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Effect of Yoga on Women with Type II Diabetes Mellitus in Selected Area of Coimbatore

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ABSTRACT

Diabetes mellitus is chronic condition due to impaired functions of pancreas and leads to less insulin production or no insulin production. Insulin is a hormone that regulates blood sugar. Increased blood sugar is a common effect of uncontrolled diabetes. It requires medical as well as lifestyle modifications for the management.

Aim of the study: Effect of yoga on women with type II diabetes Mellitus in selected area of Coimbatore.

Objectives: To assess the blood glucose level before the yoga, To demonstrate the selected yoga to women with diabetes, To find out the effectiveness of yoga to women with diabetes

Methodology*:* Non probability, purposive sampling method approach is adopted to identify thirty samples. The demographic variables and blood glucose level, duration of the disease and lifestyle modifications were assessed. Selected women were demonstrated with the yoga techniques (pranayama, pavanmuktasana, viprikarni, sethubandhasana, bujangasana, dhanurasana, manduhasana, pachimothasana, kaplbhati).

Results and Discussion: The result shows there is significant changes in the mean score of blood glucose level and improvement in the quality of life (QoL) after the intervention.

Conclusion: A comprehensive yoga therapy program has the potential to enhance the beneficial effects of standard medical management of Diabetes Mellitus and can be used as a integrative therapy for controlling the blood glucose level, increasing the insulin sensitivity to the muscles and effectively reduces the body weight.

Keywords: Type 2 diabetes mellitus, yoga, lifestyle intervention, blood glucose level, quality of life.

INTRODUCTION

Diabetes Mellitus (DM) is a chronic disease, occurs when the pancreas unable to produce adequate insulin or body cannot respond appropriately to insulin. Insulin is a hormone that the body needs to absorb and use glucose (sugar) as fuel for the body's cells. When insulin signalling system fails, blood glucose levels become elevated and other metabolic abnormalities occur, leading to the development of serious, disabling complications. It is classified as Type I (Insulin dependent Diabetes Mellitus), Type II (Non Insulin dependent Diabetes Mellitus) and gestational diabetes. The problem of diabetes has grown enormously in the last two decades. In 2014, around 387 million people had diabetes with a prevalence of 8.3%; by 2035 this will rise to 592 million (Thangasami S et.al, 2015).

Untreated high blood sugar from diabetes can damage nerves, eyes, kidneys, and other organs. Type 2 diabetes occurs when the body becomes resistant to insulin, and sugar builds up in the blood. About 422 million people worldwide have diabetes, the majority living in low-and middle-income countries, and 1.6 million deaths are directly attributed to diabetes each year. Both the number of cases and the prevalence of diabetes have been steadily increasing over the past few decades. There is a globally agreed target to halt the rise in diabetes and

obesity by 2025(WHO, 2019).

Fagninou (2019) stated that prevention and treatment involve maintaining a healthy lifestyle, diet and nutrition, regular physical exercise, a normal body weight, avoiding use of tobacco and blood pressure control. Government and non-government organizations should create awareness about the disease among public and also teach them way to self-care and benefits of lifestyle modification.

The risk factors of Type 2 diabetes are interconnected by genetic, environmental and behavioural factors. Type 2 DM is characterized by increased morbidity and mortality; it has an insidious onset and late recognition and leads to premature morbidity and mortality. Type 2 DM acquires pressing clinical and economic significance due to work loss and disability leading to increased expenditures on medicines and hospital stay (Raghuwanshi, 2016).

The IDF Diabetes Atlas Ninth edition 2019 provides the latest information and projections on diabetes worldwide. In 2019, approximately 463 million adults between 20-79 years were living with diabetes; by 2045 this will rise to 700 million. The proportion of people with type 2 diabetes is increasing in most countries and it is reported 79% of adults with diabetes were living in low- and middle-income countries

Sedentary life style and unhealthy dietary habits are the major risk factors for the development of various lifestyle disorders, including diabetes. The stress level increases the severity of symptoms. Lack of physical activity was found to increase the risk of diabetes by 3 times (IDF, 2017).

Sachin G. K and Mukund P. E (2018) described about the lifestyle disorders. These are due to unavoidable stress at workplace or at home. Only medical management is not sufficient for treating these. Diabetes mellitus is known to be a slow killer in India affecting most of the population in different age group. Lifestyle modification is the best treatment modality in this case. Yoga is a series of mental, physical and spiritual disciplines that originated in ancient India. Yoga told by Lord Shiva is one among them having great potential to provide health in many disease conditions. The world is looking towards Yoga as a better management for Diabetes mellitus along with Ayurved.

Yoga, which originated in India more than 5,000 years ago, aims at balancing and harmonizing the body, mind, and emotions. Increasing evidence suggests that yoga practice tackles the pathophysiologic mechanisms of diabetes and helps in controlling diabetes and its complications (Liu XC, 2014).

Yogic involves different lifestyle changes like kriyas, various asana, changes in diet, managing stress, meditation and leading a holistic life. The comprehensive yoga, an approach incorporating body postures (asanas), breathing techniques (pranayamas), meditation (affecting the manomayakosa), cleansing (kriyas), nutrition (satvik diet), attitudinal and behavioral modification, and mental discipline, (affecting the vijnanmaya and anandamayakosha) is more beneficial and loyal to its ancient inhabitants (Babitha.R et.al,2016).

Yoga exhibits many health benefits, such as improving physical fitness, relaxation, and awareness of self. Various lifestyle disorders, including diabetes, can be effectively managed by the practice of yoga. Yoga practice improves an individual's discipline regarding food and exercise, thereby helping to modify patient-related reluctance that results in the underutilization of exercise as a treatment modality Yoga in an effort to keep the individual to maintain healthy life and improve overall quality of life. In adult diabetic patients, yoga therapy has shown more beneficial effects and very few adverse effects (Aswathy.S, 2013).

Yoga is cost-effective and beneficial option in the management and prevention of

complication in diabetes. As yoga is holistic living incorporating social and lifestyle changes which are subjective measurements. So the researcher had interest to find the effect of yoga in their day today life of women with type II diabetes mellitus

Statement of the problem

Effect of yoga on women with type II diabetes Mellitus in selected area of Coimbatore.

Objectives

- To assess the blood glucose level before the yoga on women with diabetes Mellitus
- To demonstrate the selected yoga to women with diabetes Mellitus
- To find out the effectiveness of yoga to women with diabetes Mellitus

Hypothesis

H1: There will be significant improvement in the reduction of blood glucose level of women with diabetes mellitus (DM).

H2: There will be significant improvement in the quality of life (QoL) of women with diabetes mellitus (DM) after practising yoga.

Assumption of the study

The yoga practices will improve the quality of life of women with diabetes mellitus (DM)

Review of literature

Reepa A (2019) stated about the Raja yoga and Hatha yoga. These Raja and Hatha yogas have shown to improve health and reduce illness by asanas (both active and passive relaxation postures), pranayama (breathing control), dharana (concentration) and dhyana (meditation). Yoga has become one of the supportive therapy in the treatment of type 2 DM.

Bijlani RL et al. (2005) conducted a study among the patients with hypertension, coronary artery disease, diabetes mellitus, and a variety of other illnesses. The yoga - pranayama (breathing exercises), relaxation techniques were demonstrated and practised for 9 days. The result implies the positive changes in fasting plasma glucose and serum lipid profile, serum total cholesterol, low-density lipoprotein (LDL), VLDL , the ratio of total cholesterol to high density lipoprotein (HDL) cholesterol, and total triglycerides were significantly lower, and HDL cholesterol significantly higher, on the last day of the course compared to the first day of the course.

Malhotra V, (2005) conducted study among type 2 diabetes mellitus patients by using different yoga postures. The postures are Surya namaskar, Trikonasana, Tadasana, Padmasana, Bhastrika Pranayama, Pashimottanasana, Ardhmatsyendrasana, Pawanmuktasana, Bhujangasana (cobra pose), Vajrasana (thunderbolt pose), Dhanurasana (bow pose), and Shavasana. These asana showed the improvement in health status and decreases the blood sugar level among the type II diabetes patients.

Asanas can beneficial for the diabetic patients. The important fact of Asanas is stability and relaxes the body for long time. Due to various inflection, stretches and strains in the body, the internal organs are stretched and subjected to strain. This increases the blood supply and oxygen supply to the organs, also increasing the efficiency and functioning of the organ. Stretching various glands in the body, results in increased efficiency of the endocrine system (Maurya SK et al., 2017).

Yoga practice includes cleansing processes (kriya) by using breathing, postures (asana) involves stretching and twisting the body, meditation, chanting mantras, and spirituality. A four specific sets of asanas, dhanurasana+ matsyendrasana, halasana+vajrasana, naukasana+bhujangasana, and setubandhasana+pavanamuktasana, on releasing insulin from the pancreas. Increased sensitivity of the β-cells of the pancreas to the glucose signal was observed, which appeared to be a sustained change resulting from a progressive long-term effect of the asanas (Arkiath et.al ,2018).

Mullur RS and Ames D (2016) suggested practising 10 minutes of the yoga

intervention combined with standard medical care could improve metabolic health of the individual with diabetes.

Nagarathna et.al (2018) Vivekananda Yoga Anusandhana Samsthana (VYASA) has undertaken an ambitious nationwide program, the SDM "Stop Diabetes Movement" to bring down the rising incidence of diabetes in India. SDM envisages identifying, motivating, training and organizing-Volunteers (organizers), Diabetes patients, Yoga Instructors, Doctors and Researcher to control the diabetes

The effect of yoga practice and vegetarian diet has reported significant changes in both fasting blood glucose and post prandial blood glucose as compared to baseline values in patients with type 2 diabetes mellitus. The study as well supports the improvement in quality of life and reduction in stress. Yoga can play immense role in controlling the stress of day to day life and it helps diabetic patients in reducing morbidity (Manjunatha S.et.al, 2005).

RESEARCH METHODOLOGY

Independent Variable

Imparting the yoga practises as Life Style interventions to women with Diabetes Mellitus through demonstration.

Dependent Variable

Yoga practices cause reduction on blood glucose level and improves quality of life of women with diabetes mellitus (DM)

Setting of the study

The study were conducted at Kovilpalayam, Coimbatore

Study Population

Sample selection and Sampling Size

Samples were selected by using purposive sampling. In this study woman with diabetes residing in the selected area of Kovilpalayam, Coimbatore has been selected as samples. Thirty women with type II diabetes mellitus were selected for the present study.

Inclusive criteria

- Women above 35 years
- Women newly diagnosed to above ten years.
- Women with obesity

Exclusive criteria

- Patients with any major pulmonary, renal, endocrinal and neurological diseases.
- Diabetes with the problem associated with bone

Tool for the study

Structured interview were used to analyse the effect of yoga (Life Style modifications) on women With Diabetes

Section A: Demographic variables

Section B: Assessing Fasting blood glucose level

Section C: Assessment of Quality of Life (QoL) based on the diabetes related complaints

Data collection procedure

Structured questionnaire were used to collect the data from the samples. After that yoga techniques are demonstrated to the samples. Yoga techniques such as pranayama, pavanmuktasana, viprikarni, sethubandhasana, bujangasana, dhanura-sana, manduhasana, pachimothasana, Ardhmatsyendrasana,, and kaplbhati were demonstrated. Instructed to follow the technique daily in the morning for 30 mts. After ten days fasting blood glucose level and quality of life is assessed to find out the effectiveness.

Method of data analysis and interpretation

The researcher was used appropriate statistical technique for data analysis and present in the form of tables and diagrams. The data were analysed by using descriptive and inferential statistics.

- Demographic Variables: Frequency and Percentage
- Blood glucose level of women with diabetes Mellitus assessed by inferential statistics

- Assessment of Quality of Life (QoL) based on the diabetes related complaints: Frequency and Percentage

Table 1: Distribution of demographic variables of women with diabetes Mellitus

Sl. No	Demographic Variables	Frequency	Percentage %
1.	**Age**		
	a. 35-40 years	6	20
	b. 41-45 years	4	13.3
	c. 46-50 years	16	53.3
	d. > 50 years	4	13.3
2.	**Educational qualifications**		
	a. < SSLC	6	20
	b. >SSLC	16	53.3
	c. Undergraduate	4	13.3
	d. Post graduate	4	13.3
3.	**Duration of Disease**		
	a. Newly diagnosed	6	20
	b. 1-5 years	12	40
	c. 5-10 years	8	27
	d. >10yrs	4	13
4.	**Medications**		
	a. Oral medications	16	53.3
	b. Insulin therapy	10	33.3
	c. Both	4	13.3
5.	**Occupation**		
	a. Professional work	4	13.3
	b. Sedentary work	10	33.3
	c. Cooliee	16	53.3
6.	**Weight & BMI**		
	a. 18.5 and 25	6	20
	b. 25 -30	10	33.3
	c. 30-35	10	33.3
	d. >35	4	13.3
7.	**Waist circumference**		
	a. <70 cm	6	20
	b. 70-89 cm	10	33.3
	c. 90-109 cm	10	33.3
	d. >110 cm	8	13.3
8.	**Information of lifestyle modification on DM**		
	a. Friends	6	20
	b. Relatives	10	33.3
	c. Medical personal	10	33.3
	d. Mass media	4	13.3
9.	**Performs exercise**		
	a. Daily(walking)	12	40
	b. Alternative days	4	13.3
	c. Weekly	4	13.3
	d. Never	10	33.3
10.	**Did you practice yoga**		
	a. Yes	-	-
	b. No	30	100

Regarding the age, 6(20%) were belongs to 35-40 years, 4(13%) were in 41-45 years,16(53%) were in 46-50 years and 4 (13%) were in the above 50years

6(20%) were belongs to the category of less than SSLC, 16(53%) were belongs to the category of more than SSLC, 4(13%) were in undergraduate and 4(13%) were in postgraduate

Duration of disease, 6(20%) were belongs to newly diagnosed, 12(40%) in 1-5 years, 8(27%) in 5-10years and 4(13%) were in the years of more than ten years.

16(53%) of the women under oral hypoglycaemic agents, 10(33%) in insulin therapy and 4(13%) were in both.

16(53%) of women were in coolie work and 4(13%) in professional work others were doing the sedentary work.

Only 6(20%) belongs to normal range of BMI 18.5-25,10(33%) were in 25 - 30,30-35 each and 4(13%) were in more than 35.

Only 6(20%) belongs to normal range of waist circumference <70 cm, 10(33%) were in 70-89 cm and 90-109 cm in each category and 4(13%) were in more than 110 cm.

Regarding the information of lifestyle modification 6(20%) were receiving information from friends, 10 (53%) were from relatives, 10(53%) were from medical personnel and 4(13%) were from the mass media.

Regarding the exercise, 12(40%) women were doing simple walking daily, 4(13%) of women were doing walking in alternative days and weekly and10 (53%) were not doing any form of exercise.

No women were following yoga as one of the exercise in their day today life. But they were aware of yoga has positive effect on diabetes.

Table 2: Mean difference of fasting blood glucose level of women with diabetes Mellitus

Test	Mean	SD	t value
Pretest	120.8	20.5	9.86
posttest	119.6	8.4	

Table 2 describes about the mean difference between pre and post test. The t (9.86) value is significant at 0.05 levels at 29(df).There is little difference in the mean score of fasting blood glucose level. It implies that regular practice of yoga makes significant difference in the blood glucose level.

Table 3: Assessment of QoL based on the diabetes related complaints

Sl. No	Diabetes related complaints	Pretest		Post test	
		f	%	f	%
1.	Tired and feels lazy	26	87	4	13
2.	Inadequate Sleep	30	100	8	27
3.	Increased urination	12	40	--	--
4.	Weight change	26	87	10	33
5.	Problems in work life	20	67	4	13
6.	Decreased Energy Levels	26	87	8	27
7.	Problems in social life	26	87	8	27
8.	Difficulty in walking	26	87	4	13
9.	Tingling sensation/Numbness	26	87	2	7
10.	Hypoglycemic symptoms	2	7	--	--

The above table 3 describes the quality of life of women with diabetes. Most of the (87%) women had the complaints of tired and feels lazy, inadequate sleep, weight change, decreased energy to perform daily activity, Problems in social life, difficulty in walking and Tingling sensation/Numbness, 67% had problems in work life, 40 % of women had increased urination and Only 7% woman had the hypoglycaemic symptoms.

After the yoga practice the quality of life improved and the complaints of diabetes percentage were reduced. There were no complaints of increased urination and hypoglycaemic symptoms. Other diabetic related symptoms like tired and feels lazy is reduced to 13%,inadequate sleep to 27%,weight change to 33%,problems of work life and difficulty in walking to 13%, decreased energy to perform daily activity and problems of social life to 27% and tingling sensation / numbness to 7%

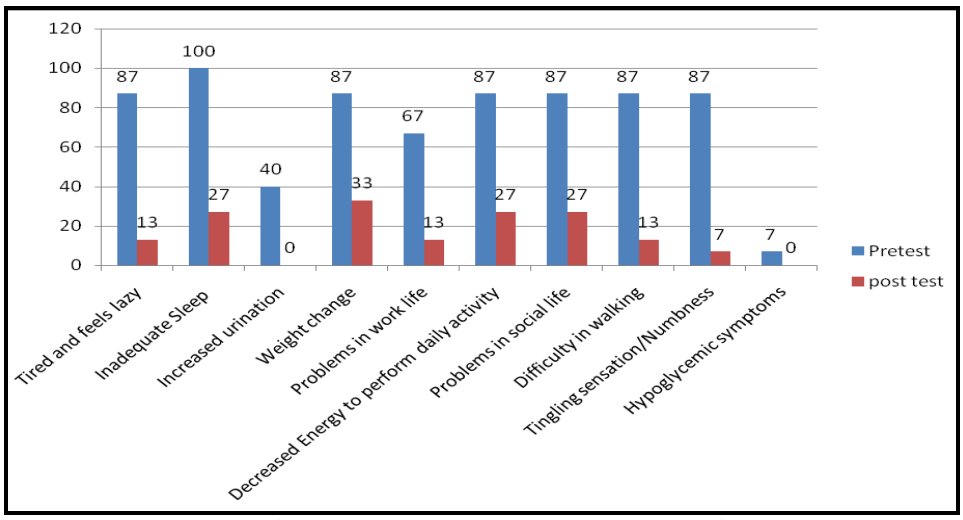

Figure 1: Distribution of QoL based on the diabetes related complaints of pretest and posttest

RESULT AND DISCUSSION

The result of the study shows there is significant changes in the fasting blood glucose level. There is a mean difference between pre and posttest. The 't' value of fasting blood glucose level was 9.86 significant at 0.05 level at 29(df).

Sachin G et.al (2018) showed the positive effects of yoga on blood glucose levels. The reason of this consistency between these studies can be explained by the mechanism, that muscle contraction and relaxation in yogic postures during yogic exercises stimulate the pancreas gland and helps for the secretion of insulin. The deep breathing, bending and twists and turning of the spine will directly stimulate pancreatic beta cells to produce insulin and regulation the blood glucose level.

The present study reveals there is reduction in the complaints of diabetes after the practice of yoga. In pretest 87% of women had the complaints of tired and feels lazy, inadequate sleep, increased urination, weight change, decreased energy levels, Problems in social life, difficulty in walking and Tingling sensation/Numbness. Only one woman had the hypoglycaemic symptoms. After the practice it's reduced to 27%, other complaints of diabetes like problems in work life, social life, difficulty in walking, tingling sensation/ numbness also

significantly reduced and there were no symptoms of increased urination and hypoglycaemia.

The study reported by Shirley T and Udupa KN the improvement in the quality of life such as a feeling of well being, more relaxed and satisfied, and a sense of relief from anxiety due to Yoga asana with its change in posture and controlled breathing in pranayama influences mental status of an individual allaying apprehension, stress and brings about feelings of well being and hormonal balance.

CONCLUSION

Yoga helps for the direct activation of beta cells of pancreas .The abdominal stretching during yogic exercise, which may increase the production of insulin and utilisation of glucose by the muscular tissues. Practicing yoga on a regular basis help to improve overall well-being and manage type II diabetes mellitus. Present study also implies the changes in fasting blood glucose level and reduced the complaints related with diabetes and enhanced their quality of life on women with diabetes. This study was done in a small group with short duration. If the diabetic women practices yoga regularly, it makes significant changes in the blood glucose level and their quality of life.

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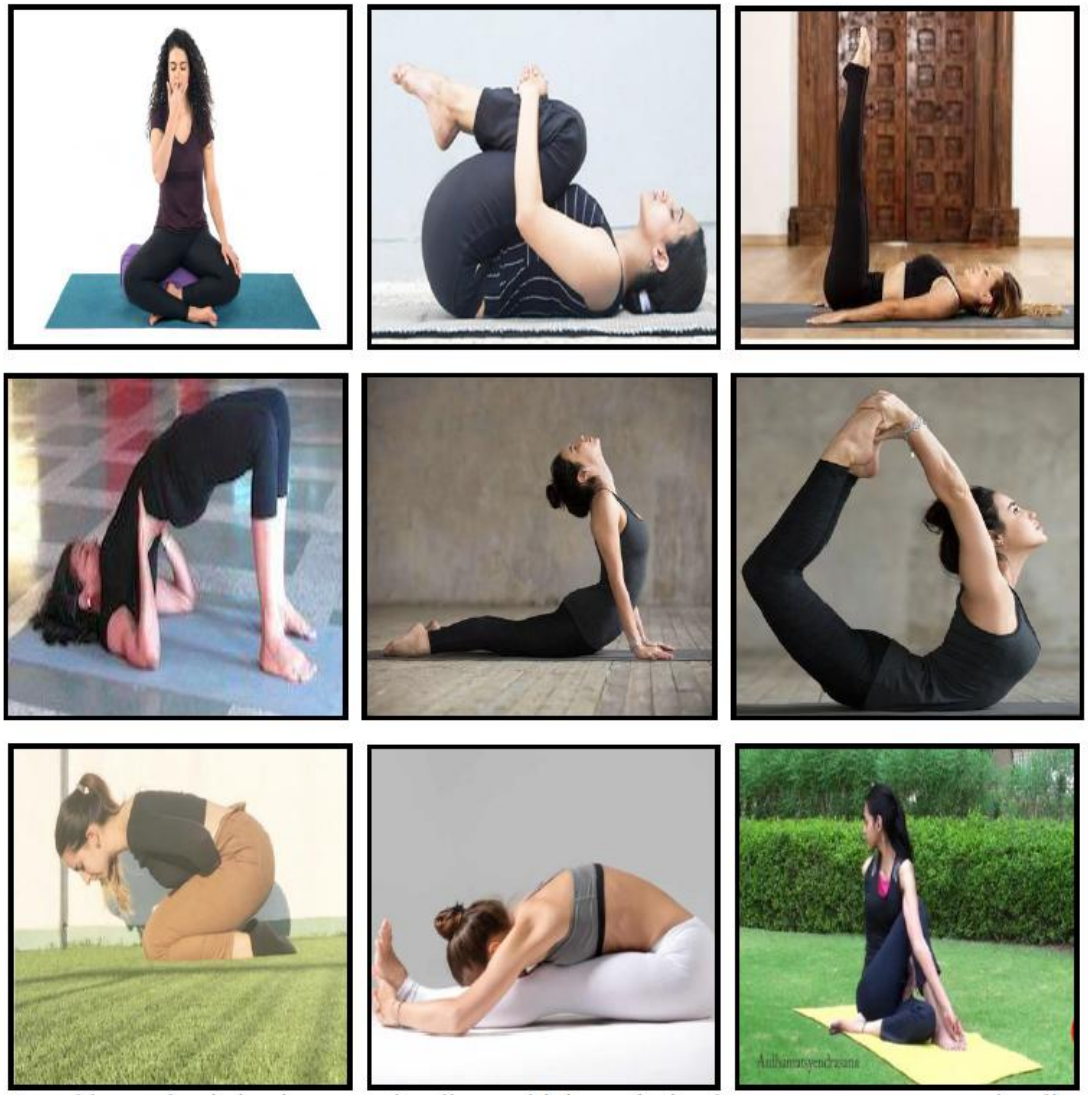
Yoga postures followed: Pranayama and kaplbhati, pavanmuktasana, viprikarni, sethubandhasana, bujangasana, dhanurasana, manduhasana, pachimothasana and Ardhmatsyendrasana



Stretching and twisting improves insulin sensitivity and stimulates pancreas to secrete insulin.