

Economical Benefits of Yoga and Pranayama for Diabetic Patients

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ABSTRACT :- Yoga is an ancient Indian science and rich heritage of our culture. Yoga practice is useful in the treatment of certain diseases and prevention of health in normal individuals. It is economical and ecofriendly.

In the present study 40 local people joined for the three month Yoga camp. Among them 16 patients were shown diabetes. All these patients were suggested by food habits, other useful habits & one and half hours Yoga. Almost all patients shown good progress. In diabetes 4 patients shown 40-50% progress in their blood glucose level, 7 patients shown 30 to 40 % progress & 4 patients 25 to 30 %. All these 16 patients the cost of expenditure on medicine was 7,950.00/- rupees per month, but after yoga camp the cost was reduced to 3,837.50/- rupees per month.

KEYWORDS: Yoga, Pranayam, Diabetes, economical, Patients, Yoga camp, Medical examination, etc.

I. INTRODUCTION

Yoga is a complete science of life that originated in India many thousands of years ago. [1]. It is a rich heritage of our culture. Yoga practice is useful in the treatment of certain diseases and prevention of health in normal individuals. Now it has become the subject of modern scientific evaluation [2]. Yoga Asanas for curing diabetes are Ardha Chandrasana, Bhujangasana, Salabhasana, Poorna Salabhasana, Dhanurasana and Ustrasana. These postures cause the internal to stretch, bringing stimulation to the pancreas and other glands and organs that otherwise receive no stimulation. [3]. Yoga has therapeutic value and benefits for individuals with a wide range of health conditions [4,5,6]. As reported in the literature, yoga practice improves mental health outcomes, stress, mood states, quality of sleep and overall psychological well-being [7]. Exercise is a major therapeutic prevention and protective effects in the treatment of diabetes mellitus by decreasing oxidative stress and improving antioxidant status [8,9]. Yoga has become popular in western culture as a means of exercise and training fitness [10]. The exact mechanism of action of Yoga asanas is unknown. It is assumed that direct regeneration of the cells of pancreas may be taking place, which may increase insulin utilization and metabolism of glucose in the peripheral tissue, liver and adipose tissues through enzymatic process [11,12,13,14]. A increasing number of research studies have shown that Hatha yoga can improve strength and flexibility, and may help control physiological variables such as blood pressure, respiration and heart rate and metabolic rate to improve overall exercise capacity [15].

Hindu Yoga has seven branches, of these Raja yoga, Mantra yoga and Hatha yoga are perhaps the best known and most commonly practiced forms. Raja yoga, Patanjali's eight limb system of meditation, contemplation and renunciation, seeks self-realization and transformation through progressive control of mind. Mantra yoga, focusing the use of specific sound or chants to achieve mental and spiritual transformation, was popularized in the West by Maharishi Mahesh Yogi [16]. Hatha Yoga, the branch of yoga most widely practiced in the Western industrialized world, approaches self-realisation and healing through the physical body and its pranic [energetic] template, with a focus on pranayam [breath control] and specific asanas [postures], including both active and relaxation poses [16]. Yoga is also easy and inexpensive to maintain, requiring little in the way of equipment or professional personnel, with some studies indicating excellent long-term adherence and benefits [17]. Yoga does not have any side effects, is a safe, simple to learn, multiple collateral lifestyle benefits and can be practiced by even ill, elderly or disabled individuals [18].

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India has more diabetics than any other country in the world, according to the International diabetes Foundation and recent estimates, approximately 51 million people was diabetes in 2010 and by 2030,87 million people is expected to have diabetes in India [19]. So WHO has declared India as the-Diabetic Capital of the World [20]. Diabetes mellitus is rapidly increasing worldwide and has become of major public health concern and according to the American Heart Association-Diabetes mellitus killed 73,138 people in the United States in 2004.Final mortality was 48.2% of total death from diabetes in male and 51.8% of total deaths from diabetes in female.[21]. Diabetes is a disease in which blood glucose level is increases than the normal level. Glucose is an essential nutrient that provide energy for the proper functioning of the body cells. After meals, food is digested and assimilated by the intestinal cells into the blood stream, and is carried by blood to all the cells in the body. However, glucose cannot enter the cells alone. It needs assistance from insulin in order to penetrate the cell walls. Insulin, therefore, acts as a regulator of glucose metabolism in the body [22,23]. Sedentary life style, mental stress and an improper diet are considered to be major components of an unhealthy lifestyle that contributes significantly to the pathogenesis of diabetes mellitus and several other disorders.[24]. Per 1 kilogram of body weight,the risk of diabetes increases by almost 5%. It is estimated that, prevention of obesity in adults approximately prevents half of the cases of diabetes mellitus. It is prove that, over weight and obesity are the main cause of development and progression of the diabetes in 60 to 70% of people. With the increase in body fat, especially fat around the abdomen, muscle cells and other tissues of the body become resistant to insulin and inhibit glucose entry into muscle cells, hence, glucose accumulates in the blood and blood sugar rises[25]. Various types of physical activity, along with a proper diet have been proposed to prevent diabetes mellitus, and in between, yoga can reduce risk factor in people with diabetes by optimal effects on body composition, glucose levels, and blood pressure and lipids[26] . With the proliferation of yoga based studies in recent years, few have examined the long-term benefits of yoga practice on diabetes mellitus. The aim of present study were therefore to investigate the effect of 90 days [three months] of Raja Yoga as well as yogic jogging [physical training] exercise investigations on BSL in diabetic patients.

II.MATERIAL & METHODS

For present study 40 local peoples joined to the three month Yoga comp. Among them 16 patients were showed high blood glucose level or diabetic patients. They were suggested by following two suggestions before practicing of Yoga.

Food habits : i) The lunch & dinner timing should be fixed ii) the time difference 2 meals should be 4 hrs.
iii) Low fat meal, with fiber rich vegetables & fruits should be taken.
iv) Reduce fats, excess calories, sweets, milk, butter, cheese, etc. in meals.

Other useful habits : i) Do not sleep more than 6 to 7 hrs. ii) Try to stop addiction such as smoking, drinking, alcohol or any other drugs iii) Taking help from dietician, one should fix the daily diet schedule
iv) If possible take massage & steam bath regularly.

Diabetes : The yogic practices training programme was given to 40 subjects [16 diabetic patients] for 90 days of one session in the morning between 5.30 a. m. to 7.00 a.m.for six days in week. Prior to every training session, subjects underwent 5 to 10 minutes warm-up exercises [yogic jogging].

. Training volume and intensity were increased progressively in fourth and ninth weeks.The details of yogic intervention were presented in the Table 1.

Before the start of experimental treatment, all 16 diabetic subjects underwent baseline testing for assessment of their blood sugar[fasting plasma glucose,post-prandial blood sugar].Final testing, which repeat of the base line tests,was conducted at the end of 90 days yogic intervention. Blood analyses were performed at SHREERAM computerized clinical laboratory. Medicines or drugs taken before camp medicines continued after camps & their cost is tabulated in the (Table No.3).

The percentage change of diabetes is calculated by following formula

$$\% \text{ change} = \frac{\text{B.S.L. before yoga intervention} - \text{B.S.L. after yoga intervention}}{\text{B.S.L. before yoga intervention}} \times 100$$

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TABLE 1- Yoga scheduled for diabetes (for 90 days daily 1 ½ hrs.)

	Pranayams	Micro exercises & Asnas	Time	No. of ways
1	Bhastrika		2 to 5 min.	
		Straight the legs, then movement of toes, heels & ankles clockwise & anticlockwise.		10 times
		Butterfly		10 times
2	Kapalbhati		2 to 5 min.	
		Straight the hands, close the palm, rotate the clockwise & anticlockwise.		10 times
		Mandukasana	6 to 8 sec.	2 times
		Ardhachandrasana	4 to 6 sec.	2 times
	Kapalbhati		2 to 5 min.	
		By putting hands on shoulders & rotate so as to make zero, clockwise & anticlockwise		10 times
		Yog mudrasana	4 to 6 sec.	2 times
		Ushtrasana	4 to 6 sec.	2 times
	Kapalbhati		2 to 5 min.	
		Hand to hand holding, inhale forcefully & take hand back to the head left & right alternately.		2 times
		Vajrasana	10 sec.	1 time
	Kapalbhati		2 to 5 min.	
		Spread the legs making angle & touch the right hand to the toes of left hand & vice – versa		10 times
		Vakrasana	4 to 6 sec.	2 times
		Ardhamatsyendrasana	4 to 6 sec.	2 times
3	Bahya			2-5 times
		Pavanmuktasana	4 to 6 sec.	2 times
		Matsyyasana	6 to 8 sec.	2 times
4	Anulom - vilom		2 to 5 min.	
		Halasana	4 to 6 sec.	2 times
		Survangasana	10 - 15 sec.	2 times
	Anulom - vilom		2 to 5 min.	
		Bhujangasana	4 to 8 sec.	2 times
	Anulom - vilom		2 to 5 min.	
		Merkatasana	4 to 8 sec.	2 times
5	Brahmari		2 min.	
6	Udgeet		2 min.	
7	Ujjayi			3-5 times
		Hashayyasana	1 min.	
		Shawasana	5 min.	

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III.RESULT & DISCUSSION

The blood sugar level of all 16 subjects before yoga camp & after yoga camp shown good improvement. Diabetic 4 patient shown 40 to 50 % improvement in their blood glucose level , 7 patient shown 30 to 40 % improvement & 5 patient shown 25 to 30%. All these 16 patients, the cost of treatment was 7950.00 rupees per month, but after Yoga camp, it was reduced and it is only 3837.50 rupees per month.

Our results are corroborated with the findings of [1,27,28]. Kamakhy²², the role of yoga in the of diabetes mellitus fasting and post-prandial blood glucose levels came down significantly. Similarly the blood glucose were examined before and after exercise training in both groups, results indicated a significant difference in the changed levels of blood glucose between the control and the experimental groups. [29 , 4].

Practice of Kapalbhathi, Bhastrika, Mandookasan, Yog Mudrasan & other asanas activates the pancreas & helps in proper secretion of insulin. The insulin dependent patient also get positive results with the practice of Yoga & Pranayam [30]. Similar Asanas are also suggested by Sharma³¹ & B.K.S. Iyengar³². Yoga is simple, easy, effective & scientific treatment with the help of Yog to around 500 crore people who are unable to get medical facilities due to poor economic conditions will get benefit [33]. Diet, exercise, drug & finally insulin are the management options in diabetes can be adequate controlled by diet alone, 20 to 30 % need oral hypoglycemic drugs while 20 % to 30 % require insulin[34].

IV.CONCLUSION

1. Long term Yoga practice can bring reduction in blood level.
2. By doing Yoga and Pranayam activity patient can reduce the cost of treatment.
3. Yoga practice is feasible, economical & ecofriendly, one can adapt in their daily routine life.
4. It is sustainable & good for nation building.

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Table - 2 B.S.L of diabetic patients before & after Yoga camp

Name of the patient	Sex	Age	Weight	B.S.L. mg./DL before camp	B.S.L. mg./DL after camp	Perc entag
A	Male	40	70	F – 122, PP - 232	F – 92, PP - 167	F-24.5%,PP- 28.%
B	Male	61	68	F - 252, PP- 362	F - 112, PP - 152	F-55.5 %, PP-58 %
C	Male	38	70	F 182, PP -306	F - 112, PP - 152	F-38.4 %, PP- 50.03%
D	Male	41	75	F - 172, PP – 252	F - 114, PP – 147	F-33.7 %, PP- 41.6%
E	Male	39	65	F - 302, PP - 439	F - 118, PP -167	F-60.09%, PP- 61.9%
F	Male	42	61	F - 191.2, PP - 310	F - 100, PP - 142	F-47.6 %, PP- 54.01%

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G	Male	54	55	F – 182, PP - 273	F - 100, PP – 142	F-45%, PP- 47.9%
H	Male	60	70	F - 146, PP - 266	F – 112, PP - 162	F-23.2%, PP- 39.%
I	Male	42	78	F - 106, PP 206	F - 88, PP - 126	F-16.9 %, PP- 38.8%
J	Male	57	60	F - 114, PP - 202	F - 92, PP – 142	F-19.2%, PP- 29.7%
K	Male	55	60	F - 212, PP – 422	F - 152, PP - 262	F-28.3%, PP- 37.09%
L	Male	42	63	F - 170, PP - 232	F - 92, PP - 122	F-45.08%,PP- 47.04%
M	Male	54	80	F - 162, PP – 212	F - 86, PP – 127	F-46.09%,PP- 40.00%
N	Male	38	68	F - 171, PP - 249	F - 86.53, PP - 123.86	F-49.30%,PP- 50.02%
O	Male	35	82	F - 191, PP - 352	F – 189	F-46.57% Random
P	Male	39	78	F - 144, PP - 264	F - 108, PP - 159	F-25.%, PP- 39.07%

- F = Fasting
- pp = postprandial
- values in percentage indicate percentage decreased over control

Table 3 : showing medicinal expenditure on diabetes before & after Yoga camp

Patient Name	Drugs before Yoga	Cost of drugs/ month	Drug after Yoga	Cost of drugs/ month
A	Gimer P2, Nebistar 5 Ecosprin AV.	410/m	1\2 dose only	200/m
B	Insulin 50 Unit - 50 unit	600/m	Insulin 30 - 30 unit	250/m
C	Homocheck, Glycinorm M 40	500/m	1/2 dose	250/m
D	Cetapin X R 500 mg, Tryptanar 10, XReeuglin	300/m	Cetapin XR & Tryptanar ½ dose	200/m
E	Misobit 25, Metride plus	300/m	1/2 dose	150/m
F	Dibetrol 500 mg	200/m	1/2 dose	100/m
G	Insulin (Humna Mixtard 40) 30 - 30 unit	300/m	Insulin 15 - 15 unit	150/m

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H	Volix 0.3, Glycomet 500 SR Bisocar 5, Delisprin 75, Betonin Plus 170 ml, Calpol, falcigo, L - cin 500 mg	818/m	1/2 dose	435/m
I	Matcee 500	55/m	1/2 dose	27.50/m
J	Genminar m	100/m	1/2 dose	50/m
K	Ceftum 250, Eption 10 mg, Emeset 4 mg, Nimodip 60 mg, Bisocars .5	2900/m	1/2 dose	1450/m
L	Consivas - 5, clordfort 4 + Glimolin 1 mg, Revavel 50	350/m	1/2 dose	175/m
M	Glynase + mf, Amlace	300/m	1/2 dose	150/m
N	Fibator, catapin XR 500, Cardace- 2.5	317.76	No Dose	Nil
O	Genmer P, Nerogen, Mevpame, Plenge	400/m	1/2 dose	200/m
P	Geminar M1	100/m	1/2 dose	50/m
Total before camp		Rs.7950.00	Total after camp	Rs.3837.50/m

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