya*) . Yoga teacher (Sharma, A. P. S., 2007) writes for those who choose to go beyond the health benefits and calming effects of yoga, “Divested of superstitions and myths, yoga contains absolutely nothing that can be abhorrent to any faith or creed.” Yoga, properly speaking, is a supplement to religion and has always been treated as such in India.”

Since ancient times, Sadhus, Yogis have advocated for the practise of Surya Namaskar because it provides a holistic way of life that includes numerous health and mental benefits as well as a state of good lifestyle for physical health, social health, mental health, and spiritual life that is in harmony with nature. “*Surya*” means Sun, and “*Namaskar*” means to salute. It is a yogic exercise to bend down before the mighty Sun (Mullerpatan, R. P., et al., 2020). With this new dimension of thought, the ancient Indians lived up to spiritual traditions and attributed the secret of “*Jivem Shardha Shatam*”. According to spiritual traditions, “*Jivem Shardha Shatam*” refers to living a hundred years of a vibrant, healthy, joyful, and creative existence (Sharma, A., 2020).

Definition of Yoga

Yoga, according to Maharishi Patanjali, is described as *Yog: chitvriti nirodha* (Yoga Sutra 1:2). It is a technique for calming the mind in order to return to the original condition. It is, also known as “*Yog Karmasu Kaushalam*” in Sanskrit, which means to acquire a special ability that teaches the mind to seek its finer condition. Yoga is a talent in use, a method or technique, and a quest for the pinnacle of perfection, according to Saraswati, Swami Satyananda. It is defined as the cheerful mental state that is marked by stability. Practise of *Yog asana* unifies the personality by fostering the body-mind synchronisation that is necessary for producing flawless work. In the holy ancient Book ‘*Gita*’ yoga has been portrayed as the power of creation:

As a result, yoga is defined as:

- a powerful technique for elevating oneself through mind stillness and reaching a higher, subtler level.
- seen as a creative discipline in man and reality itself.

The following characteristics of the yoga way of life and society have been prescribed by Hatha Yoga Pradipika.

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The body thins out, the face glows with delight, the Godly appearance shows on healthy body with shinning eyes, appetite increases sexual and excretion suppresses. The ‘Naris’ (pulse purification) get purified then on can say that Hatha Yoga is becoming success.

Yoga is now at the forefront of the West, proving its important role in have comfortable lifestyle free from ailment, harmonious environment and growth in humanity, and by itself can create an ideal society (Sagar, S., et al., 2023). The world community has to learn to eschew wars and ensure social harmony and realize the full potential of mankind. Extensive scientific research in India and abroad has proved beyond any shadow of a doubt that yoga is an effective tool in combating the modern stressful life characterized by psychosomatic and psychiatric problems (Deshmukh, D. S. K. 2021).

Advantages of Yoga Practice

External: gaining control of the mind as a consequence; correcting and improving bodily posture; enhancing the digestive system; improving the respiratory and circulatory systems.

Internal: Interpersonal interactions get better, and judgement and decision-making skills are better. There is an increase in concentration and a relaxing of the mind and thoughts. Freedom from anxiety and dread, as well as freedom from negative thoughts.

Yoga encourages mind-body balance, which improves one’s health, happiness, agreeable nature, and sense of fulfilment in life. Yoga is divided into eight steps, which is why it is also known as Ashtanga Yoga in *Sanskrit* (Sagar,S., et al., 2022). There are 8 stages to *Ashtanga yoga: Yam, Niyamas, Asanas, Pranayama, Pratyahara, Dhaarna, Dhyana and Samadhi*. These are more commonly known as physical body postures, mind and breathing techniques, Pratyahara (control over own desires) meditation (control over mind) .The Yam or the Universal Ethical Principles are those basic precepts that have to be observed and manifested through the actions of the person seeking self-actualization. They are as follows:

- i. Satya Truthfulness
- ii. Ahimsa Non-violence, both physical and in thoughts
- iii. Asteya Not taking anything which does not belong to us
- iv. Brahmacharya Abstinence
- v. Aparigraha Non-accumulation

The Niyamas are the observances and rules of personal conduct which have to be followed and practiced by the Sadhak. They are as follows:

- i. Shauch Cleanliness of the body and mind
- ii. Tapas Perseverance
- iii. Santosh Contentment, the state of mind in which one has to always remain.
- iv. Sivadhyaya Self-study – a continuous study of the fact that one is on the right path is a must, lest one should lose the track of one’s goal
- v. Ishivar An unflinching faith in the Pranidhan Supreme Being that nothing will go wrong and everything will end well.
- vi. Jeevan Cultivate awareness of the Nashwarta temporary nature of our bodily existence on this planet.

The asanas are various postures that should be practiced daily to keep the body in proper condition. The definition of asana is ‘*Sukhen Asyate Iti*’ or the pose in which one can sit with comfort.

Brahmacharya

Brahmacharya (celibacy) is one of the basic yam principles enshrined in the eight-limbed Hatha Yoga edifice. It emphasizes avoiding coition in thought, word, and action for single persons. Married couples also observe it as per directions in the scriptures. Young Brahmacharis are encouraged in yogic discipline to get established in Brahmacharya and sublimate sexual energy for achieving the state of the enlightened one. This vital aspect of yoga has been dealt with thoroughly by Brahmachari, Dhirendra and a Western scholar, Elisabeth Haich, *Sexual Energy and Yoga*, London, George & Unwin Ltd., 1972. There are specific asanas for the young practitioners to get established in celibacy by damming one of the most powerful urges bestowed on mankind and sublimating the same for enlightenment. The following asanas are known to bestow self-control, celibacy, and tranquillity as the sensual motivation in thought and action is checked to a great extent:

- Siddhasna (accomplished sitting posture)
- Svastikasana (auspicious posture)
- Simhasana (lion posture)
- Vajrasana (martial posture)
- Guptasana (concealed posture)
- Sarvanana (inverted posture)
- Matsyendrasna (full spine twist posture)
- Gorakshasana (back-lying Gorksha’s posture)
- Utthanasana (squatting posture)
- Kukkutasna (cock posture)
- Vrksasana (tree posture)
- Salabhasana (locust posture) and
- Yoga Mudra (yoga-gesture posture)

According to Swami Samarpananda Saraswati, Bihar School of Yoga, 1999 these asanas help in the upward channelization of the sexual energy and its sublimation. Pranayama, So-ham Meditation, chanting of the Gayatri Mantra, Satsang, Kirtan, and Yogic lifestyle including body cleaning practices, such as *Jal Neti*, *sattvic food*, early rising from bed – all these practices are helpful in transmuting the sexual energy into spiritual energy and attaining a state of Sat Chit Ananda (Truth, Joy, and Happiness).

As per Yogi (Iyengar, V..2020) Brahmacharya encourages (‘*Ojas*’) brilliance in human body since it is the essence of all tissues and the life sap . In accordance with the Science of Ayurveda, it permeates every pore and area of the body. The excessive sex, drugs, talking, loud music, lack of sleep, or burnout that characterises modern life drains out “*Ojas*.”

The following are indicators of decreased ‘*Ojas*’ brilliance in the human body:

Fear, worry, sensory organ pain, a dull complexion, lack of cheer, emaciation, and a weakened immune system are only a few symptoms.

Ayurveda notes that ‘*Ojas*’ coats the immune system and protects it from disease and heals us from disease. Certain nuts and products, such as almonds, honey, etc. promote ‘*Ojas*’ and are thus rejuvenat-

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ing and increasing energy, vitality, joy, delight, and creativity. They are based on the principle of giving the human body a complete exercise, the main emphasis being on the backbone, the spine. The spine carries the main spinal cord. It carries the instructions issued by the brain to various organs.

Surya Namaskar Yog

There are sequence of twelve Yogasanas (physical postures) to perform one Surya Namaskar, for best result it is recommended to perform during sun rise or sun set (Verma, A., *et al.*, 2020). The postures are bending alternating backward and forward with flex-in and stretch-out the back bone with minimum range giving a reflective stretch to the whole body. While performing Suryanamaskar one has to also concentrate on inhale and exhale of breath along with Yogasanas so that its advantages are skilfully incorporated for best outcome of results. In the Indian traditional style, the Vedic mantras, are chanted while practicing all twelve stages of Surya Namaskar are also very useful as its every hymn has specific benefits and scientific value (Ambareesha, K.,2019).

Researchers (Mahesh, N. K., et al ., 2018). have found that Surya Namaskar yoga practise is an effective way to improve managerial quality and a number of crucial factors crucial for overall productivity in an organisation, such as control, concentration, and autonomy. (Bhaumik, U., et al., 2022) in their article presents a technique for analysing Suryanamaskar postures using key point estimates and statistical analysis. The suggested technique uses a trained model based on the COCO key point detection dataset to identify key points in yoga poses. In this piece, the author put up a key point detection system for self-yoga correction. Surya Namaskar yoga therapy with Momordica charantia fruit juice was researched by Rajput, R., and Sharma in 2022. They found that surya namaskar helps in reduction sugar levels in diabetic patients.

The figure 1 shows sequence of twelve Yogasanas (physical postures) to perform one Surya Namaskar

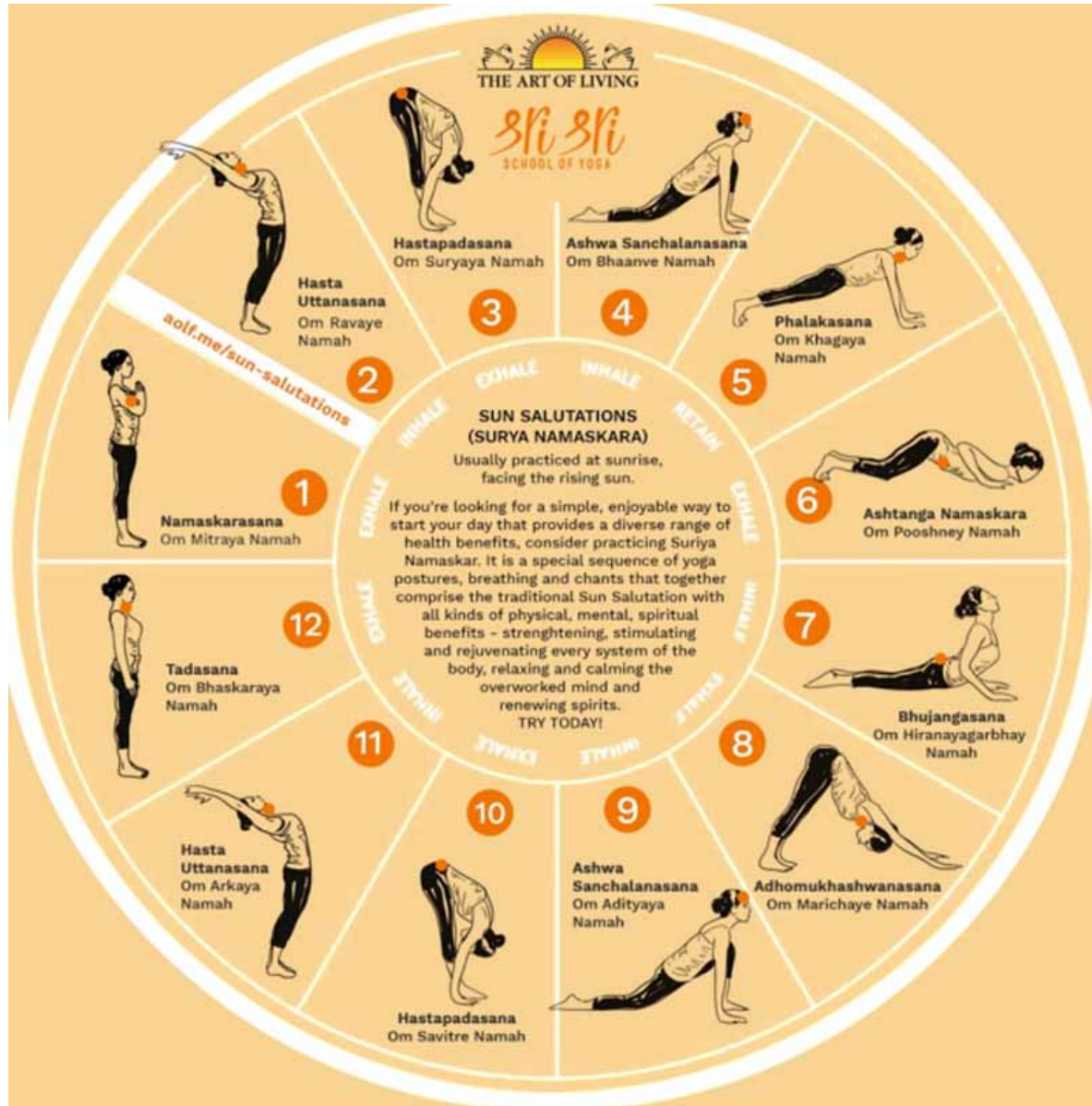
QUALITY OF LIFE

According to WHO, Quality of Life of an individual's perception is their position in life in the background of their value systems and culture they live and with respect to their goals, standards, concerns and their expectations. Access to good healthcare, clean and safe housing, healthy food, and a job that pays a living wage are some of the factors that contribute to a good quality of life. QoL concerns have progressively gained importance in medical practise and academic study since 1948 after this definition was pronounced by WHO. Since then evaluation on QoL as a clinical research technique has grown almost exponentially (<https://www.who.int/tools/whoqol/whoqol-bref>), (Sagar.S., et at .,2022).

The researchers (Mason, D., et al., 2022) in their work, used a mixed methods technique to examine the WHOQoL-dependability BREF's and validity. An exploratory factor analysis of 352 autistic individuals was undertaken of age group between 18 – 80 for quantitatively examining the structural validity. Four discussion groups with a total of 20 autistic participants were held to test the face rationality for questions qualitatively of QoL Bref. Having good consistency of domains (internally), they observed five-factor structure were conceptually similar to the formulation of WHO -QoL. However, certain items are full in an unexpected manner. The discussion group transcripts investigated the causes of these unforeseen loadings.

In a cross-sectional study by Amin, M. F., et al. (2022), participants with type 2 diabetes who were at least 15 years old were divided into three groups (T2DM). Patients who had a history of mental illness

Figure 1. Surya Namaskar
(<https://www.artofliving.org/us-en/yoga/sun-salutations>)



and who objected were not included. The 26-item questionnaire was castoff in the interviews in physical mode, which were done using a pretested structured questionnaire. 500 T2 DM patients in total were included, with an average age of 55.8 (SD13.8) and a female prevalence of 50.8 percent, according to the data. 22.2 percent of participants overall judged their quality of life as poor, while 25% expressed satisfaction with their health as assessed by questions 1 and 2 of the (Bref questionnaire). The majority (54% females and 51.2% males) gave their health as quality of life average ratings. The below average life quality was with mean scores (SD) of 37.2 20.5, 44.2 21.0, 39.6 23.2, and 41.6 19.5 for the domains of

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psychological health, social connection, and environment, respectively. The final readings of this study showed that people having diabetes lived their life below average quality of life .

LITERATURE REVIEW

In their research study (Selvan, P., et al., 2022) found that yoga and meditation as an integrative or complementary and alternative medical practices with lessen side effects associated with conventional treatments without compromising the effectiveness of those treatments. In this methodical review, it especially observed by the authors that yoga-asana help in the possible symptoms for management strategy for people receiving breast cancer treatment in U.S. The impact of yoga on breast cancer patient was revealed in a study of 28 randomized controlled trials (RCT) papers . The cancer therapies can have serious adverse effects on the body and mind as well as long-term problems that significantly lower quality of life and increase morbidity. The author evaluated the intervention of a yoga asana during radiation therapy, chemotherapy and neoadjuvant therapy for twelve weeks, they discovered that both the yoga asana group and controlled group saw a decline in the burden of their disease ‘*global health status*’, physical activity, and operative functions as measured by the EORTC QLQ C30 scale at the conclusion of controlled trials ($p = 0.045$) after 12 weeks therapy ($p = 0.001$) of intervention, the emotional functioning had significantly improved for yoga group. The findings revealed the possible advantages of yoga for cancer patients like significant positive impact on their quality of life, reduction in anxiety, depression, stress, improvement in wound healing and sleep quality etc. Numerous studies investigated how yoga affected the body’s systems.

Researchers examined the effects of yoga on cognitive performance (Yadav, A., et al., 2022). Cognitive abilities were assessed using tests of selective executive function processes. According to the findings, patients who practised yoga significantly improved on the selective attention test ($p = 0.005$), however patients who took part in the climbing programme did not. Furthermore, neither group experienced significant changes on measures of executive function. To determine cognitive functioning, executive functions and selective attention were tested.

(Sharma, G., et al., 2022) investigated that Yoga as adjunctive therapy, is better than the standard therapy. It alone can help to reduce the indicative burden with vasovagal syncope problem (sudden drop-in heart rate and blood pressure) and help in enhancing the QoL of such patients . The Patients were randomly assigned to yoga training program in addition to guideline-based therapy intervention arm, group 1 and control arm, group 2. Fifty five patients were involved for Randomization . At 12 months, the average of syncopal or presyncope occurrences was observed as 0.7 for intervention group and 2.52 in the control group ($P = 0.01$). Compared to 4 (16%) patients in the control arm, 13 (43.3%) patients in the intervention arm stayed free of events ($P = 0.02$). Questionnaire scores for the status of syncope function as well as the scores for 2 domains of the WHOQoL-BREF indicated a substantial increase in QoL at 12 months ($P = 0.05$).

In a case study done by (Mishra, A., et al., 2018) to assess the quality of life of three cancer patients suffering from breast cancer, oral cancer, and chronic myeloid leukaemia. The patients were instructed do Pranayama inhale and exhale of oxygen early morning in the premises of Dev Sanskriti Vishwavidyalaya followed by specifically employing Yoga Asana. Patients continued to receive supportive care such as yoga as part of their regular routine. Using a self-made 10-scale questionnaire, their QOL was evaluated. All three patients reported improvement in all conditions that were accessible, including physical and

psychological concerns, with scores of 75%, 41.67%, and 40%, respectively. According to the study, yoga therapy has the potential to improve cancer patients' quality of life when used as supportive treatment.

The aim of this study by (Thalanjeri, P., et al., 2022) was to assess how well the designed yoga module reduced stress among staff members of a Deemed to be University. Maintaining and improving one's health is essential. In the study participants 34 employees, primary results showed, substantial increase in some parameters of HRV, PFT, perceived stress score, and a noteworthy decrease in the level cortisol saliva levels, after intervention of one month of the personalized yoga module. An expert-validated personalized yoga program was created by a licensed yoga trainer (Females 26-76.5% vs males 8-23.5%) The participants were 43.24 and 9.68 years old on average. Participants' mean heart rates before and after the intervention was not statistically significant.

METHODOLOGY

Participants for the research study were chosen from a selective sample of 140 young managers and engineers working in an Indian manufacturing unit of high-tech electrical and mechanical division of Industry located in Greater Noida (U.P) India. (56 males and 84 females), mean age 35.26 \pm 5 years.

Objectives

To investigate the impact of Sun Salutation Surya Namaskar on QoL of young employees after 2-months of intervention.

Hypotheses

It is hypothesized that Surya Namaskar significantly improves the constituent parts of QoL Further speculations are made that the Surya namaskar yog group will exhibit most significant and positive effects on five domains of Quality of Life as compared to Controlled group,

H₀ There exists no significant impact of Surya Namaskar yog on QoL and its four domains on the employees working in private sector (Rejected).

H₁ There exist significant impact of Surya Namaskar yog in enhancing the QoL and its four domains on the employees working in private sector (Accepted).

Data Analysis: was performed using SPSS 2.1 application. The analysis involved computation of means and SD. The mean difference between-groups was calculated through ANCOVA along with the effectiveness of the interventions which was ascertained using Paired t-Test.

Subject Selection Criteria

Inclusion Criteria

- i. The engineering professionals working in a Industry at Greater Noida City(NCR) India .
- ii. Age range: 35-40
- iii. No physical activity during the previous six months, starting on the study's start date.
- iv. Not moving for three months after the study's commencing date

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- v. Comfortable in Hindi and English languages
- vi. Those who are open to taking part in the research project.

Table 1. Comparative study on effect of Yoga on different age groups studied by different researchers in time period (1988-2022)

Author & Year	Methods	Control Group (CG)	Participants	Intervention	Outcomes	Effects Found
Berwal, S., & Gahlawat, S. (2013). Effect of yoga on self-concept and emotional maturity of visually challenged students: An experimental study.	Pre-post	NO	<i>n</i> = 15 14–18 years <i>No gender details</i> <i>Visually impaired students drawn from a special school for the blind in India.</i>	Ashtanga and theory yoga—Postures, breathing, meditation and theory classes on the importance of yoga 30 days daily for 60 min.	Self-concept	Improvement in all dimensions of self-concept, including academic, intellectual and social.
Kodidala, S. R., RAJ HANS, P. S., Sorout, J., & Soni, H. (2022). Impact of Suryanamaskar Training on Cardiovascular, Respiratory, and Cognitive Functions among Medical Students.	Qualitative	NO	<i>n</i> = 21 7.4 years (mean) <i>F</i> = 12/ <i>M</i> = 9 <i>3 participants received additional support for learning</i>	Hatha yoga—Postures, breathing, meditation and relaxation + 15 min activities at end for self-concept (e.g., making an Olympic medal to wear or a collage of people who loved them) 45 min × 1 a week for 8 weeks. In addition, 4 days a week, the teacher of the class led 15 min yoga in the classroom.	Self-concept, attention	Three themes emerged: 1. feeling calm/focused, 2. controlling own behaviour, 3. supporting a positive self-concept suggesting that yoga programs with at-risk children may enhance well-being and positive self-concept.
Sagar, S., Garg, V., & Rastogi, R. (2022). Effects of Yoga on the Cardio-Respiratory System: Socio-Technical Effect to Reduce the Impact of the Pandemic on Indian Employees.	Within-groups	YES—general PE activities	<i>n</i> = 120 25–35 years <i>No gender details</i> <i>Not labelled but exhibit cardiac and respiratory problems during Covid pandemic</i>	Yoga—Postures, breathing and meditation 2 conditions—15 min for 8 or 22 sessions (duration not detailed)	Cardio-Respiratory System	Both treatments were followed by more efficient completion of the criterion task than CG.
Klatt, M., Harpster, K., Browne, E., White, S., & Case-Smith, J. (2013). Feasibility and preliminary outcomes for Move-Into-Learning: An arts-based mindfulness classroom intervention. .	Mixed methods	NO	<i>n</i> = 41 8.54 years (mean + 0.55) <i>F</i> = 25/ <i>M</i> = 16 <i>The teachers describe some of the participants as having ADHD symptoms.</i>	Mindfulness-based Intervention (MIL)—Postures, meditation, background music, art activities with weekly overarching theme, e.g., health, support, success 45 min × 1 a week for a total of 8 weeks conducted during the school day in the classroom	Attention	Assessment of student behaviour on both ADHD index and in cognitive/inattentive behaviour showed decreases in disruptive behaviours.
Hart, N., Fawcner, S., Niven, A., & Booth, J. N. (2022). Scoping Review of Yoga in Schools: Mental Health and Cognitive Outcomes in Both Neurotypical and Neurodiverse Youth Populations. <i>Children</i> , 9(6), 849.	Qualitative	NO	<i>n</i> = 3 15–18 years <i>Participants were conveniently recruited as they had learning and intellectual disabilities and varying degrees of autism.</i>	Goldberg's Creative Relaxation Programme designed for young people with autism—postures, breathing and relaxation 5 min × 1 week for 5 weeks in the classroom	Subjective well-being	Improvements in positive affect were noted by some students.

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Table 1. Continued

Author & Year	Methods	Control Group (CG)	Participants	Intervention	Outcomes	Effects Found
Mehta, S., Mehta, V., Mehta, S., Shah, D., Motiwala, A., Vardhan, J., ... & Mehta, D. (2011). Multimodal behavior program for ADHD incorporating yoga and implemented by high school volunteers: a pilot study.	Pre-post	NO	n = 63 6–11 years F = 26/M = 44 Participants were recruited as they had been diagnosed previously with ADHD using the Vanderbilt questionnaire as well as having a neurodevelopmental assessment by a neurodevelopmental paediatrician.	Multimodal programme that incorporates yoga as well as behavioural play therapy—Postures, breathing and meditation, behavioural play. 60 min × 2 a week over 6 weeks during the school day	Academic performance	More than 50% of the children improved their academic and behavioural performance.
Powell, K. P., Hasegawa, L., & McWalter, K. (2010). Expanding roles: a survey of public health genetic counselors.	Pre-post	NO	n = 21 11–15 years M = 21 Of the 21 pupils, 6 were diagnosed with an EBD alone, 2 were diagnosed with EBD and ADHD, 1 was diagnosed with ADHD alone, 1 was reported by teachers to have ADHD and epilepsy, and 1 child had a diagnosis of global delay. The remaining 9 pupils had mild to severe learning disabilities. Six pupils were in receipt of additional help.	Hatha yoga and self/peer massage—Postures, massage, breathing, meditation, relaxation and visualisation 60 min × 12 classes over 2 school terms in a room in the school	Attention	Positive change was noted by teachers of pupils' reduced hyperactivity. No statistically significant changes, but there were trends toward improvements in attention span and eye contact with teachers.
Powell, L., Gilchrist, M., & Stapley, J. (2008). A journey of self-discovery: an intervention involving massage, yoga and relaxation for children with emotional and behavioural difficulties attending primary schools.	Quasi-experimental	YES—regular additional support as normal	n = 107 8–11 years F = 48/M = 59 Participants exhibited emotional, behavioural and learning difficulties.	Self-Discovery Programme—Postures, breathing, relaxation, communication and massage 45 min × 1 a week over 12 weeks	Attention	The yoga group had significant improvements in 'contribution in the classroom'; however, there were greater trends towards improvement in attention in CG.
Smith, B. H., Connington, A., McQuillin, S., & Crowder Bierman, L. (2014). Applying the deployment focused treatment development model to school-based yoga for elementary school students: steps one and two.	Randomised controlled trial	YES—CG attended Healthy Eats: a non-physical activity	n = 77 9.38 years (+0.97) F = 41/M = 36 6 of the 77 students were categorised as 'special education'.	'YogaKidz' Curriculum—Postures, breathing, relaxation and didactic themes 40 min × 2 a week for 28 weeks	Academic performance	Better growth in reading scores for the yoga group as opposed to decline in scores for CG.
Steiner, N. J., Sidhu, T. K., Pop, P. G., Frenette, E. C., & Perrin, E. C. (2013). Yoga in an urban school for children with emotional and behavioral disorders:	Pre-post	NO	n = 37 8–11 years (10.4 mean age) F = 15/M = 22 9.8% had attention problems (ADHD), 9.8% depression/bi-polar, 19.5% anxiety/OCD, 24.4% behaviour problems, 24.4% autism spectrum disorder, 7.3% neurological problems and 58.5% school problems including speech and language, reading.	'Yoga Ed' Protocol—Postures, breathing, relaxation, social component of partner/group exercises, imagery and meditation 60 min × 2 a week for 3.5 months during school hours	Anxiety, attention, psychological and subjective well-being, executive function.	Teachers reported improved attention in class, adaptive skills and reduced depressive symptoms. Children did report increased anxiety.

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Table 1. Continued

Author & Year	Methods	Control Group (CG)	Participants	Intervention	Outcomes	Effects Found
Uma, K., Nagendra, H. R., Nagarathna, R., Vaidehi, S., & Seethalakshmi, R. (1989). The integrated approach of yoga: a therapeutic tool for mentally retarded children: a one-year controlled study.	Quasi-experimental	YES—no treatment	<i>n</i> = 90 6–16 years 6–16 years <i>F</i> = 32/ <i>M</i> = 58 <i>Students were selected based on mild, moderate, and severe functional impairment such as IQ and adaptive skills. Amongst those who were included in the study, 12 pairs (pairs refer to control and treatment balanced) belonged to the mild degree (IQ 50–70), 17 pairs belonged to the moderate degree (IQ 35–50), and 16 pairs belonged to the severe degree (IQ 20–34).</i>	Yoga—Postures, breathing, meditation 60 min × 5 days a week for 10 months	IQ	IQ scores improved significantly in the yoga group compared to the CG.

Exclusion Criteria

- i. Pregnancy is known
- ii. Those who already have endocrine difficulties, cardiac issues, psychological illnesses, or other medical issues (non-diabetic, non-hypertensive)
- iii. Patients who had surgery within six months of when the trial began
- iv. Those who take drugs like steroids, amphetamines, sedatives, benzodiazepines, CNS stimulants, or any other substance that severely impairs sleep.
- v. People who use alcohol, tobacco, or other drugs.
- vi. People who are unwilling to engage in the study.

Diet Chart

- i. A vegetarian diet was recommended to prepare the body and mind for yoga practice and make the body light & flexible (Shin, S., & Pradhan, B.,2022)
- ii. To adopt eating habits to satisfy hunger but not to make one feel heavy and lazy.
- iii. Avoid food that cause acidity or gas. It is desirable to follow a dietary programme in accordance with Dr Dean Ornish's Programme (listed in appendix) . It comprises vegetarian menus full of colourful, flavoured and healthy dishes for breakfast, lunch and dinner that are all fat free.

Procedure

The study used a pre-post intervention-control group design. Employees of PPS International Greater Noida NCR Delhi, India, make up the study's sample. Through the company's communication channels, a leaflet with details on the study was distributed to the staff. The flyer was also sent via WhatsApp and

email to several social media groups. People who were interested were encouraged to spread the word to their friends and co-workers. After being determined to be eligible, registered interested parties were randomized into either the intervention (experimental) or control group.

Before the trial began, all participants were provided written informed consent following thorough explanations of the study. Participants had evaluations at both the baseline and 8-week intervention time. The intervention group (n=70) (27 Male and 43 Female) volunteered for the research study, The components of yoga-based intervention were explained in a demo class by the yoga experts in physical mode. All subjects regularly practiced yoga and followed the protocol for 2 months (5 days a week). The control group (Non Yoga group) (n=70) (29 Male and 41 females) were investigated pre-test and post-test before & after 8 weeks without the yoga practice. They carried on as usual with their daily activities. The participants in the study were encouraged by their CEO of the company to practice yoga, they were given one hour relaxation from their regular duties for this research study however they did not receive monetary incentive for their participation.

Five times a week, a physical 60-minute group yoga class was offered. Asanas (yogic postures), pranayama (yogic breathing techniques), and relaxation were all a part of each yoga intervention session (either Shavasana or Yoga Nidra). An academically qualified yoga therapist provided the yoga intervention. The practices listed in Table 2 were gradually introduced and continued for the duration of the intervention. There were no negative consequences noted.

WHOQOL BREF Assessments

As per Figure 2, The Confirmatory Factor Analysis is a technique used to determine if evidence matches a speculative model, as shown in Fig. 2. When a number of requirements are satisfied, and the Comparative Fit Index is greater than 0.9, the model is fit and data should be acceptable depicts the WHOQOL-potential BREF’s structure. The information offered here is focused on four areas.

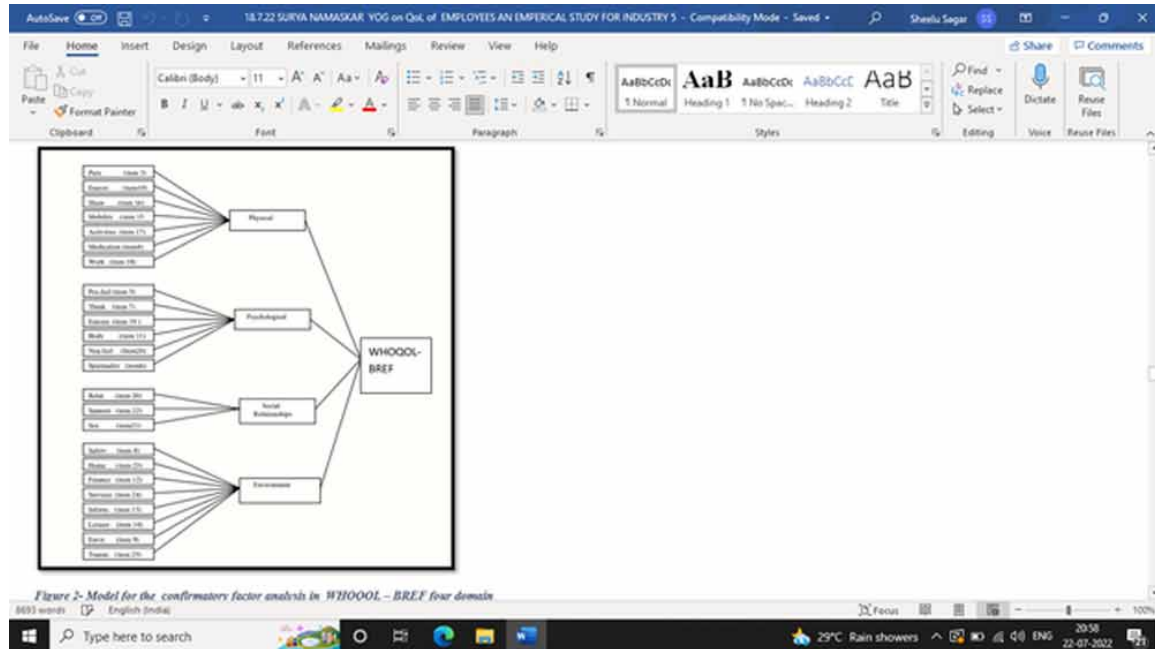
Using the tested and approved WHOQOL-BREF scale, QOL was evaluated. There are a total of 26 questions in this test, divided into four domains: environment, social connections, psychological health, and physical health. A 5-point Likert scale was used to rate each of these domains. According to WHO criteria, 25 raw scores were produced for each domain by combining the values of individual questions. These raw scores were then converted into scores ranging from 0 to 100, with 100 being the greatest score and 0 representing the lowest value.

Table 2. Components of the yoga-based intervention

<i>Stage</i>	<i>Yoga Activity</i>
<i>Sooksma Vayam Asanas Primary stage</i>	<i>Om Chanting 3 times, Svastikasana, Vajrasana, Supta Vajrasana, Simhasana, Tadasana I, Trikonnasanna, Parsvakonasana, Parvatasana, Pavanmukasana, Bhujangasana, Uttanapadasana, Savasana</i>
<i>Surya Namaskar Asana (Sun Salutation) Secondary stage</i>	<i>Pranamasana Hasta Utthanasana Hasta Padmasana, Ashwa Sanchalanasana Chaturanga Dandasana, Ashtanga Namaskar, Bhujangasana, Adho Mukha Shavasana, Ashwa Sanchalanasana, Hasta Padmasana, Hasta Utthanasana, Pranamasana</i>
<i>Pranayama</i>	<i>Ujjayi, Anuloma Viloma, Bhastrika, Bhramari</i>
<i>Relaxation</i>	<i>Shavasana, Yoga Nidra, Shanti Path</i>

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Figure 2. Model for the confirmatory factor analysis in WHOQOL – BREF four domain (<https://www.who.int/tools/whoqol/whoqol-bref>)



Calculations were used to determine the average score, total score, and mean scores for each domain. Prior to the poll, a pilot test was conducted. For analysis of data software SPSS24 is used . A variety of descriptive statistics, calculated. Cronbach's Alpha reliability more than 0.86 will be considered satisfactory.

The validity of the total QoL was also evaluated. Using Pearson's correlation coefficient, we looked at how well the four domains of the WHOQoL-BREF were aligned. The association of QoL with and their characteristics, such as gender, date of birth, body mass index, educational qualification, matrimonial status, salary income, and travelling time from office to home, is examined using a t- test and a multiple linear regression model .Transformed scores will be employed in the statistical analysis of this research study for different domains. The measures of probability, P values below 0.05 will considered for assuming the null hypothesis as true.

RESULTS AND DISCUSSION

The WHOQOL questionnaire had good internal consistency for both subscales. Cronbach's alpha for each of the four domain scores ranged from 0.71 (for domain 5) to 0.86. We can conclude that the internal consistency was good and the set of questions was reliable to carry out the study.

As per table 3. Baseline sociodemographic profile of study groups Characteristic $M \pm SD$ or % Total sample (n = 140) Yoga group sample size is 70, for Control group sample size is 70 Age group selected was between 30 ± 5 , gender Male was 56 (40.5%) yoga group males were 27(39%) and for non yoga group males were 29 (42%) similarly Female 84(59.5%) 43 (61%) 41 (58%) Educational level

Table 3. Baseline sociodemographic profiles of the study groups

Characteristic	Total sample (n = 140)	Sample Size of yoga group (70)	Sample Size of non -yoga (controlled group 70)
Age group	35±5.	30±5	32±5.
Sex	Male 56 (40.5%)	27 (39%)	29 (42%)
	Female 84 (59.5%)	43 (61%)	41 (58%)
Educational level			
Diploma	28 (19%)	10(8.7%)	18(31.6%)
Degree	108 (76%)	59 (87%)	49 (63.2%)
PhD	4 (5%)	1 (4.3%)	3 (5.2%)

Table 4. Paired sample t- distribution value

TEST PAIRS=Q1 WITH Q2 (PAIRED)/CRITERIA=CI(.9500) /MISSING=ANALYSIS.										
Paired Samples Test										
Paired Differences 95% Confidence Interval of the Difference										
	Domain	N	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Level of Sig. (One-tailed)
Yoga Surya Namaskar	Quality of Life Pre-test & Post test	70	5.3	0.34198	0.16327	4.83844	3.76156	1.75	69	0.0312
	Physical Health Pre-test & Post test	70	3.7	0.95231	0.17387	4.0556	3.3444	3.58	69	0.0334
	Psychological Health Pre-test & Post test	70	4.3	1.44198	0.26327	3.83844	2.76156	2.52	69	0.0512
	Environment Pre-test & Post test	70	2.2	1.29721	0.23684	2.68439	1.71561	2.58	69	0.03124
	Social Relationship Pre-test & Post test	70	1.26	1.01483	0.18528	1.64561	0.88772	1.67	69	0.0410

for diploma was 28(19%) 10 (8.7%) 18 (31.6%) for Degree 108(76%) 59 (87%) 49(63.2%) for PhD 4 (5%)1(4.3%) 3 (5.2%)

As per table 4. in the pre-test and post test scores of the QoL domain for the experimental group is (t = 1.75 <p.05). There is a significant increase in the pre-test and post test scores of the for the Physical Health domain (t = 3.58 <p0.05). In the pre-test and post test scores of the Psychological Health domain T-distribution table value is higher than calculated t- distribution (t=2.76,< p0.05) . There is an increase in pre-test post-test reading for the Environment domain (t=1.71,<p 0.05), and increase in pre-test post-test score for the Social Relationship domain (t=1.67, <p.05). In the result of the control group, there was not much significant difference in pre-test and post-test . The paired t-test was used to analyse the pre-and post-data, and conclusions were obtained for p < p0.05. This calculated t- distribution value when compared against a value obtained from a critical value T-distribution table it is seen that there is higher values of the t-score indicating that a large difference exists between the pre-test and post- test of each domain of QoL, since calculated t-value is more than the table value at a significance level of 5%, hence null hypothesis is rejected .

The paired t-test and sociodemographic profile of study groups showed 61% women and 39% of men were reported to have less Pain and discomfort, more Energetic less fatigue with good Sleep and rest indicating that Physical Health domain improved with the practice of Surya Namaskar Yog (t = 3.58 <p.05) 39% of men Yoga demonstrated improved positive emotions. Imagination, learning, memory,

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and focus on Self-respect with lesser Negative feelings indicating that Psychological Domain showed significant improvement among Yoga Group ($t=2.76, < p.05$). Over all 87% of Degree Holders, 8.7% Diploma Holders and 4.3% of PhD participants of yoga group exhibited better Personal relationships and Social support and were reported to be more satisfied with their Sexual activity. The result support Domain IV Social Relationships with significant increase ($t=1.67, < p.05$).

27 (39%) men and 43 (61%) women reported feeling more physically safe and secure, were content with their living arrangements and financial resources, and actively pursued opportunities to learn new skills. They also supported efforts to create a better physical environment with less pollution of noise traffic, and environmental pollution as a result of which there was a significant increase in pre-test and post-test score for the Environment domain is ($t=1.71, < p.05$). When compared to the control group, the yoga group showed improvement.

All four of the Quality of Life categories are benefited by Surya Namaskar yog, according to the this study. The physical health domain contributed the most and the social connections domain the least, All four areas are significant and should be taken into account when evaluating overall QoL and Good wellness.

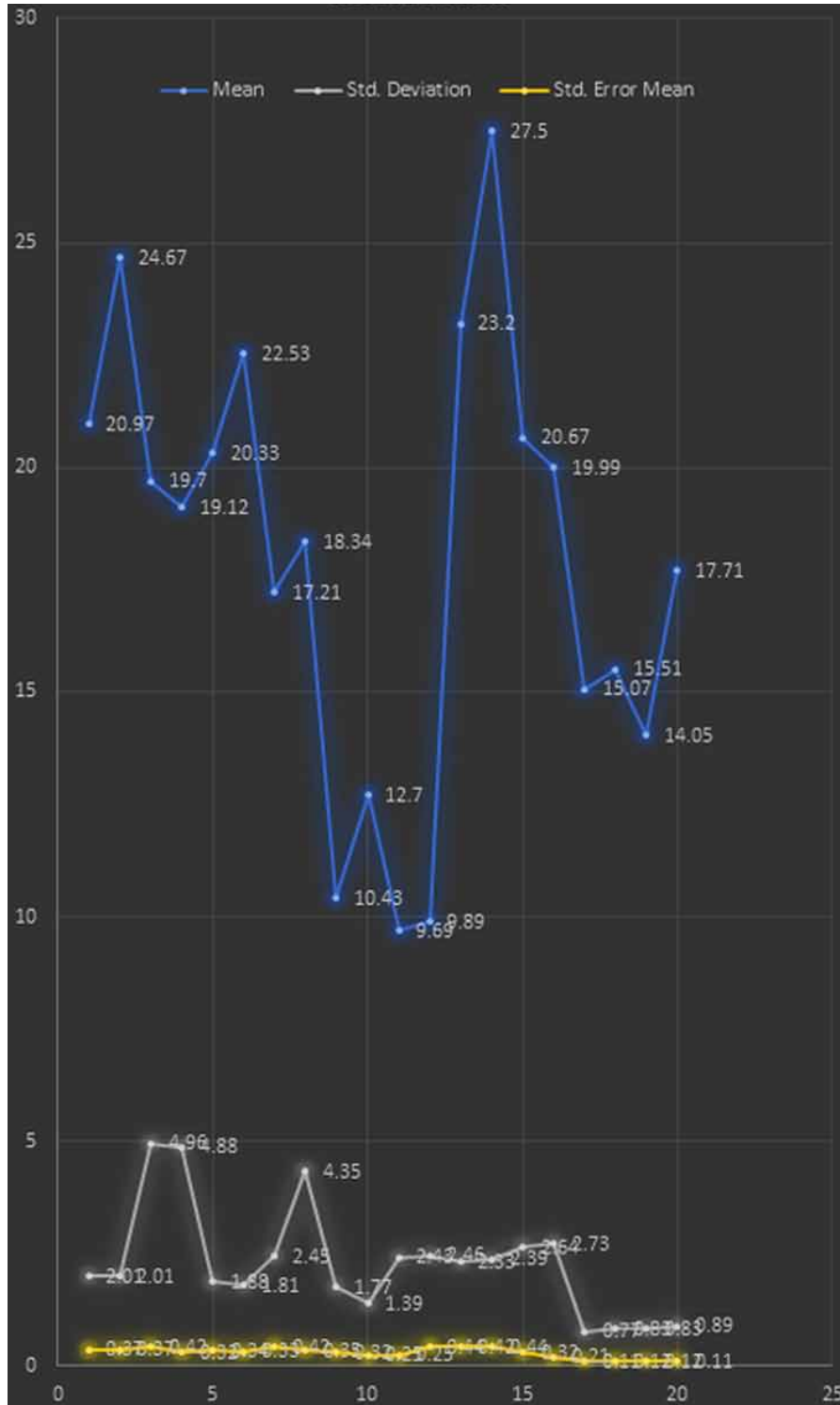
The non-yoga group had a higher likelihood of having unhealthy food habits and sleeping disorders. Yoga practitioners reported having strong physical strength and stamina. In comparison to the non-Yoga group, the yoga group also displayed lower levels of stress, worry, and fear and better coping mechanisms. When it came to handling the tension and anxiety that came with lockdown and COVID-19, the yoga group showed a striking and superior capacity. Participants who practiced Surya namaskar Yog and meditated in the Yoga group allegedly had somewhat improved mental health.

As per Figure 3, We may infer from the graphical depiction, that there were substantial differences between the Yoga intervention group and the control class. The all domains of QoL rose while frequent disorders decreased for the experimental group,

Table 5 provides brief descriptive statistics for the questionnaire scores obtained in Yoga group and controlled group (non-yoga group) at pre-intervention and post-intervention test on four domains of quality of life after two months of Yoga intervention. The demographic features of the Yoga group (Table 1) shows the large majority of the participants were women as compared to men (60:40 ratio), there was a larger proportion of men 42% in Non Yoga group as compared to 39% in Yoga group. 61% women showed their inclination for better QoL and volunteered for Yoga Practice happily whereas in the non-Yoga / controlled group 42% women were randomly selected. As a group, Degree Holders participants were 87% as compared to the Diploma Holders 8.7% and 4.3% were of the level of PhD in the Yoga group. As the domain and aspect scores are scaled positively, higher scores represent a greater QoL. Higher ratings for some traits, such as pain and distress, depressed mood, and medication dependence, may not always translate into a higher quality of life. These aspects are not given a high rating. The findings of all WHOQOL categories should not be added to determine a final quality of life score, the outcomes of the four items in the component for overall wellness & QoL. The studies investigated, how well a yoga practice affected changes in employees' physical, psychological, social, and environmental reactions (i.e., enhanced quality of life). The hypothesis of the study was supported by the outcomes of a five-day per week Surya Namaskara (SN) yoga practise.

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Figure 3. Comparison of post-adjusted means of four quality of life domains after two months of Yoga intervention



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Table 5. Representing pairwise comparison of post-adjusted means of four quality of life domains after two months of Yoga intervention

Paired Samples Statistics				
Test	Domains	Mean	Std. Deviation	Std. Error Mean
Pre-Test	Yoga S.N. * intervention group for Physical Health	20.97	2.01	0.37
Post-Test	Yoga S.N. intervention group for Physical Health	24.67	2.01	0.37
Pre-Test	Controlled Group Physical Health	19.7	4.96	0.42
Post-Test	Controlled Group Physical Health	19.12	4.88	0.32
Pre-Test	Yoga S.N. intervention group for Environment	20.33	1.88	0.34
Post-Test	Yoga S.N. intervention group for Environment	22.53	1.81	0.33
Pre-Test	Controlled Group Environment	17.21	2.45	0.42
Post-Test	Controlled Group Environment	18.34	4.35	0.35
Pre-Test	Yoga S.N. intervention group for Social Relationship	10.43	1.77	0.32
Post-Test	S.N. & Meditation intervention group Social Relationship	12.7	1.39	0.25
Pre-Test	Controlled Group Social Relationship	9.69	2.43	0.25
Post-Test	Controlled Group Social Relationship	9.89	2.46	0.44
Pre-Test	Yoga S.N. intervention group for Psychological Health	23.2	2.33	0.42
Post-Test	Yoga S.N. Intervention group for Psychological Health	27.5	2.39	0.44
Pre-Test	Controlled Group Psychological Health	20.67	2.64	0.32
Post-Test	Controlled Group Psychological Health	19.99	2.73	0.21
Pre-Test	Yoga S.N. intervention group for Quality of Life	15.07	0.77	0.11
Post-Test	Yoga S.N. intervention group for Quality of Life	15.51	0.83	0.12
Pre-Test	Controlled Group Quality of Life	14.05	0.83	0.12
Post-Test	Controlled Group Quality of Life	17.71	0.89	0.11
	* SN - Surya Namaskar			

CONCLUSION

In the previous researches conducted by (Uma, K., et al., 1989) showed that intelligence quotient among school children can be increased with Yoga asanas intervention. Another research team of (Steiner, N. J., et al., 2013) examined on for children having attention difficulty, hyperactivity and impulsiveness disorder at young age due to this the students suffer having low relationship building, for its treatment yoga therapy and found quite effective. (Gupta, P. K., et al., 2010) studied on breathing exercise (sudarshan kriya) for improvement in sleep quality and general wellbeing by lowering blood triglyceride levels, boosting antioxidant capacity, and reducing oxidative stress. (Thalanjeri, P., et al., 2022) used the study protocol of yogic practise for one month on 50 yoga practitioners of mean age 45 years females 76.5% vs. males 23.5%, the average heart rates of the yoga group did not obtain much change, beats per minute before and after the intervention, respectively was recorded as 74.47 and 74.05. (Saksena, T., et al., 2016) showed a substantial variation in how older persons perceived their quality of life. The findings showed that there was no significant difference between groups in terms of social contacts ($F=1.18$, $p>.05$). A post-hoc comparison using the Bonferroni approach

was performed to determine whether of the experimental and control groups showed a significant difference for the post-adjusted scores on all the categories indicating quality of life. The post hoc pairwise comparison of adjusted means across all quality of life areas reveals significant differences between the experimental and control groups, according to the results. According to (Nagarathna, R., et al.,2021), the Government of India's Ministry of Ayurveda, Yoga, Naturopathy, Unani, Siddha, and Homeopathy (AYUSH) is promoting methods to encourage the general public to practise yoga and meditation for the treatment of various illnesses like Type 2 Diabetes Mellitus and to strengthen resistance to Covid infection.

Our research demonstrates that Surya Namaskar Yoga can be a successful intervention to improve mental health in people with co-morbidities and/or lifestyle issues. When Surya Namaskar Yog was practiced, the sociodemographic profile of the study groups and the paired t-test revealed that 39% men and 61% women reported better sleep and rest, greater vitality, and less weariness. ($t = 3.58 < p.05$), indicating an improvement in the Physical Health domain. 39 percent of men demonstrated greater learning, memory, focus, and thinking skills. Self-esteem with fewer negative sentiments suggested that the yoga group's psychological domain had significantly improved ($t=2.76 < p.05$). Overall, 87 percent of yoga group participants with degrees, 8.7 percent with diplomas, and 4.3 percent with PhDs showed improved interpersonal relationships and social support, and they also reported being happier with their sexual activities. The outcome significantly increases Domain IV Social Relationships ($t=1.67 < p.05$). Additionally, using cutting-edge Surya Namaskar Yog techniques, we have shown that QoL, including the happiness index, has improved among industrial employees during Covid Pandemic. We created the daily free yoga and mindfulness sessions in physical mode for industrial employees and corporate offices in response to the closing of gyms and sports facilities. After eight weeks of guided yoga intervention, the study discovered that the QoL of Yoga practice group had increased more than that of the Non-Yoga group (controlled group). Through a sequence of gentle motions, the Surya Namaskara yoga series blends the physical and mental facets of the body, making it a distinctive style of yoga.

This study is the first of its kind to evaluate the considerable impact of Surya Namaskar Yog on raising the QoL among industrial employees'. The regular practice has resulted to reduce or even eliminate a variety of physiological and physical stressors while enhancing general mental wellness.

NOVELTY

- i. This study is fulfilling the norms of Smart Cities 4.0 and Industry 5.0 in the 21st-century lifestyle.
- ii. This study met the requirements of a conventional five-minute "*Y break*" AYUSH protocol and the usual yoga procedure intended to help employees feel less stressed and anxious.
- iii. This study was done specifically for industrial workers in an authentic manner.
- iv. A socio-demographic study was also investigated.
- v. Yoga is a subjective study however this research has been statistically quantified.
- vi. Use of the control group was done for comparative study, however, in the previous studies, most of the authors did not take the control group.

RECOMMENDATIONS AND SUGGESTIONS

WHO took initiative to develop assessment for QoL for its reaffirmation of commitment for mental health care (Sagar, S., et al., 2022). It is interesting to note that although India's public health service model is founded on Western models of care, there is a strong and growing trend in policy to incorporate traditional AYUSH services into primary care, according to (Sharma, K., et al., 2021). The incorporation of AYUSH has been characterised as a cost-effective approach and as a chance to move toward a more comprehensive view of mental healthcare. The focus of health measurement has evolved in recent years from measurements of the impact of illness and damage on daily activities and behaviour to measures of the effect of disease and damage on conventional health indicators, such as death and disease by incorporating yoga into daily life, one may achieve increased health, self-confidence, inner serenity, and stress-free living. In this technological age, yoga is a stronger shield for health and pleasure. As the age increases significance of yoga also increases. Our well-being will greatly benefit from performing a few yoga asanas and poses each day. To be the happiest and healthiest version of yourself, it is wise to dedicate a few minutes each day to practicing yoga Surya Namaskar.

Various studies have suggested that, the Surya Namaskar Yog increases traits of QoL like focus, attention, relaxation, cognitive function, and memory to boost learning concentration. Yoga builds rock-hard abs, enhances digestion, aids in detoxification, increases flexibility, ensures regular menstrual cycle, tones up arms and legs muscles, strengthens back bone, supports weight loss, and enhances good health (Sagar, S., et al., 2022), (Ismail, S., & Amalia, T. V. 2022).

LIMITATION

The short sample size and unequal gender distribution of participants in the yoga and control groups hampered the investigation. A bigger sample size would allow the researcher to extend the results to the full population.

The study was limited by the small sample size and unbalanced gender distribution of contestants in the yoga group and non yoga groups. A larger study sample would enable the researcher to extrapolate the findings to the entire population.

FUTURE RESEARCH DIRECTIONS

Future studies on the effects of the Surya Namaskara Yog series on populations of patients with hypertension under medication control are advised in order to determine whether blood pressure can be dropped to the point where medication can be stopped, or the dosage lowered. It is crucial for the participants' safety that blood pressure is under control because Surya Namaskara (SN) is contraindicated for uncontrolled hypertension. By lowering stress and boosting immunity, yoga may help reduce the risk of COVID-19 if specific yoga routines are put into practice as part of a global public health program (Rastogi, R., et al., 2022) When there is a short of time in the day for work, study, exercise, and socializing. The offices' workplaces and corporate wellness centers may offer Surya Namaskar Yog for recreational facilities to live a happier and more serene life.

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