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Yoga therapy of obesity and diabetes

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Abstract:
Objectives: *The present study assessed the impact of yoga therapy on obese and diabetic patients of Government College of Yoga Education and Health and Sector-38 (West), Chandigarh, India.*
Design and methods: *This was observational study with an intervention. The intervention was yoga sessions for three months (5 days in a week) for one hour for patients.*
Results: *The obese patients of therapy hall of Government College of Yoga Education and Health and sector – 38 (West), Chandigarh were active and there was loss of weight; high blood pressure also reduced; after yoga class they felt relaxed. They were regular students of yoga. The diabetic patients of therapy hall of Government College of Yoga Education and Health and sector – 38 (West), Chandigarh started feeling more energetic, their high glucose level in blood reduced. The setting of obese and diabetic patients also improved.*
Conclusion: *It can be concluded that Yoga therapy is beneficial in maintaining good health and improves the biochemichal functions of the body and is helpful in overcoming the complications of behaviour problems.*
Keywords: *diabetic patients, high blood pressure, intervention, obese patients, yoga therapy*

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I. Introduction

Yoga means 'union' between the mind, body and spirit. It involves the practice of physical postures and poses, which is sometimes referred to as 'asana' in Sanskrit. As the name suggests, the ultimate aim of practicing Yoga is to create a balance between the body and the mind and to attain self-enlightenment. In order to accomplish it, Yoga makes use of different movements, breathing exercises, relaxation technique and meditation. Yoga is associated with a healthy and lively lifestyle with a balanced approach to life.

Yoga therapy may be defined as the application of Yogic principles to a particular person with the objective of achieving a particular spiritual, psychological, or physiological goal. The means employed are comprised of intelligently conceived steps that include but are not limited to the components of Ashtanga Yoga, which includes the educational teachings of yama, niyama, asana, Pranayama, pratyahara, dharana, dhyana, and Samadhi. Also included are the application of meditation, textual study, spiritual or psychological counseling, chanting, imagery, prayer, and ritual to meet the needs of the individual. Yoga therapy respects individual differences in age, culture, religion, philosophy, occupation, mental and physical health. The knowledgeable and competent yogin or yoginî applies Yoga Therapy according to the period, the place, and the practitioner's age, strength, and activities.

Therapeutic yoga is an inherently holistic approach, simultaneously working on the body, mind, and spirit. Various yoga practices systematically strengthen different systems in the body, including the heart and cardiovascular system, the lungs, muscles, and the nervous system. Yoga practices can improve function of the digestive system, foster psychological well-being, and improve oxygen delivery to tissues. Yoga also can help the body more efficiently remove waste products, carcinogens, and cellular toxins [1].

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health.

Adults

For adults, WHO defines overweight and obesity as follows:

- overweight is a BMI greater than or equal to 25; and
- obesity is a BMI greater than or equal to 30.

BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered a rough guide because it may not correspond to the same degree of fatness in different individuals.

For children, age needs to be considered when defining overweight and obesity.

Children under 5 years of age
For children under 5 years of age:
- overweight is weight-for-height greater than 2 standard deviations above WHO Child Growth Standards median; and
- obesity is weight-for-height greater than 3 standard deviations above the WHO Child Growth Standards median.

Children aged between 5–19 years
Overweight and obesity are defined as follows for children aged between 5–19 years:
- overweight is BMI-for-age greater than 1 standard deviation above the WHO Growth Reference median; and
- obesity is greater than 2 standard deviations above the WHO Growth Reference median.

The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended. Globally, there has been:
- an increased intake of energy-dense foods that are high in fat; and
- an increase in physical inactivity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization.

Changes in dietary and physical activity patterns are often the result of environmental and societal changes associated with development and lack of supportive policies in sectors such as health, agriculture, transport, urban planning, environment, food processing, distribution, marketing, and education [2].

Raised BMI is a major risk factor for noncommunicable diseases such as:
- cardiovascular diseases (mainly heart disease and stroke), which were the leading cause of death in 2012;
- diabetes;
- musculoskeletal disorders (especially osteoarthritis – a highly disabling degenerative disease of the joints);
- some cancers (including endometrial, breast, ovarian, prostate, liver, gallbladder, kidney, and colon).

The risk for these noncommunicable diseases increases, with increases in BMI.Childhood obesity is associated with a higher chance of obesity, premature death and disability in adulthood. But in addition to increased future risks, obese children experience breathing difficulties, increased risk of fractures, hypertension, early markers of cardiovascular disease, insulin resistance and psychological effects [3].

Overweight and obesity, as well as their related noncommunicable diseases, are largely preventable. Supportive environments and communities are fundamental in shaping people's choices, by making the choice of healthier foods and regular physical activity the easiest choice (the choice that is the most accessible, available and affordable), and therefore preventing overweight and obesity.
At the individual level, people can:
- limit energy intake from total fats and sugars; increase consumption of fruit and vegetables, as well as legumes, whole grains and nuts; and
- engage in regular physical activity (60 minutes a day for children and 150 minutes spread through the week for adults).

Individual responsibility can only have its full effect where people have access to a healthy lifestyle. Therefore, at the societal level it is important to support individuals in following the recommendations above, through sustained implementation of evidence based and population based policies that make regular physical activity and healthier dietary choices available, affordable and easily accessible to everyone, particularly to the poorest individuals. An example of such a policy is a tax on sugar sweetened beverages.
The food industry can play a significant role in promoting healthy diets by:
- reducing the fat, sugar and salt content of processed foods;
- ensuring that healthy and nutritious choices are available and affordable to all consumers;
- restricting marketing of foods high in sugars, salt and fats, especially those foods aimed at children and teenagers; and
- ensuring the availability of healthy food choices and supporting regular physical activity practice in the workplace [4].

Obesity and Yoga
- Yoga works on all aspects of Obesity or excess weight (physical, emotional and mental).
- Regular practice of Yoga and controlled life style reduces obesity (weight is reduced).
- Yoga makes human being agile, efficient and slim.
- Yoga is suitable for people in any age group.

- Yoga helps achieve control over mind and behavior (one can easily control food habits and change life style to reduce the obesity).
- Yoga has different effect on obesity, which is permanent in nature than other techniques for obesity reduction. Weight loss is permanent but one needs to practice few important techniques regularly.

Various ways to get rid of Obesity

Practice of Yoga, yoga poses, pranayama, cleansing techniques, meditation, and various exercises

Regular exercise like running, swimming etc.

- Yogasanas or yoga poses like Paschimotannasana, Saral Hasta Bhujangasana, Sarwangasana, Halasana, Dhanurasana, Veerasana, Trikonasana, Ardha Matsyendrasana, etc.
- Along with Yogasanas Sun salutation is very effective for obesity reduction, also Pranayama, cleansing processes like agnisar, uddiyan bandha etc helps.

Diabetes, often referred to by doctors as diabetes mellitus, describes a group of metabolic diseases in which the person has high blood glucose (blood sugar), either because insulin production is inadequate, or because the body's cells do not respond properly to insulin, or both. Patients with high blood sugar will typically experience polyuria (frequent urination), they will become increasingly thirsty (polydipsia) and hungry (polyphagia) [5].

There are three types of diabetes:

Type 1 diabetes

The body does not produce insulin. Some people may refer to this type as insulin-dependent diabetes, juvenile diabetes, or early-onset diabetes. People usually develop type 1 diabetes before their 40th year, often in early adulthood or teenage years. Type 1 diabetes is nowhere near as common as type 2 diabetes. Approximately 10% of all diabetes cases are type 1. Patients with type 1 diabetes will need to take insulin injections for the rest of their life. They must also ensure proper blood-glucose levels by carrying out regular blood tests and following a special diet.

In the patients with Type 2 diabetes, the body does not produce enough insulin for proper function, or the cells in the body do not react to insulin (insulin resistance). Approximately 90% of all cases of diabetes worldwide are type 2. Some people may be able to control their type 2 diabetes symptoms by losing weight, following a healthy diet, doing plenty of exercise, and monitoring their blood glucose levels. However, type 2 diabetes is typically a progressive disease - it gradually gets worse - and the patient will probably end up have to take insulin, usually in tablet form. Overweight and obese people have a much higher risk of developing type 2 diabetes compared to those with a healthy body weight. People with a lot of visceral fat, also known as central obesity, belly fat, or abdominal obesity, are especially at risk. Being overweight/obese causes the body to release chemicals that can destabilize the body's cardiovascular and metabolic systems.

Gestational diabetes

This type affects females during pregnancy. Some women have very high levels of glucose in their blood, and their bodies are unable to produce enough insulin to transport all of the glucose into their cells, resulting in progressively rising levels of glucose. Diagnosis of gestational diabetes is made during pregnancy. The majority of gestational diabetes patients can control their diabetes with exercise and diet. Between 10% to 20% of them will need to take some kind of blood-glucose-controlling medications. Undiagnosed or uncontrolled gestational diabetes can raise the risk of complications during childbirth. The baby may be bigger than he/she should be [6].

Yogic Treatment for Diabetes

Yoga poses (Asanas) such as Meru Wakrasana, Ardhmatsyendrasana, Uttanmandukasana and Mandukasana are good for prevention of Diabetes. Pranayama includes Anlom Vilom with ratio of 1:2:1 and shatkarma includes Dand Dhauti.

1.1 Aims and Objectives

1.1.1 To assess the impact of yogic exercises/ yogasanas on obese and diabetic patients.

1.1.2 To create awareness among obese and diabetic patients about yogasanas, pranayama and meditation techniques.

II. Methods and Material

2.1 Study area: The Therapy hall of Government College of Yoga Education and Health, Sector- 23 A, Chandigarh and Sector – 38 (West), Chandigarh.

2.2 Study period: Nov 2017 – Jan 2018.

2.3 Study design: Observational study with intervention.

2.4 Study unit: Total 12 patients were selected for this study. 9 patients were obese and 3 patients were diabetic. The obese patients were Prempati, aged 83 years, female, weight was 83 kgs, height was 5 feet 4 inch and housewife; Mohini, aged 59 years, weight was 94 kgs, height was 5 feet 4 inch and housewife; Rajini Sharma, aged 52 years, weight was 84 kgs, height was 5 feet 3 inch and housewife; O. P. Luthra, aged 78 years, male, weight was 103 kgs, height was 5 feet 5.5 inch and retired professional; Mohini, aged 59 years, female, weight was 94 kgs, height was 5 feet 4 inch and housewife; Harminder Kaur, aged 65 years, female, weight was 75 kgs, height was 5 feet and housewife; Pawan Anand, aged 36 years, female, weight was 77.8 kgs, height was 5 feet 3 inch and housewife; Prerna Chopra, aged 35 years, female, weight was 80 kgs, height was 5 feet 3.5 inch and housewife and Sneh Kaul, aged 62 years, female, weight was 69 kgs, height was 5 feet and retired school teacher. The diabetic patients were Gurpreet Kaur, aged 43 years, female, weight was 82 kgs, height was 5 feet 2 inch and housewife; Kanta, aged 55 years, female, weight was 70 kgs, height was 5 feet 2 inch and clerk; Perivartan Chakkar Kaul, aged 71 years, male, weight was 79 kgs, height was 5 feet 1 inch and retired businessman.

2.5 Data collection: Data was collected by measuring blood pressure, sugar and weight of patients before and after an intervention.

2.6 Analysis: Observations were done for three months of this study

2.7 Intervention package: An intervention of yoga therapy was done for obese and diabetic patients. The obese and diabetic patients were asked to perform yoga sessions for three months regularly for one hour.

The obese patients performed asanas such as Pawanmuktasana Part 2 and 3, Ustrasana, Meru wakrasana, Garudasana, Bhujangasana, and Surya Namaskar; pranayama such as Uddiyan Bandh, Kapalbhati, Suryabedhan with kumbhak, Agnisar and Bhastrika; relaxation such as Yoga Nidra and meditation; and shatkarma such as Kunjal and Rubber Neti.

The diabetic patients performed asanas such as Meru wakrasana, Ardhmatsayendrasana, Uttanmandukasana and Mandukasana; pranayama such as Anlom Vilom with 1:2:1 ratio; relaxation such as Yoga Nidra and meditation; and shatkarma such as Dand dhauti.

III. Results

The outcomes showed that after three months of regular yoga sessions (5 days in a week) for one hour among obese patients of therapy hall of Govt. College of Yoga Education and Health, Chandigarh, they were active and there was loss of weight; high blood pressure also reduced; after yoga class they felt relaxed; and their setting also improved. They were regular students of yoga. Among obese patients of Sector – 38 (West), Chandigarh, in Mrs. Pawan Anand there was weight loss of 1.2 kgs, blood pressure reduced from 133/ 76 mm Hg to 100/ 65 mm Hg and the waist circumference reduced by 2 cms; in Mrs. Prerna Chopra there was weight loss of 1 kg and blood pressure reduced from 134/ 90 mm Hg to 123/ 84 mm Hg and in Mrs. Sneh Kaul there was weight loss of 1 kg and blood pressure reduced from 180/ 101 mm Hg to 149/ 90 mm Hg.

The outcomes showed that after three months of regular yoga sessions (5 days in a week) for one hour among diabetic patients of therapy hall of Govt. College of Yoga Education and Health, Chandigarh, they started feeling more energetic, high glucose level in blood reduced and their setting also improved. After yoga class, they felt relaxed and sometimes during dynamic meditation they loudly sang and performed fast clapping. They were willing for yoga class and regular students of yoga.

IV. Discussion

A. S. Tikhe et al. (2015) showed that Twenty-four mid-life patients (6 females) with T2DM (Age, Mean ± SD, 55.38 ± 7.96 years) participated in the study and practiced IAYT for 7 days. The IAYT worked at five layers of human existence (physical, vital, mental, intellectual and bliss) to bring positive health. The body fat and BMI and resting metabolism were recorded before and after IAYT using Karada Scan body composition monitor HBF-375 from Omron Healthcare Singapore PTE LTD. Data analysis showed that there was a significant decrease in body fat and BMI and resting metabolism (in all assessments, $P < 0.001$). This relationship has been confirmed in our study of yoga therapy of obesity and diabetes as obese patients of therapy hall of Govt. College of Yoga Education and Health, Chandigarh were active and there was loss of weight; high blood pressure also reduced; after yoga class they felt relaxed; and their setting also improved. Among obese patients of Sector – 38 (West), Chandigarh, in Mrs. Pawan Anand there was weight loss of 1.2 kgs and blood pressure reduced from 133/ 76 mm Hg to 100/ 65 mm Hg in Mrs. Prerna Chopra there was weight loss of 1 kg

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H. Cramer et al. (2016) reported that 60 women with abdominal obesity (waist circumference ≥ 88 cm; body-mass index [BMI] ≥ 25) were randomly allocated in a 2:1 ratio to either a 12-week yoga intervention (n = 40) or a waiting list (n = 20). The waist circumference was the primary endpoint. Secondary (exploratory) endpoints included the waist/hip ratio, body weight, BMI, body fat percentage, body muscle mass percentage, blood pressure, health-related quality of life, self-esteem, subjective stress, body awareness, and body responsiveness, and the safety of the intervention. Results howed that the patients in the yoga group participated in a mean of 30.2±9.2 (maximum, 42) hours of supervised yoga practice. Their abdominal circum - ference was significantly reduced in comparison to the participants on the waiting list, with an intergroup difference of -3.8 cm (95% confidence interval [-6.1; -1,.5]; p = 0.001). There were further, moderate intergroup differences in the waist/hip ratio, body weight, BMI, body fat percentage, body muscle mass percentage, mental and physical well-being, self-esteem, subjective stress, body awareness, and trust in bodily sensations (all $p<0.05$). This relationship has been confirmed in our study of yoga therapy of obesity and diabetes as among obese patients of Sector – 38 (West), Chandigarh, in Mrs. Pawan Anand there was weight loss of 1.2 kgs, blood pressure reduced from 133/ 76 mm Hg to 100/ 65 mm Hg and the waist circumference reduced by 2 cms; in Mrs. Prerna Chopra there was weight loss of 1 kg and blood pressure reduced from 134/ 90 mm Hg to 123/ 84 mm Hg and in Mrs. Sneh Kaul there was weight loss of 1 kg and blood pressure reduced from 180/ 101 mm Hg to 149/ 90 mm Hg [8].

V. Malhotra et al. (2005) showed that twenty NIDDM subjects (mild to moderate diabetics) in the age group of 30-60 years were selected from the out patient clinic of G.T.B. hospital. They were on a 40 days yoga asana regime under the supervision of a yoga expert. 13 specific Yoga asanas < or = done by Type 2 Diabetes Patients included. Surya Namaskar, Trikonasana, Tadasana, Sukhasana, Padmasana, Bhastrika Pranayama, Pashimottanasana, Ardhmatsyendrasana, Pawanmuktasana, Bhujangasana, Vajrasana, Dhanurasana and Shavasana are beneficial for diabetes mellitus. Serum insulin, plasma fasting and one hour postprandial blood glucose levels and anthropometric parameters were measured before and after yoga asanas. The results indicated that there was significant decrease in fasting glucose levels from basal 208.3 +/- 20.0 to 171.7 +/- 19.5 mg/dl and one hour postprandial blood glucose levels decreased from 295.3 +/- 22.0 to 269.7 +/- 19.9 mg/dl. The exact mechanism as to how these postures and controlled breathing interact with somatoendocrine mechanism affecting insulin kinetics was worked out. A significant decrease in waist-hip ratio and changes in insulin levels were also observed, suggesting a positive effect of yoga asanas on glucose utilisation and fat redistribution in NIDDM. Yoga asanas may be used as an adjunct with diet and drugs in the management of Type 2 diabetes. This relationship has been confirmed in our study of yoga therapy of obesity and diabetes as diabetic patients of therapy hall of Govt. College of Yoga Education and Health, Chandigarh started feeling more energetic, high glucose level in blood reduced and their setting also improved after yoga sessions. After yoga class, they felt relaxed and sometimes during dynamic meditation they loudly sang and performed fast clapping. They were willing for yoga class and regular students of yoga [9].

V. Figures and Tables

Fig. 1: Causes of obesity

Fig. 2: Consequences of obesity

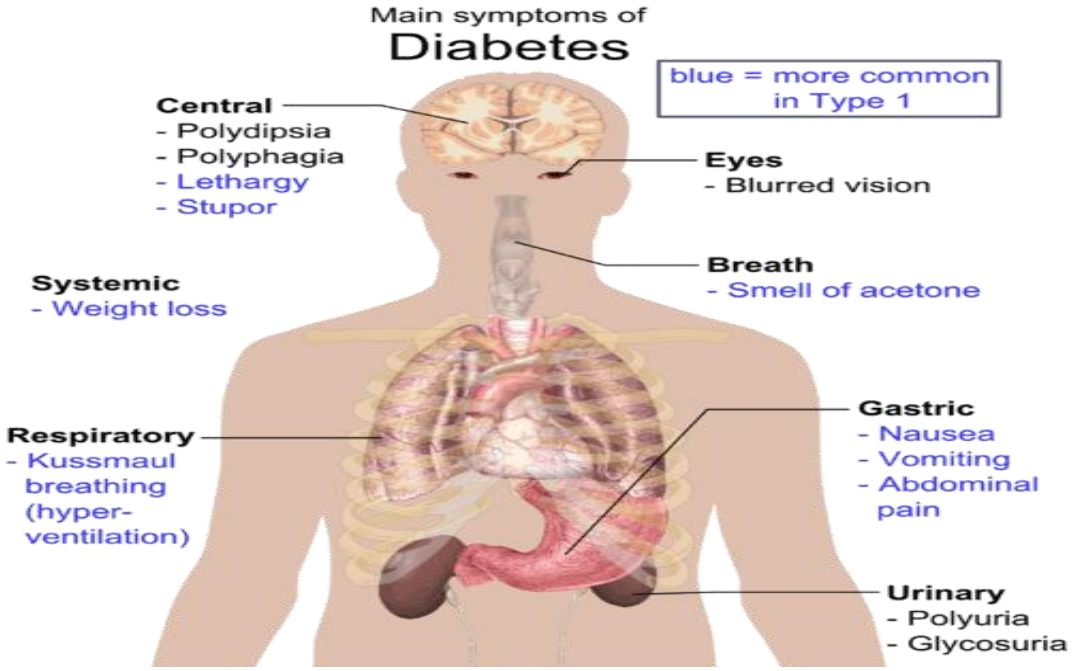

Fig. 3: Symptoms of diabetes

Fig. 4: Padotthansana

Fig. 5: Pad chakrasana

Fig. 6: Pad sanchalasana

Fig. 7: Supta pawanmuktasana

Fig. 8: Ustrasana

Fig. 9: Meru wakrasana

Fig. 10: Garudasana

Fig. 11: Bhujangasana

Fig. 12: Ardhmatsayendrasana

Fig. 13: Mandukasana

Fig. 14: Uttanmandukasana

Fig. 15: Surya Namaskar

Fig. 16: Yoga Nidra

Fig. 17: Dand dhauti

Fig. 18: Kunjal

Fig. 19: Kapalbhati

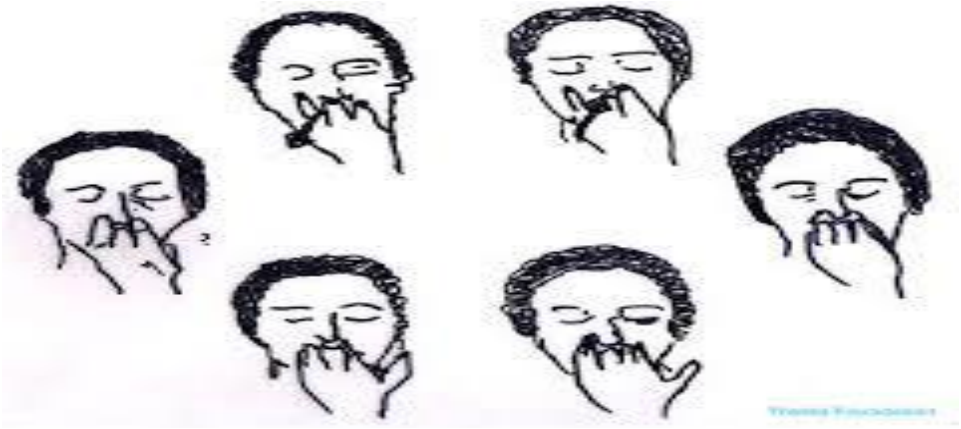

Fig. 20: Anlom Vilom

Fig. 21: Rubber neti

Fig. 22: Uddiyan bandh

VI. Conclusion

Yoga therapy is beneficial in maintaining good health and improves the biochemichal functions of the body and is helpful in overcoming the complications of behaviour problems. Hence this case study shows the efficacy of yoga therapy on physical as well as mental health. Use of yoga therapy can be stated as safe therapeutic modality in behaviour management and its further complications. However, further studies in larger samples are needed to confirm these findings and to better understand mechanisms behind such beneficial effects of yoga in patients of lethargic.

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