ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 09 | September - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

INTERVENTION STUDY OF DIABETES MANAGEMENT WITH INTEGRATIVE YOGA THERAPY.

Clinical Research

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ABSTRACT

An intervention study of diabetes patients with integrative yoga therapy along with dietary intervention was done along with the medical treatment going on by the physicians with anti-hyperglycemic drugs prescribed to observe complimented in not only better control of blood sugars but also effective changes in B.M.I., body weight. I also observed a positive approach towards health with behavioral and food choices, which changed the lifestyle as a whole with the set of yogic practices followed for an 8-12 weeks period under guidance. The normalized range of blood sugars is observed to minimize the prevalent co-morbidities like elevated lipid neuropathy, CVD risk, and others, with consistent practice of a yogic regime. The change in B.M.I., which shows fat percent loss, is significant in preventing comorbidities in the future.

KEYWORDS

INTRODUCTION

Globally, diabetes represents the 3rd and 10th leading cause of loss of years of potential life among women and men, respectively.[1] The recent estimates by the International Diabetes Federation showed that the number of adults affected by the disease in 2011 was 366 million, which is projected to increase to 552 million by 2030. Among the top 10 countries/territories with the most significant number of diabetic adults, five are in Asia.[2] China tops the list with 90.0 million, followed by India, which has 61.3 million persons affected by diabetes. The numbers are estimated to rise to 129.7 million and 101.2 million, respectively, by 2030.[3-5] Keeping in view the alarming increase in the incidence and prevalence of diabetics in India, the WHO has declared India as the diabetic capital of the World.[6] The risk for Type 2 diabetes mellitus (T2DM) rises with increasing age and is further elevated in certain racial and ethnic groups, including Asians, Native Americans, and Pacific Islanders.[7,8] However, while race, age, genetic predisposition, and other nonmodifiable factors are essential in the pathogenesis of T2DM, lifestyle factors, particularly physical inactivity, overnutrition, and related obesity, are thought to be primarily responsible for the current global diabetes epidemic.[9] Other contributing lifestyle-related factors include chronic stress, impaired sleep, and smoking.[10-13] In fact, lifestyle factors may account for 90% of incident diabetes cases[12] and are significant predictors of T2DM-related complications and mortality.[14] Thus, a central element of T2DM care is lifestyle management, which is considered critical to the prevention of acute complications and the reduction of risk for long-term complications.[15] A central goal in T2DM management is the reduction of blood glucose levels and improved lipid profile, which has been shown to reduce the risk of microvascular and possibly certain other complications.[16] The characteristic features of diabetic dyslipidemia are high plasma triglyceride (T.G.) concentration, low high-density lipoprotein (HDL) concentration, and increased concentration of small, dense, low-density lipoprotein (LDL) particles. Insulin resistance leads to an increased flux of free fatty acids and, hence, lipid changes.[17]

In our study, better control of blood sugars with enhancing insulin sensitivity can be seen with the integrative approach of yoga therapy, which includes a set of yogic practices along with dietary intervention for a period of 8-12 weeks. Dietary modification with a calculated Carb-Protein-Fat ratio, along with the inclusion of micronutrients in every meal, was complimentary to the yogic practices. Yoga has been publicized and practiced by many people for years, but in this intervention, a set of physical poses, Asana, with focused breathing, and Pranayama, at specific sites (energy channels) along with a relaxation regime is attempted for the expected outcome.

MATERIAL AND METHODS:-

For the intervention study, 5 cases are chosen representing different age groups, professions, and social conditions. The dietary intervention was done by calculating the Anthropometry and dietary recall of every individual to understand the food habits and activities they are practicing and the path lab blood test reports,

1. Body weight
2. B.M.I.
3. blood sugar
4. HbA1c

The diet is divided into three meals with calculated proportions of carbohydrates, proteins, and fats along with macronutrients such as dietary fiber and micronutrients. A total of 4 diet plans are suggested at the interval of 3 weeks- 4 weeks week intervals with proportionate changes in calories and nutrient quantity as per the changes seen in the blood sugar markers at that time. A complete 12-week diet regime prescribed individually could show a significant change in blood sugars, weight & B.M.I.

Diet methodology: -

Diet plan	duration	Title	Supplement
Diet 1	3weeks	Calculated carbohydrates modified protein diet	Vit.12
Diet 2	4weeks	High fiber diet calories restricted diet	Omega -3
Diet 3	4weeks	High protein diet	Vit.D

- This regime is followed by 4th plan, which is a maintenance diet plan provided in the final stage to regulate and maintain the normal parameters of blood sugars, lipids, and required weight.
- The carb-prot-fat ratio is as per the blood sugar readings in the resp. Intervals with a close watch on the calorie count.
- Dietary supplements also vary depending on the patient's profile.
- The medicine regime prescribed by the doctor is continued with observation of the required changes in doses or lines of treatment
- The final maintenance diet will also be observed for the next four weeks to see if there are any changes in the parameters after reaching the average level.

Yogic Practices Methodology:-

The practice of Asana: 20 min./weekdays /12 weeks
The asana poses given below was practiced with a breath focus on the specific sites of stretching –extension–and compression with respect to every pose.

The stiffness, in the beginning, was relieved as the practice proceeded with short to long duration gradually.

Standing pose	Tiryaktadasan Padhastasan	Ardhachandrasan Dandkatichakrasan	Trikonasan Paravartrikonasan	tadasana rakshasa

Sitting pose	Vakrasan naukasan	Ardhmatsendrasa n Paschimitta nasan	Bhadrasan ushtrasan	Vajrasan mandukasa n
Supine pose	Ardhchakrasan uttanpadasan	Halasan Matsyasan	Katichakra san Janushi rasan	suptbhadra s an
Prone Pose	Urdhvnaukasan tadagasan	Bhujangasan shashankasan	Parvatasan Shalabhasa n	Dhanurasa n (Ardh-Purn)
Duration	10 sec. each	20 sec. each	40sec. each	1min.each

1. **Kriya:** The kriya without any external sadhan (material) Kriyas induces breath awareness and also facilitates the pranayama.

Shwasanshuddhi	Nadishuddhi	Udar shuddhi
Kapalbhati Set of 50-80rep.	Anulom-vilom Set of 21 rep. both nadis	Agnisar kriya 3sets in a session

2. Pranayam (controlled breathing techniques)

Pranayama practice: 15 min./day

Initially, the practice was in minimum sets of 10-20 repetitions, but gradually, it was increased to 21-30 repetitions per technique, which developed excellent breath awareness and a sense of enhanced breathing.

Energising	Pacifying	Neutral
Bhasrika Bellow breathing	Bhramri humming	Dirgh Shwasan deep breathing
Kapalbhati	Shitali	Anulom vilom

- The practice of energizing pranayam affects reducing the inflammatory stress at the body level. Enhanced metabolism is also achieved with heat generation.
- The practice of pacifying pranayama is helpful in reducing mental stress and pacifying the mindset in a calm state.
- The neutral pranayama has a cleansing effect like nadishuddhi. It is also said to activate glandular function.
- Once the technique was understood, pranayama practice was recommended in both morning and bedtime to attain good rest and sound sleep.

Relaxation:-

Rest at the physical and mental levels is the most essential part of maintaining all organ functions in harmony.

Relaxation: Yog-nidra in yoga is not merely sleep but an awareness of resting the body, calming the mind, and stabilizing the thought process in the brain.

Short Yog Nidra for ten min. was included in every day post session, and Yog Nidra was included for 45 min. Once in a week

Meditation: Meditation was practiced once a week for 20 min. When a good stability of the body and breath awareness was seen in the participants. The definition of meditation is a subtle state where the minimal sense of body and thoughts is attained.

Case Study:

In the intervention study with the integration of Yoga Therapy 5, cases of type 2 D.M. were studied for the effect of dietary intervention followed by yogic practices guided for a span of 12 weeks with consent taken by the participants.

The pre-post-study data was collected from time to time, along with telephonic conversations with patients. Consulting physicians were also a part of the intervention.

RESULTS:-

Table no. 1: The mean value of fasting blood sugar, HbA1c, BMI, and weight Pre-intervention and post-intervention Diabetic patients.

Name Of the Parameters	Pre-intervention		Post-intervention (after 12 weeks)		Significance
	Mean ±SD	Std. Error of Mean	Mean ±SD	Std. Error of Mean	
Blood Sugar	195.8 ± 47.48	21.23	148.4 ±13.88**	6.20	**P =< 0.05**
HbA1c	8.06± 2.58	1.1	6.3±0.47 **	0.21	**P = <0.05**
B.M.I.	29.88±3.19	1.4	28.24±3.14**	1.4	**P =< 0.05**
Weight	82.72±10.49	4.6	77.82±10.54**	4.7	**P =< 0.05**

The statistical method used to compare data was an unpaired' test

*P> 0.05……Not Significant

**P<0.05……...Significant

***P<0.001…...Highly Significant

In the present study, Mean Blood glucose level, HbA1c, B.M.I., and weight were lower after Post-intervention (after 12 weeks)in D.M. patients thain n Pre-intervention.

DISCUSSION:-

The present study aimed to study the effect of yogic intervention on blood sugar, HbA1c, B.M.I., and weight in T2DM for 12 weeks.

In our study, Mean Blood glucose level, HbA1c, B.M.I., and weight were lower after Post-intervention (after 12 weeks)in D.M. patients than in Pre-intervention.seyendrasana, vakrasana, and navasana stimulate the pancreas for insulin secretion.[18]

Yoga has been increasingly considered to be a promising, cost-effective, and non-invasive option in the management of D.M., with data from several studies implying that yoga and other mind-body therapeutic modalities could pronouncedly attenuate stress-related hyperglycemia and have a positive effect on blood glucose control. Stress management has become increasingly important in recent times. It holds the key to the management of D.M. It is believed that pranayama techniques and yoga therapy alleviate stress-induced hyperglycemia. The practice of Chandra nadi pranayama, Pranava pranayama, and dhyana, as well as Om japa with mudras, reduces stress and helps in proper metabolism. During periods of stress or trauma, the increased release of epinephrine in conjunction with glucagon leads to increased blood glucose.[19,20]Kaya kriya and marmansthana kriya are relaxation techniques that help to relax the mind and body.

Our results suggest that intervention through yoga could help improve insulin sensitivity in D.M. It must, however, be noted that dynamic measures of insulin sensitivity resemble stimulated insulin action and denote peripheral insulin-mediated glucose uptake. Existing studies have found positive effects from physical exercise and integrated yoga protocols.[21]

CONCLUSION:-

The 12-week yoga therapy regime, along with diet intervention, has shown significant outcomes in controlling elevated blood sugars, increasing HbA1C levels to near normal levels, and reducing BMI with weight reduction.

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