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A SYSTEMATIC AND SCIENTIFIC IMPACT OF PHYSICAL EXERCISES COMBINED WITH YOGIC PRACTICES ON SELECTED PSYCHOLOGICAL VARIABLES OF MIDDLE AGED TYPE-II DIABETIC PATIENTS

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Abstract

The aim of this research was to methodically and thoroughly investigate how specific psychological variables in middle-aged women with type II diabetes were affected by physical activity and yoga. Sixty (n=60) volunteers between the ages of 35 and 45 were chosen from the Alagappa network of educational organizations in Karaikudi, Sivagangai District, Tamil Nadu. There were four equal teams of fifteen individuals each: Group I engaged in sporting activities, Group II practiced yoga, Group III pursued a combination of yoga and strenuous exercise, and Group IV was the control group, receiving no specific prescription. Training sessions lasted two hours each and were held five days a week for the duration of the six-week training. Everly's and Girnado's Psychological Stress Scale was used to measure stress concentrations. Data were collected from both the untried and switch groups. The dependent't' test and Research of Covariance (ANCOVA) were used for statistical examination. The 'F' ratio of the corrected post-test means was considered significant when it reached the necessary level.

Keywords: Physical Exercises, Yogic Practices, Middle aged Diabetic Women**,** Stress

INTRODUCTION

A major and concerning worldwide health issue, type 2 diabetes mellitus (T2DM) is impacted by behavioral, environmental, and genetic variables [1]. It causes pancreatic β-cell dysfunction, insulin resistance, decreased insulin production, and elevated blood sugar levels. T2DM, which is brought on by impaired glucose tolerance or fasting glucose, lowers millions of people's quality of life and places a heavy financial strain on healthcare systems. Roughly 90% of diabetes cases occur in low- and middle-income countries. As per the 10th edition report of the International Diabetes Federation 2022, 95% of the 436 million individuals with type 2 diabetes in 2019 had diabetes mellitus, up from 285 million in 2009. By 2030, this figure is anticipated to reach 643 million, and by 2045, it will reach 783 million. According to WHO estimates, 700 million persons may have diabetes by 2045. Type 2 diabetes is becoming more common due to a number of major risk factors, including obesity, sedentary lifestyles, smoking, excessive alcohol use, western foods, aging, and physical inactivity. Over the past 40 years, the incidence of these variables has significantly grown. Insulin resistance and βcell failure can both result from these circumstances. Modern medication has historically been the mainstay for managing diabetes, but it is frequently target-based and nonholistic, which can have long-term negative impacts. Numerous alternative and integrated therapy approaches are often beneficial for people with chronic diseases, according to research.

Additionally, patients' health is improved by complementary and alternative medicine, which either directly or indirectly addresses chronic noncommunicable lifestyle illnesses. One major obstacle on the road to holistic health is the potential for traditional treatment modalities to be replaced by simultaneous applications of herbs and integrated medicines [2]. Additionally, integrated therapy treats T2DM's psychological and physiological components.

Integrative medicine, sometimes referred to as integrated treatment, is founded on the ideas that patients and doctors should work together to promote the body's own healing processes and that conventional and complementary therapies should be used appropriately. This all-encompassing strategy includes quitting smoking, controlling weight, getting frequent checkups, managing one's lifestyle, and including dietary changes, vigorous exercise, asana, or natural medicine, yoga, and acupuncture. All of these actions enhance long-term health and wellness. Integrated medicine aims to control blood sugar levels and enhance general health.

Patients with type 2 diabetes are increasingly adopting the integrated-pathy approach. Aayog, the National Institution for Transforming India, has also taken a big step toward putting integrative medicine policy principles into practice. Stress has a biological or physiological basis. A physical, mental, or emotional stressor may be the cause of tension in the body event mind. Numerous factors can cause stress, including external factors like the environment, mental health, or social circumstances, as well as internal factors like diseases or medical procedures [3]. Stress can set off the complex neurologic and endocrinologic "fight or flight" response.

Physical exercise with yogic practices offers a promising approach to managing stress among middle-aged individuals with type-II diabetes, especially when tailored for holistic well-being. Physical exercises are known to improve insulin sensitivity [4], glucose metabolism, and cardiovascular health, which are crucial for diabetic patients When combined with yoga, these benefits are amplified, as yoga not only aids in physical health but also supports mental relaxation, reduces cortisol levels, and helps in stress management.

Stress is a significant factor influencing the progression of type-II diabetes, often exacerbating glycemic levels and worsening overall health. Regular yogic practices, such as Yoga and prana (breathing techniques), have shown a direct impact on reducing psychological stress markers by modulating the autonomic nervous system [5], thus improving mental clarity and fostering emotional resilience Additionally, yoga can help improve physical endurance and flexibility, making it easier for patients to engage in moderate physical exercises.

Since its alleged inception in India about 2,000–3,000 years ago, yoga has been connected to religious, cultural, and physical pursuits. Yoga has been used for thousands of years to enhance mental, physical, and spiritual health. 16–18 Asanas (physical postures), pranayama (controlled breathing), and meditation are among the yoga techniques frequently employed to manage illness and advance health. 19. Yoga is being utilized more and more as a supplemental treatment for type 2 diabetes. According to research, yoga helps diabetic patients with their blood sugar, cholesterol, oxidative stress, blood pressure, body weight, waist-to-hip ratio, heart rate, sympathetic activity, coagulation profiles, and pulmonary function. The utility of yoga for glycaemic management in individuals with type 2 diabetes was assessed in a recent comprehensive review. 20

The scientists came to the conclusion that yoga helped patients with type 2 diabetes achieve better results. Yoga primarily produced significant benefits in relatively short-term glycaemic control measures (like Fasting Plasma Glucose [FPG]); on the other hand, its effects on longer-term endpoints (like HbA1c and problems connected to diabetes) were either non-significant or contradictory. Numerous papers were also found to have subpar study designs, inadequate control groups, and inadequate explanations of sampling and statistical analysis methods. 22 Despite the fact that numerous systematic reviews and/or meta-analyses have assessed the advantages of yoga for diabetes control, no reviews have yet to compare the effectiveness of yoga with other forms of physical exercise, such as resistance or aerobic training. The current study is to conduct meta-analyses and a systematic review of the literature regarding the benefits of yoga practice over vigorous physical activity in the treatment of type 2 diabetes.

RELATED WORKS

When compared to standard care or no intervention, yoga has been shown to be effective in reducing the prevalence of modifiable metabolic disease risk factors, including fasting blood glucose (FBG) [6], glycosylated hemoglobin A1c (HbA1c), and lipid levels, in both high-risk and type 2 diabetes populations. A number of methodological flaws in the reported studies have been brought to light by the majority of meta-analyses. These flaws primarily relate to the appropriateness of sample size, incorrect randomizations, allocation concealment, absence of intention-to-treat analyses, and failure to blind at least outcome assessors. Yoga was first practiced in India more than 4,000 years ago, and in recent decades, its popularity has grown gradually in the US and other developed nations. Perhaps the most well-known and frequently practiced of the seven main types of Hindu yoga are Hatha (or muscular) yoga, Raja yoga, and mantra yoga.

The rising socioeconomic cost on society is indicated by the current global prevalence and mortality rate linked to diabetes mellitus. Diabetes can cause microvascular problems including neuropathy, nephropathy, and retinopathy as well as macrovascular problems like cardiovascular illnesses [7]. Type 1 (insulin-dependent), type 2 (noninsulin-dependent), gestational diabetes mellitus, and diabetes from other causes are the categories into which the American

Diabetes Association divided diabetes. The most widely used antidiabetic medication, metformin, is linked to elevated homocysteine levels and vitamin B12 deficiency due to vitamin B12 malabsorption with continuous use. Despite the established advantages of insulin and/or oral medications, there are a number of negative pharmacological reactions, patient metabolic complications, and unavoidable financial consequences. Since diabetes mellitus is a chronic condition, long-term adherence to treatment is necessary.

Sedentary lifestyles, poor diets, and psychological stress are the main risk factors frequently linked to the onset and maintenance of Type 2 diabetes mellitus (T2DM). The risk factors and illness maintenance are closely linked to psychological stress [8]. The prediabetic state plays a major role in the development of type 2 diabetes in addition to the hereditary background. Diet, exercise, and medication are the three main pillars of diabetes control. Yoga's effectiveness in treating a number of chronic conditions, including diabetes, hypertension, asthma, and chronic obstructive pulmonary disease, has been investigated.

According to earlier research, yoga may help lower insulin resistance syndrome, which is a unique set of risk factors for the onset of type 2 diabetes. It has also demonstrated encouraging outcomes in terms of symptom improvement [9], prognosis improvement, and complication reduction. Additionally, research indicated that regular exercise, a balanced diet, and proactive stress management could either prevent or postpone the onset of diabetes from the prediabetic stage.

Buddhist monks frequently engage in walking meditation, which consists of focusing on the posture or movement of the arms or legs while you walk in order to generate intention, which then results in calm. Buddhist arm-swing-walking meditation enhanced endothelium-dependent vasodilation and decreased depression in older patients with symptoms of depression, according to a recent study conducted in our lab. The potential benefits of walking meditation for decreasing vascular problems and glycemic control in diabetic patients are uncertain. The older participants in our earlier trial [10], who were otherwise healthy but anxious, walked on the hard surface outside. The current study used a meditation technique based on Buddhism while walking on a treadmill. This allowed for greater control over workout intensity in a monitored environment while requiring less space. This exercising on a treadmill may help lower stress, enhance vascular function, and regulate blood sugar levels, all of which could help avoid complications from diabetes.

Asanas that stretch and compress the throat region are thought to be beneficial adjuvant modulators. Additionally, the warming effect of pranayama practices will benefit people who experience persistent coldness due to thyroid imbalance. It is known that the specified scenario in type II diabetes is characterized by the quantitative measurement of insulin, cortisol, triiodothyronine (T3) and thyroxine (T4), and thyroid-stimulating hormone (TSH). But oftentimes, latent thyroid comorbidity in type 2 diabetes has not received enough attention. Given the aforementioned information, the current study has suggested a yoga therapy-based methodology. There are currently relatively few yoga routines available for people with type II diabetes who are clinically euthyroid. Furthermore, the WHO and Asian Indian anthropometric criteria for defining obesity and overweight differ [11]. In order to present a comprehensive picture using significant biochemical parameters, we have taken care to incorporate the anthropological component into our study as well.

METHODS OF MATERIALS

YOGA IN TYPE 2 DIABETES

Yoga as a treatment is still an emerging and developing trend in the field of medicine, even though yoga has been practiced since ancient times. Numerous studies have examined how yoga practice affects biochemical, electrophysiological, cell phones, genetic, neuromuscular, and radiological parameters. This has made it easier to use yoga practically to cure a variety of illnesses, and it is currently acknowledged as a clinically effective treatment on a global scale. Yoga is a discipline of health management rather than a treatment for particular illnesses. It has long been a form of meditation with the ultimate objective of spiritual enlightenment.

Dietary management of diabetes with yog

Yoga has been promoted as a potential treatment for eating problems and has been shown to control eating patterns. It is thought that yoga practice fosters a mind-body connection that offers chances for introspection, self-awareness, and transformation. It has been discovered that yoga, a practice called pr and sudarshan kriya helps people follow their drug regimens and eat better.

Yoga practice and mindful eating

Participating in yoga has been linked to better eating habits, mindful eating techniques, and consumption of fruits and vegetables. The capacity to increase mindfulness and practice meditation may help manage binge-eating behaviors. Glycaemic management, mild weight loss, and food intake improvements have all been demonstrated to be facilitated by mindful eating in people with diabetes.

Recommended practice based on evidence in diabetes

A complex intervention, yoga practice consists of many different elements, such as kriya (cleaning procedures), asana (postures), pranayama (controlled breathing), meditation, relaxation, mantra chanting, yogic food, code of conduct, theology, and spirituality.

Numerous yoga techniques have been proven to help control type 2 diabetes; nevertheless, their careful application is advised following a thorough evaluation of the patient's general health, unique needs, related risk factors, and contraindications. Yoga poses of varying intensities may be recommended by taking into account the individual as a whole, incorporating physical inactivity and unhealthy habits.

t is challenging to interpret the benefits of specific yoga postures or other activities because the majority of research has assessed the impacts of yoga practices including postures, a practice called pr relaxation, and meditation. A selection of yoga poses that have been shown to help people with type 2 diabetes are discussed here, along with some potential mechanisms of action.

leansing processes

The purification/cleaning procedures known as shatkarmas are described in the famous ancient literature Hatha Yoga Pradipika and Gheranda Samhita. Of these, the techniques of shankhaprakshalana (intestinal cleansing), kapalbhati (frontal brain cleansing, which is a method of breathing with forceful breaths and automatic inhalations), and vaman dhauti (stomach cleansing with induced vomiting) aid in boosting insulin production and regulating blood glucose levels. Frequent interior cleaning improves the organs' ability to function.

According to a study, vaman dhauti, or emetic therapy, significantly lowered postprandial blood sugar levels and fasting blood sugar levels. By lowering the body's levels of free fatty acids in circulation, it is thought to improve insulin action, decrease insulin resistance, and increase glucose uptake. In kapalbhati [12], the abdominal pressure produced during expiration enhances the effectiveness of the pancreatic β-cells. In order to cleanse the digestive tract, sankhaprakshalana involves a series of yoga poses interspersed with lukewarm water seasoned with salt. Until just water is removed, this process is repeated. This colon cleansing procedure results in a considerable drop in blood glucose levels. This method has been said to boost insulin production and aid in diabetes management. In order to stimulate the digestive fire, or agnisar kriya, the abdomen must be pulled in (uddiyan bandha) and snapped back and forth while holding one's breath. This action's "vacuum" effect increases the flow of blood to the area and massages the inside organs. It increases metabolism and makes it easier for the abdominal organs to work properly. It is advised to use this technique to treat diabetes.

Surya namaskar (sun salutation)

A sequence of energetic yoga postures is performed as part of Surya Namaskar. When a vigorous surya namaskar is performed with energy, the body needs more oxygen and glucose. Brain signaling is used to boost insulin production in order to meet these needs.

In one study, perimenopausal women who participated in a yoga intervention that included 25 minutes of surya namaskar, additional yoga poses, and a deep relaxation technique had a substantial drop in their mean systolic blood pressure and hip circumferences as well as positive impacts on their glycaemic outcomes.

Fight against Chronic Inflammation

PA is essential for maintaining good health. For significant health advantages, the World Health Organization (WHO) suggests a mix of moderate-to-vigorous-intensity physical activity. Pregnant women are advised to incorporate aerobic activity into their daily routines despite antiquated concerns about exercise-induced harm or adverse consequences on the fetus and mother. Patients with GDM are advised by the ADA (American Diabetes Association) and the American College of Obstetrics and Gynecology to engage in moderate exercise for at least 30 minutes each day. A non-pharmacological "adjunctive long-lasting anti-inflammatory therapy" is regular moderate-intensity physical activity. This intervention technique regulates atherosclerosis, glucose metabolism, and other disease processes and has strong anti-inflammatory, antioxidant, and immunosurveillance potential. Significantly, through several impacts, PA may be essential in the treatment and enhancement of T2DM patients' quality of life (Figure 1).

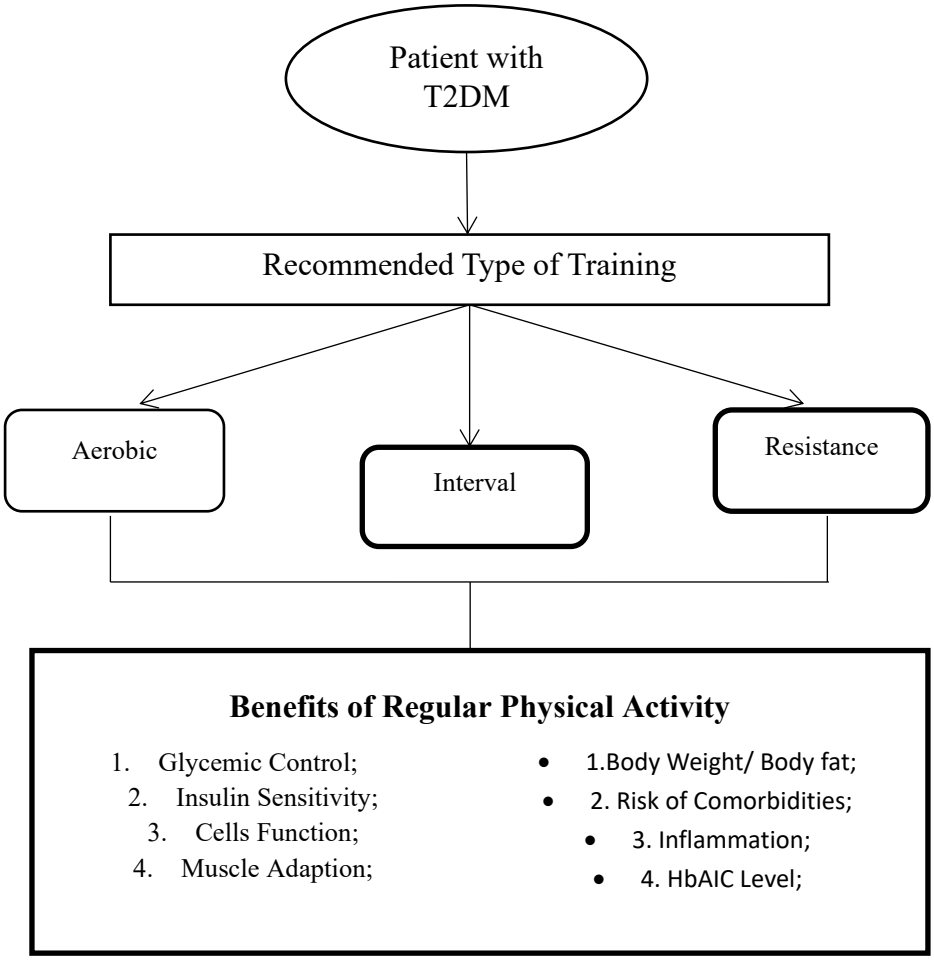


Figure 1 PA's effects on those with type 2 diabetes. Arrows down indicate reduction; arrows up indicate progress

The goal of the study was to discover the A systematic and scientific impact of physical exercises combined with yogic practices on stress of middle aged type II diabetic patients. Sixty (N=60) women subjects were chosen purpose sampling method Alagappa group of Educational Institutions at Karaikudi, Tamilnadu's Sivagangai District in India. They were between the ages of 35 and 55. They were divided into four identical groups of fifteen subjects each. Group I consisted of physical practices [13]; Group II consisted of yogic teachings; Group III incorporated yogic practices with physical movements; and Group IV served as an observation group.

Testing Procedure

Data was collected before to and following the training sessions [14]. A pretest and a post-test were given prior to and after the training enforcement, respectively.

S.no	Variable	Test Articles	Unit of dimension
1	Stress	Everly and Girnado's Psychological Stress Scale	In Numbers

Analysis of Data

Mean	Somatic Exercises	Yogic Observes	Collective Physical Exercises & Yogic Observes	Control group
Pre-test	43.45	43.58	43.67	42.72
Post-test	35.93	38.43	31.47	42.90
't' test	5.34*	3.27*	7.91	0.13

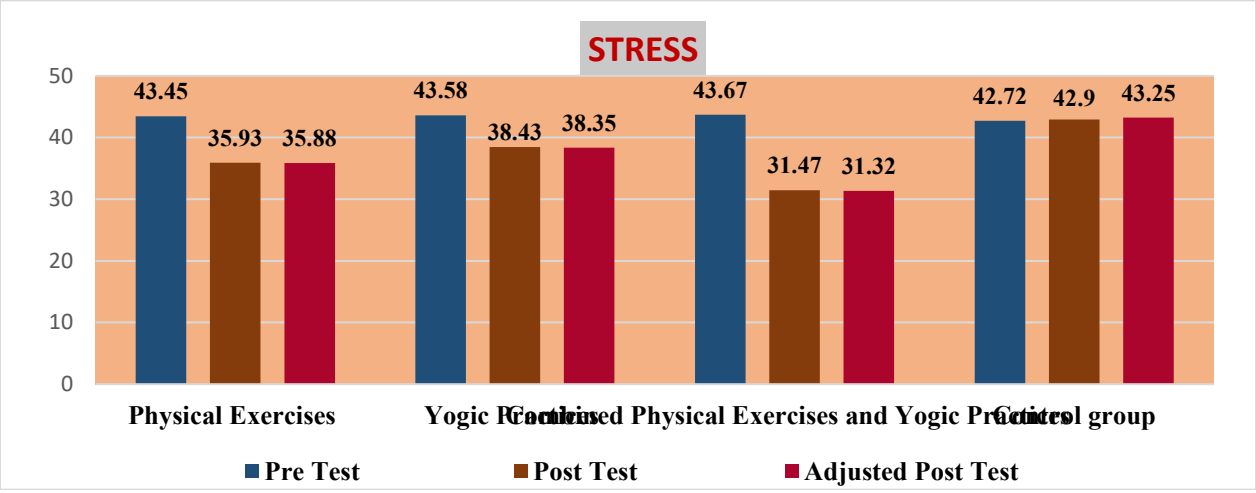
The respiratory rate "t" values for the Physical Workouts, Yogic Practices, Combined, and control groups are 5.34, 3.27, 7.91, and 0.13 respectively, according to Table I. Since the Personal Movements [15], Yogic Things paired value is 2.15 for an important difference with 3 df 14 at the 0.05 level, significant improvement in the stress in experimental groups, including the Yoga, physical activity, and a combination of yoga and cardiovascular exercise and control group.

The covariance coefficient analysis between experiment and control groups' stress levels

Experiment	Corporal Exercise	Yogic Performs	Mutual Physical Exercise & Yogic practice	Mechanism group	SOV	SOS	df	Mean squares	F relationship
Pre test nasty	43.45	43.58	43.67	42.72	Between	8.33	3	2.78	0.21
					With in	745.60	56	13.31	
Post test mean	35.93	38.43	31.47	42.90	Between	1034.27	3	344.66	36.47*
					With in	529.33	56	9.45	
Adjusted post test mean	35.88	38.35	31.32	43.25	Between	1105.52	3	368.51	60.41*
					With in	341.40	56	6.10	

The Calculated post-test mean variance according to Table II stress averages for the physical exercise, yoga, and combined physical exercise and yoga control groups are 35.88, 38.35, 31.32, and 43.25 respectively. For strain to be meaningful at the 0.05 level of confidence, the corrected post-test results' "F" ratio exceeded the 2.78 table values for degrees of flexibility 3 and 56.

Figure: 1 Mean values for the pre, post, and adjusted post-tests Yoga, physical activity, and an uncontrolled group on stress that included both yoga and vigorous exercise



CONCLUSION

The findings showed that the collective did both physical activity and yoga experienced a more significant reduction in stress compared to those practicing either intervention alone. Meanwhile, the control group showed no notable changes in stress levels.

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