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A Holistic Approach to Disease Control and Well-Being in the Technological Age via Yoga Asanas

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Abstract: As technology is being developed in the modern world, the prevalence of many physical and mental illnesses has also been. This health trend is mostly influenced by food decisions, lifestyle choices, and exercise routines. Yoga, pranayama, and mudras have become important tools in the fight against sickness, helping both individuals and the entire human race. The impact of various yoga asanas on common ailments including Type 2 Diabetes and digestive issues is thoroughly examined in this study. The results of the study clearly imply that yoga may be used to control these diseases as a preventative tool as well as a therapy alternative.
Keywords: Yoga, Asanas, digestive disorders, Diabetes.

1. Introduction

One of the earliest disciplines of Indian heritage, yoga aids in enhancing mobility, lowering blood pressure, and boosting general well-being. Yoga is a well-liked workout and as well as an alternative spiritual and medicinal route [1,2] Yoga is a psycho-somatic spiritual practice for obtaining the ultimate oneness of the person with the world as well as unity and harmony between the mind, body, and soul. In addition to using medications, including a basic yoga routine to your everyday routine can help the diseased to fight disease. For yoga to provide the greatest health benefits, consistency and regularity must be upheld[3–5].

According to its etymology, the term "Yoga" comes from the Sanskrit root "Yujira Yoga," which means "to unite, to combine, or to integrate." In this area, yoga is significantly advancing the field of contemporary medicine. Numerous studies on yoga therapy have been conducted over the last several decades, and they have demonstrated its effectiveness in treating various conditions as a long-term form of rehabilitation as well as a valuable addition to medical treatment. Yoga is essential in avoiding ailments, as the adage goes, "Prevention is better than cure." In the new century, yoga is essential in this area. Yoga is a method of obtaining mastery over the mind, according to Patanjali muni, one of the greatest rishis of ancient India, who lived from the second century BC to the fifth century B.C. The eight limbs of Patanjali Ashtanga Yoga are: Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana, and Samadhi [6].

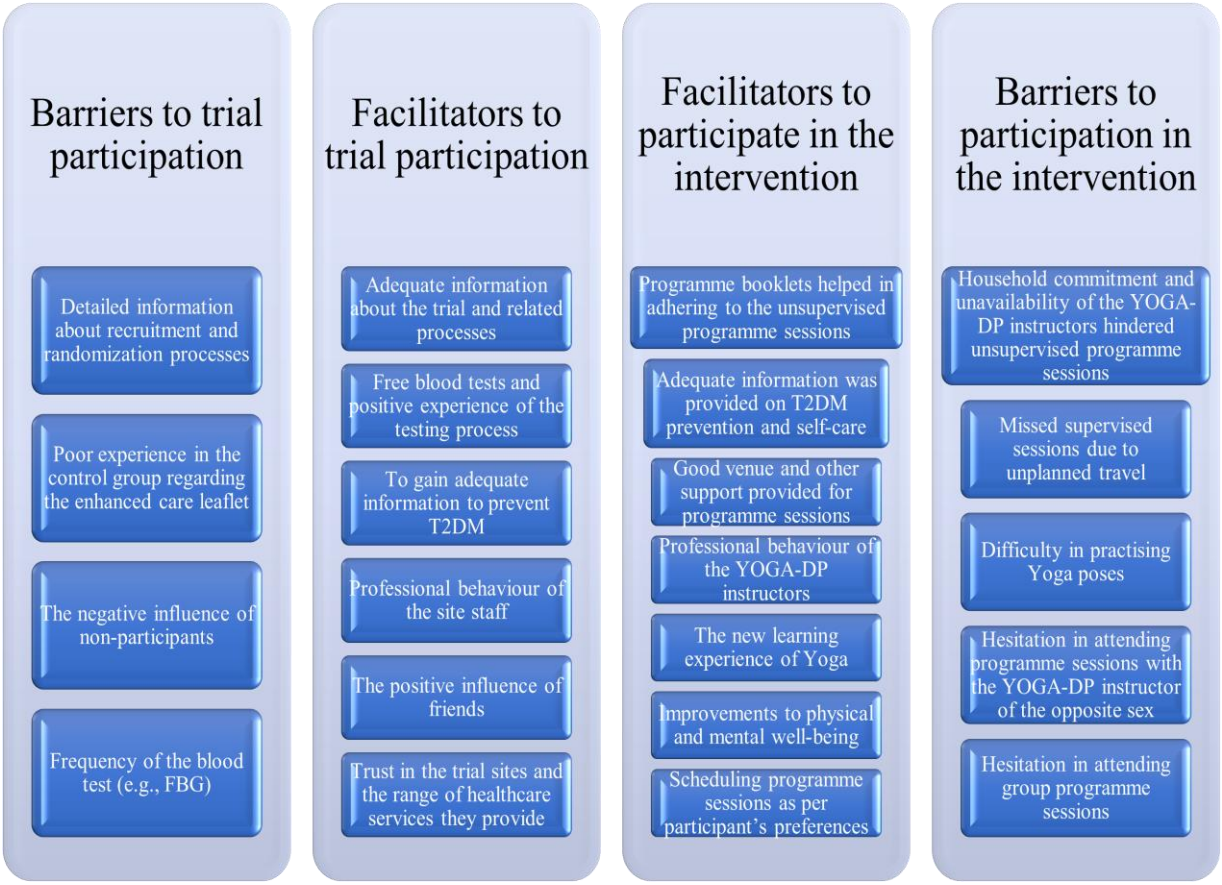
A person who does yoga improves his lifestyle. The human race has entered the 21st century. Better technology and medical scientists collaborate to provide better healthcare. Humans should be happier and healthier with greater technology and facilities at their disposal, according to expectations. But in reality, there are more and more people who are afflicted by both physical and mental illnesses. Yoga might be used to both prevent and manage many ailments. Health professionals must now recognize the paradigm change in how we see human health issues as we approach the new millennium. All dimensions of mental health are being investigated. A sizable study team at WHO has discovered that through years of reflection, practice, and discussion, a vast body of information is accessible in this soil of spiritual searchers who meditated in Himalayan caves. Health experts are beginning to recognize the body of information that these diligent researchers have left for us as a great resource for advancing the fundamental human consciousness toward a harmonious way of life that promotes satisfaction and peaceful living.

2. Literature survey

Asana, according to David Frawley and Sandra, refers to a bodily position that promotes mental and physical stability as well as a sense of well-being. Asana is also known as a postural pattern; to attain this

pattern slowly, keep it consistently for a period of time, and then release it again gently and smoothly. The majority of these patterns are based on the natural postures of different animals, birds, or even symbols like trees, lotuses, etc. since asana is an attitude that is psycho-physiological in nature. Through specific neuromuscular systems engaged in various postural patterns, the entire body and mind get progressive instruction[7][8]. Studies have outlined and looked at the participants' challenges and facilitators linked to trials and interventions (Table. 1). The findings are presented using four primary subjects and a number of sub-themes. Although all participant quotes provided here have been anonymized, their age, gender, and research arm have not changed [9].

Table. 1: Classification of trial and intervention-related facilitators and obstacles experienced by participants [9]



3. Impact Of Yoga On Various Disorders

1. **Digestive Disorders**:

Other than these, common digestive disorders include IBD (Inflammatory Bowel Disease), GERD (Gastroesophageal Reflux Disease), gastric ulcers, duodenal ulcers, Chron's disease, ulcerative colitis, hemorrhoids, etc. Common digestive disorders include abdominal pain, flatulence, gastritis, diarrhea, dysentery, anorexia, constipation, etc.

2. **Effect of Yogasana on the digestive system-**

The bodily functions of internal glands and tissues, the removal of waste products from the body, and the flexibility of the muscles all contribute to overall health. Numerous Asanas offer the inside organs a special massage that makes them work better. The Asanas' alternating stretching and contracting motions aid in maintaining muscular tone. Constipation and intestinal sluggishness are treated in the upside-down position. A

projecting belly may be flattened and strengthened as the stomach muscle settles into its natural place. (Fig.1.) Yogasana, which not only massages and stimulates internal muscles for peristaltic activity but also keeps the internal organs in their correct positions in the abdominal cavity, prevents prolapse of the stomach and intestine, promotes the entire evacuation of waste products from the body.

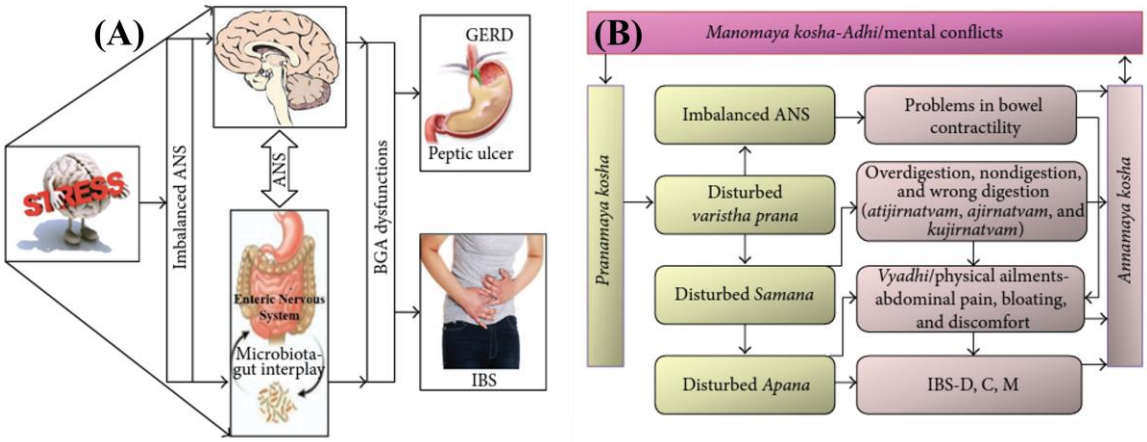


Fig 1: (A) Role of stress in the development/exacerbation of stress. (B) Adhi's transformation into Vyadhi in the setting of IBS is depicted schematically [10].

1. Padmasana: Digestion is reported to be improved by padmasana. The organ in the stomach and belly is stimulated throughout this asana to create enough enzymes to efficiently digest all the food consumed. Through this pose, blood flow is diverted away from the legs and toward the belly. The internal organs benefit from the increased blood flow in the belly, which also helps digestion.
2. Pavanamuktasana: It increases peristaltic motions and regulates the activity of the abdominal endocrine viscera because it massages the belly and digestive organs. By applying pressure on the belly, this asana helps to cure constipation and release any trapped gases in the gut. The digestive system operates more efficiently. This pose is employed in the treatment of abdominal discomfort, intestinal colic, dyspepsia, constipation, and flatulence.
3. Bhujangasana: It properly massages the stomach, pancreas, liver, and gallbladder as well as other abdominal organs. It increases the digestive system's blood flow, oxygenation, and efficiency in removing waste.
4. Shavasana: Shavasana is the ideal healing position. You will be in your parasympathetic nervous system while you are at rest. Alternatively referred to as your "Rest and Digest" reaction. Your extremities are pointing toward your digestive organs while you lie quiet, letting all of your tension melt away. The digestive organ's oxygenation will rise as a result. Additionally, it fosters the best conditions for healing, cleaning, and digesting.
5. Trikonasana: It tones and massages every internal organ. It helps to enhance digestion and reduces indigestion, acid reflux, and gas. It enhances the effectiveness of the digestive system and increases appetite.
6. Dhanurasana: It strengthens the stomach muscles, improves digestion and appetite, relieves constipation, and enhances the function of the liver, pancreas, small and large intestines.
7. Ustrasana: It increases belly size, which enhances digestion and urination. It relieves indigestion and constipation and releases Apana Vayu.
8. Vajrasana: It helps with regular digestion and is most effective just after a meal. As a result of the muscles on both thighs sharing weight while we are seated in Vajrasana, there will be less blood flow through those areas. Due to this decrease, more blood reaches the head, heart, and stomach. Blood circulation will be rather excessive above the navel. As a result, the ability of several glands linked to the digestive process to function better rises, enhancing the strength of digestion.
9. Sarvangasana: By holding oneself inverted, you may reverse the effects of gravity on your digestive system, which can encourage the flow of any stalled waste products, relieve gas, and generally

restore your digestion. To avoid acid regurgitation, it is advisable to perform this position either right before or right after eating. It helps in the treatment of colitis, hyperacidity, and other conditions.

10. Shirshasana: A handstand improves body heat and energy by enhancing digestive fire. By turning the pull of gravity backward and releasing clogged blood in the colon, internal organs, in particular the intestines, are cleaned.
11. Padahastasana: Yogasana is a forward bend. It is regarded as one of the finest yoga postures for beginners since it calls for a lot of flexibility in the legs, back, and abdomen. As it stretches the abdominal viscera and stimulates blood flow, it relieves digestive disorders. Additionally, it aids with abdominal organ toning.

4. Simple Yoga Poses to Control Diabetes:

1. Dhanurasana (Bow Pose): The pancreas is regulated and strengthened by this stance. Therefore, those who have diabetes can perform this stance. It also aims to strengthen the abdominal muscles, improve digestion, and avoid stomach cramps.
2. Balasana (Child pose): Hamstrings, rotator cuff, and spinal extensors are all engaged in this position. Stress, weariness, and back and neck discomfort are all reduced by it. Additionally, it promotes relaxation, which aids in boosting the synthesis of beta cells that produce insulin.
3. Bhujangasana (Upward-Facing Dog Pose): In this position, your quadriceps, triceps brachii, and spinal extensors all cooperate. It therefore improves the muscle strength in your body. In the end, it lowers blood sugar levels.
4. Corpse Pose (Shavasana): It is the ideal stance for sleeping. It enables the body to chill off and transition into a state of meditation. The corpse stance helps to relax the body and clear the mind. It makes it possible for the brain to digest the workout and get its physical effects.

Table. 2: Before and after 40 days of yoga asanas, fasting blood glucose (FBG), postprandial blood glucose (pPG), glycosylated hemoglobin (HbA), and lipid profile readings were measured [11].

	N	Mean ± S.D.		P Value
		Before	After	
FBG (*mg/dl*)	20	208.3 ± 20.0	171.7 ± 19.50	0.001
PPG *mg/dl*)	20	295.3 ± 22.0	269.7 ± 19.9	0.059
HbA_1 (%)	20	10.27± 0.5	8.68 ± 0.4	0.004
Chol (mg/dl)	22	222.8 ± 10.2	207.9 ± 8.6	0.003
TG (*mg/dl*)	22	168.5 ± 15.5	146.3 ± 13.5	0.075
LDL (*mg/dl*)	22	144.8 ± 8.6	140.7 ± 7.9	0.309
HDL1 (*mg/dl*)	22	43.8 ± 2.6	40.7 ± 1.9	0.309
VLDL1 (*mg/dl*)	22	37.4 ± 4.6	32.1 ± 3.4	0.059
Chol/HDL	22	4.76 ± 0.06	4.55 ± 0.05	0.154

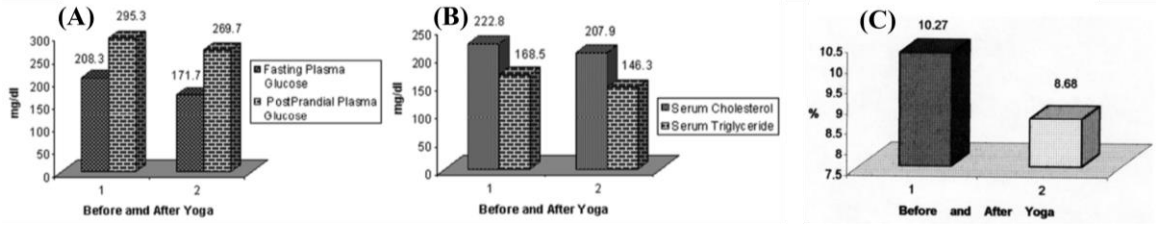


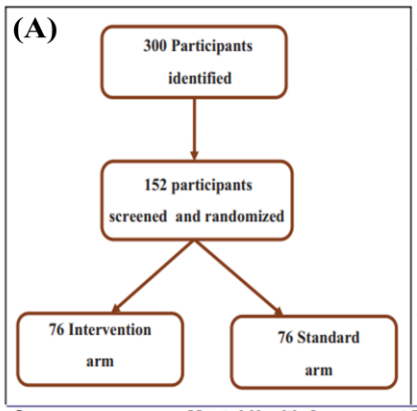
Fig 2: Competition plats on (A) fasting blood glucose & postprandial blood glucose, (B)Cholesterol & Triglyceride (C) glycosylated hemoglobin level [11]

Twenty Type 2 diabetic participants between the ages of 30 and 60 participated in the V Malhotra et al study to examine the effects of 40 days of yoga asanas on biochemical profiles. The individuals performed a recommended series of yoga movements for 30–40 minutes each day while being free from specific problems. The findings showed statistically significant gains in a number of measures. Significant reductions were

observed in serum cholesterol, triglycerides, low-density lipoprotein cholesterol, and very low-density lipoprotein cholesterol as well as fasting and postprandial blood glucose levels (Fig.2). Additionally, levels of glycosylated hemoglobin dropped, indicating improved glycemic management. These results imply that yoga asanas can improve lipid profiles and glycemic management in Type 2 diabetic patients with mild to moderate disease [11].

Diabetes is a prevalent lifestyle illness that results in persistent hyperglycemia, different cardiovascular problems, and insulin resistance with relative or absolute insulin insufficiency. The anticipated prevalence of diabetes worldwide in 2019 is 9.3% (463 million people), and it is expected to increase to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045. Urban regions (10.8%) and high-income nations (10.4%) have greater prevalence rates than rural areas (7.2%) and low-income countries (4.0%), respectively. One in two (50.1%) diabetics are unaware that they have the disease. Impairment in glucose tolerance is predicted to affect 7.5% (374 million) people worldwide in 2019 and 8.0% (454 million) people by 2030 and 8.6% (548 million) people by 2045 [12].

People with diabetes are increasingly turning to yoga practice to keep their blood sugar levels under control, and Dr. Ashwini Sarode, a consultant diabetologist, has remarked that it's having a great impact. A single yoga teacher from Krishnamacharya Yoga Mandiram led and supervised 35-minute yoga sessions at the diabetes facility. Five people were trained in a single session over the course of an entire day since the teacher had expertise in the small group intervention teaching style. Participants in the intervention group received the lesson once every two weeks for three months. Tadasana, Parshwa uttanasana, Trikonasana, Apanasana, Jatara parivritti, Dwipadapeetam, and Chakravakasana Vinyasa are a few of the asanas that will be practiced throughout the 20 minutes of yoga. The practice will conclude with 8 minutes of Shavasana and 6 minutes of pranayama technique. Each of these poses was executed dynamically, with breathing and movement coordinated. In order to enhance learning while keeping participants safe, the asanas were modified to fit their needs and abilities. Through reduced stress and increased metabolism, the yoga intervention helps with glucose control. Every two weeks over a 12-week period, participants in the intervention group were urged to attend yoga classes. Twelve weeks of intervention are followed by a three-month follow-up period. Participants were urged and given instructions to carry on their yoga practice at home during the follow-up period and to record their sessions in the accompanying yoga booklet. In order to assure compliance, follow-up was conducted extremely actively throughout these three months via frequent phone calls and occasionally, house visits. After the intervention sessions, participants were examined and urged to carry on their yoga practice at home. Standard medical care, including medication, dietary recommendations, and exercise, were given to the individuals in the control group [13].



(B)

S. no.:	Variable	Intervention (n = 76)	Control (n = 76)	P-value
1.	Age (years)	52.36 ± 7.0	53.75 ± 7.9	0.254
2.	Body mass index (kg/m²)	27.39 ± 3.86	26.75 ± 3.28	0.272
3.	Systolic blood pressure (mmHg)	123.28 ± 11.67	123.70 ± 9.9	0.811
4.	Diastolic blood pressure (mmHg)	78.21 ± 7.35	76.58 ± 7.02	1.632
5.	Fasting blood glucose (mg/dL)	142.2 ± 27.38	141.11 ± 28.67	0.811
6.	Post-prandial blood sugar (mg/dL)	237.18 ± 58.93	247.61 ± 66.3	0.308
7.	HbA1c (%)	8.49 ± 1.1	8.30 ± 1.09	0.290
8.	Urea (mg/dL)	22.81 ± 6.78	21.13 ± 5.31	0.920
9.	Creatinine (mg/dL)	0.70 ± 0.14	0.68 ± 0.13	0.366
10.	Serum cholesterol (mg/dL)	171.90 ± 39.74	173.18 ± 39.25	0.842
11.	Serum triglycerides (mg/dL)	135.06 ± 45.25	166.6 ± 219.4	0.221
12.	HDL(mg/dL)	38.38 ± 6.67	39.40 ± 6.10	0.325
13.	LDL (mg/dL)	102.25 ± 31.85	101.04 ± 32.25	0.818

(C)

S. no.	Mental Health Assessment Test	Intervention (n = 76)	Control (n = 76)	P-value
1.	Patient Health Questionnaire (PHQ)	6.9 ± 4.8	5.9 ± 3.7	0.137
2.	MoCA (cognitive function)	25.9 ± 2.1	25.5± 2.4	0.311
3.	Perceived Stress Scale (PSS)	12.7 ±6.1	14.3 ± 5.6	0.079
4.	Mindfulness (MASS)	78.5± 9.6	79.2± 9.3	0.653
5.	Quality of life (QoL)	-1.3± 1.5	-1.5± 1.4	0.294

Fig 3: (A) Allocation of participants to intervention and control arms, (B) Baseline characteristics of the study population, (C)Baseline Mental Health Assessment score for the study population [14].

The Madras Diabetes Research Foundation in Chennai conducted an interventional, randomized prospective trial for a duration of six months, and the Institutional Ethics Committee gave its approval. The registration number for the trial is CTRI/2018/04/013169. The study was conducted in conformity with the good clinical practice standards described in Schedule Y (revised 2005), Declaration of Helsinki, as updated and revised from time to time, and established by the International Conference on Harmonization. From Chennai's Dr. Mohan's Diabetes Specialities Center, T2DM participants were chosen. Participants in the study were recruited, with ages ranging from 18 to 65, verified T2DM, and HbA1c values between 7.0% and 10.5%. Participants with type 1 diabetes mellitus, serum creatine concentration >132.6 mmol/L, liver function impairment, abnormal biochemistry, hematology, or urine tests, significant drug, alcohol, or medication abuse, current treatment for schizophrenia, dementia, bipolar disorder, or bipolar disorder under the supervision of a psychiatrist, or those with any of these diagnoses were excluded from the study (Fig.3.). The participants' preferred language (English or Tamil) was used to fully explain the study's details and get their signed permission. The trial's consenting participants were divided into the intervention and control groups at random. Each patient's permission was sought by the investigator before any study-related procedures were carried out. Information was handled in strict confidence and in accordance with the local data protection laws [14].

Table. 3: Changes in life quality as a result of intervention [15].

Parameter	Control		Yoga	
	Pre	Post	Pre	Post
Environmental Domain	31.12 (3.47)	31.08 (3.29)	26.08 (3.49)	31.84** (3.10)
Social Domain	10.8 (1.32)	10.8 (1.12)	11.44 (1.39)	13.96** (0.84)
Physical Function	27.04 (1.86)	27.2 (1.61)	26.2 (2.38)	32.2** (2.18)
Psychological Function	21.52 (4.18)	21.68 (3.92)	22.08 (2.18)	26.84** (1.65)

Another research focuses on examining the impact of yoga on health and recruits healthy volunteers who must be between the ages of 30 and 60 and live in New Delhi. Variables/measurements, WHO Life-quality in brief. 50 people responded to the survey, 25 of them were in the control group and 25 were in the yoga practice group. Table. 3. All of the data variables passed the Shapiro-Wilk tests for normality, which revealed that the data were normally distributed. In the yoga and control groups, paired 'T' tests were performed to examine differences within each group, and independent samples 'T' tests were used to examine differences between groups. The current study evaluated the impact of yoga on many aspects of participants' quality of life in comparison to a control group. In comparison to the control group, the study found that the yoga group significantly improved on all four dimensions of the WHO QOL scale: physical health, psychological health, social relationships, and environmental health. With this, daily practice of a simple and straightforward yoga technique aids in raising quality of life [15].

Researchers are studying if these potentially interesting platforms—dubbed exergaming, serious games, or active video gaming—are similar to moderate or strenuous physical exercise and have the potential to encourage healthy active behaviors. There have been several reviews of exergame intervention trials and lab energy consumption. More over half of American adults play games, according to a recent systematic assessment that focused on kids, while just 29% of those over 50 play video games. Exergames then have the ability to reach a large audience and encourage community-wide physical activities (PAs). The goals of this project are to provide laboratory assessments of yoga as a healthful physical activity and to determine whether yoga skill development can be assessed in an exergame format as a tool for encouraging physical activity [16].

It was unheard of to combine the terms technology and yoga in a pre-artificial intelligence era. It was expected that the two would never meet since they don't complement one another. You'll notice that the future will seem significantly different if you fast-forward. Almost every business has been impacted by artificial intelligence technologies, including banking, education, healthcare, and retail. AI is now present in the health sector, including yoga. A firm has developed a method for individuals to perform precise yoga positions using AI. With the use of machine learning and movement detection technologies, Zenia bills itself as the first virtual yoga assistant in the world. In digital yoga, where a coach assists in enhancing positions, it (being yoga) is more approachable. Step-by-step instructions on how to stand, extend, or bend for each position are provided by

Zenia. The voice-activated commands also instruct the user on what to expect from the activity. With the use of artificial intelligence, the yoga software MixPose from San Francisco hopes to enhance the user's yoga positions. Yoga instructors transmit live footage to their pupils so they can see the angle of the positions and better comprehend them. For optimal effect, it helps the practitioner deepen the positions. Sofia is yet another AI-powered personal yoga teacher. It incorporates a voice assistant to provide guidance on how to improve postures. It guides users through asanas using computer vision and deep learning models and gives stars depending on how well postures are executed. Yoga will soon be practiced at home thanks to the YogiFi Mat, according to an Indian business called Wellnesys, which aims to modernize the practice globally using AI, ML, and IoT. This cutting-edge mat has a built-in feature that keeps track of all the yoga poses and provides adjustments in real-time. There is no use of a camera in all of this. Additionally, the user's strength, flexibility, and balance are calculated by this mat. This interactive, intelligent mat provides the customer with a customized service. The user will benefit from better health when hardware and software are powered by AI. When compared to a real yoga studio where there are many students being taught by one instructor, these applications have the ability to provide an app user with the best experience. Applications offer a digital coach that is personalized and has a focus on the practitioner. Additional advantages provided by AI include the ability to deliver material in the user's preferred languages and accents. Future AI-enabled interactive app development will assure more user adoption of the same. The complexity of the apps contributes to an improved user experience, which eventually leads to greater physical and mental health. Artificial intelligence and yoga both have a future. The combination of the two provides an unrivaled experience that will surely become popular all over the world. There is a lot of effort being done to integrate AI into health care via Android apps [17].

5. Conclusion

Yoga may be practiced regularly to maintain good health and it also aids in preventing many psychosomatic ailments where psychological stress is thought to be a contributing factor. These techniques primarily lower psycho-physiological arousal but also improve many components of attention, such as the capacity to sustain, concentrate, and change attention, resulting in an increased sense of calm and relaxation. It lessens stress and anxiety, enhances the functioning of the autonomic and higher neurological centers, and even, as some studies have demonstrated, improves the patients' physical health. To clarify the effects and the processes of such impacts of yoga on the human body in health and disease, more focused scientific research is unquestionably required.

AI is now present in the health sector, including yoga. A firm has developed a method for individuals to perform precise yoga positions using AI. With the use of machine learning and movement detection technologies, Zenia promises to be the first virtual yoga assistant in the world. With the coach's assistance, digital yoga makes yoga more approachable. Step-by-step instructions on how to stand, extend, or bend for each position are provided by Zenia. The voice-activated commands also instruct the user on what to expect from the activity. The conclusion that building AI-based mobile apps would be helpful to provide Yoga instruction to both prevent and treat various ailments is reasonable given the scientific information that has been covered thus far.

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