

IMPACT OF YOGA ON DIABETES MILLITUS

DR. DINESH PRASAD SAHU

Former Research Scholar,

Dept. of Psychology

Lalit Narayn Mithila University, Darbhanga (Bihar)

Yoga Instructor,

New Delhi

The present study has been undertaken to evaluate the role of yoga as a lifestyle management in the treatment of Diabetes Mellitus. The patients were divided into two groups – 1. Study 2. Controlled groups. The study group consists of 80 patients who opted for yoga as a treatment. They were compared to controlled group. This consists of 50 patients who opted or allopathic treatment. Maximum number of patients in our study belongs to age group 40 to 44 years. The mean age group in our study was 43.90 years. In this study, the patients with Diabetes Mellitus doing yoga exercise regularly show a gradual decrease in fasting blood sugar (FBS) and post prandial blood sugar (PPBS).

Key words: Yoga, Diabetes Mellitus

Introduction:

Although increase in birth prevalence and incidents of type – 2 Diabetes have occurred globally, they have been especially dramatic societies in economic transition, in newly industrialized and developing countries. Currently the number of cases of diabetes worldwide is estimated to be around 150 million (Green, Ghristion, Pramming, 2003). Globally, according to the International Diabetes Federation diabetes atlas (eighth edition, 2017), in 2017 there were roughly 425 million people with diseases, figure that is predicted to increase to 629 million by 2045(International Diabetes Federation, 2017).. The results of prevalence studies of diabetes mellitus in India were systematically reviewed with emphasis on those utilizing the standard WHO criteria for diabetes diagnosis. The prevalence of disease in adults was found to be 2.4% in rural and 4.0 – 11.6% in urban dwellers. High frequencies of impaired glucose tolerance, shown by those studies, ranging from 3.6 – 9.1% indicate potential for further rise in prevalence of diabetes mellitus in the coming decades (Prevalence of Diabetes Mellitus, Park 19th edition).

Most people with diabetes are overweight and obesity worsens the metabolic and physiologic abnormalities associated with diabetes. Dietary control and exercise are established treatment modalities in patients with type – 2 diabetes and other lifestyle disorder, including obesity, hyper-tension and dyslipidemia, urbanization, the intake of calorie-rich food, use in various machines, less open space for exercise, a busy modern life-style and lack of motivation reduce to like hood of adherence to dietary control and exercise as a management option in people with diabetes. There have been studies to assess the effectiveness of lifestyle modification and behavioural weight loss and weight control interventions in adults with type–2 diabetes (Susan, Novris et. al., 2004). Studies also suggest that the lifestyle and pharmacological interventions reduce the rate of progression to type –2 diabetes in people with impaired glucose tolerance. Lifestyle interventions seem to be at least as effective as drug treatment (Davis, Tringham, Khunti et. al., 2004). As more is understood about the physiologically of exercise, both in normal and diabetes subjects, its role in treatment of diabetes is becoming better defined. Although persons with diabetes may derive many benefits from regular physical exercise, there also are a number of hazards that make exercise difficult to management. In insulin treated diabetes, there are risks of hypoglycemia during or after exercise or of a worsening metabolic control if insulin deficiency is present. A number of strategies can be employed to avoid hypoglycemia in patients with insulin treated diabetes and both type – 1 and type – 2 diabetes subject should be examined carefully for long term complications have led many diabetologists to consider exercise to be beneficial in the management of diabetes in some individuals but not to be recommended for everyone as a ‘necessary’ part of diabetic treatment as was thought in past. Instead, the goals should be to teach patients to incorporate exercise into their daily lives if they wish to develop strategies to avoid complications of exercise. The rationale for the use of exercise a part of the treatment program in type – 2 diabetes is much clear and regular exercise may be prescribed as an adjunct to calorie restriction for weight reduction and as a means of improving insulin sensitivity in the absence, insulin resistant individuals (Horton, 1988).

The science of yoga is an ancient one. It is rich heritage of our Indian culture and originated in India more than 5,000 years ago and is a means of balancing and harmonizing the body, mind and emotions (Liu, Xc., Pan, L. et. al., 2014). Yoga practice is useful in the management of various lifestyle diseases, including type – 2 diabetes. Yoga is a discipline to improve or develop one’s inherent powers in balanced manner. It offers means to reach complete self-realization. The literal meaning of Sanskrit word Yoga is ‘YUJIR’. Accordingly, Yoga today is no longer limited hermits, saints and sages and it has taken place in our everyday lives and has aroused a worldwide awakening and acceptance in the last few decades. The science of yoga and its technique have been reoriented to suit modern sociological and psychological needs and lifestyle. Experts of various branches of medicine including modern medical science are realizing the role of these techniques in the preventive of disease (depression, anxiety, hypertension, asthma, diabetes and other diseases), mitigation and cure of disease and promotion of health. Some have studies; yoga reduces

levels of triglycerides, low density lipoprotein cholesterol and free fatty acids and improves high density lipoprotein levels (Cui, J., Yan, J. H. et.al. 2017). Yoga induces discipline regarding food and exercise (Miller, C. K., Kristeller, J. L. et. al., 2012). Yoga improves glycemic control without increasing body weight and some studies have found it to reduce body weight (Mullur, R. S., Ames, D., 2016). There is evidence that yoga can also benefit people with non-insulin-dependent diabetes mellitus (Singh, R. H. et al. 1982). Both FBG and HbA/c improved significantly ($P < 0.05$) in the yoga group, compared to the controls, three patients the yoga group were able to reduce their medication. Most patients in the yoga group wanted to continue attending yoga classes and reported feeling better, less anxious and more in control of themselves. No adverse effects were observed (Robbin, M. et al., 1992). Surwitt & Feingloss (1983) reported that relaxation training leads improved glucose tolerance in NIDDM patients without affecting insulin sensitivity or glucose-stimulated secretory activity. This could be mediated by decreases in sympathetic and adrenal cortical activity. Yoga presumably has similar effects but may also act other ways, since it includes postural and breathing exercises in addition to simple relaxation.

How Yoga Fits In:

1. Yoga effectively reduces stress, thus reducing Glucagon's and possibly improving insulin action.
2. Weight loss induced by yoga is a well-accepted mechanism.
3. Muscular relaxation, development and improved blood supply to muscles might enhance insulin receptor expression of muscles causing increased glucose uptake by muscles and thus reducing blood sugar.
4. Blood pressure plays a great role in development of diabetes and related complications, which is proven to be benefited by yoga. The same holds true for increased cholesterol levels.
5. Yoga reduces adrenaline, noradrenalin and cortisol in blood, which are termed as 'stress hormones'. This is a likely mechanism of improvement in insulin action. High levels of stress hormones like adrenaline and cortisol raise blood sugar levels and high cortisol levels also tend to promote both over eating and the accumulation of intra-abdominal fat which contributes to insulin resistance, as well as to the risk of having a heart attack. Yoga impact on stress can and prevents delay, or minimize the effects of the disease.
6. Many yogic postures do produce stretch on the pancreas, which is likely to stimulate the pancreas function.
7. Yoga increases will power, self-confidence, strength, flexibility, contentment and discipline, which can be a great help with weight loss and other health issues.

Aims and objective of the present study:

The effect of the yoga practices on the management of diabetes has not been investigated well. Now aims and objective of the study, as well as its methodological dimensions are as

follows the study had been proposed to ascertain the role of yoga in the treatment of diabetes mellitus. Thus, yoga (asana, pranayama, meditation, yog-nidra) was considered as independent variables and diabetes mellitus were considered as dependent variables. In this context following hypothesis were formulated :

1. Diabetes patients show a gradual decrease in FBS doing yoga exercise regularly.
2. Diabetes patients show a gradual decrease in PPBS doing yoga exercise regularly.

Definition of Variables:

Yoga:

Yoga is a means of balancing and harmonizing the body, mind and emotion.

Diabetes Mellitus:

Diabetes Mellitus is a condition that occurs when the body can't use glucose..

Methodology :

Sample:

For present study, diabetic patients have formed to two group, firstly - experimental or study and secondly - controlled groups. The study group in addition to normal treatment was five yoga classes per week for six month in MCD, Park, Nangal Raya (near – D – Block, Janakpuri), New Delhi. The controlled group continued with normal medical treatment only. The sample of study group were 80 and controlled groups 50. Thus, altogether 130 diabetes mellitus patients. The age range of Diabetic patients was 40-44 years with mean age Of 43.90 years.

Materials Required :

1. Yoga trainer.
2. Yoga mat.
3. Space for yoga
4. Stop watch

Procedure :

The yoga specific for diabetes mellitus were taught to the patient for one hour every day by former research scholar/qualified yoga trainer Dr. Dinesh Prasad Sahu. The following are the yoga taught to the patients by the instruction-

- A. Asana:** 1. Tadasana, 2. Trikonasana, 3. Surya Namaskar, 4. Mandukasana, 5. Vajrasan, 6. Paschhimottasana, 7. Matsyandrasana, 8. Matsyasana, 9. Pavanmuktasana, 10. Naukasana, 11. Halasana, 12. Chakarasana, 13. Shalbhasana, 14. Bhujanagasana 15. Dhanurasana..
- B. Pranayam:** 1. Aum chanting 2. Anulom-vilom, 3. Bhramari, 4. Kapalbhathi.
- C. Meditation,/Yog Nidra.** (Sahu, D. P., 2013, 2014)
- D. Diet Control**

Result and discussion :

In order to test the hypothesis – 1. Diabetes patients show a gradual decrease in Fasting Blood Sugar (FBS) doing Yoga exercise regularly. Thus for the purpose of statistical analysis data were tabulated according to study and controlled groups of diabetes patients. This table summarizes the trend of FBS over 6 months in the study and controlled groups. The obtained results are presented in Table – 1

Table - 1
Case Summaries

Group	FBS 0 month	FBS 1 month	FBS 2 month	FBS 3 month	FBS 4 month	FBS 5 month	FBS 6 month
Study/N	80	80	80	80	80	80	80
Minimum	128	126	120	119	118	112	98
Maximum	196	190	186	188	180	176	170
Range	68	64	66	69	62	164	72
Mean	141.59	137.86	133.85	130.16	126.83	122.13	118.34
SD	12.312	11.192	11.028	11.592	10.831	16.786	12.234
Median	140.00	136.00	130.00	126.50	124.00	122.00	120.00
SEM	1.377	1.251	1.233	1.296	1.211	1.877	1.368
Controlled/N	50	50	50	50	50	50	50
Minimum	126	92	100	98	98	112	112
Maximum	143	138	140	142	144	146	148
Range	17	46	40	44	46	34	36
Mean	130.80	124.94	123.02	121.56	126.52	128.18	130.08
SD	4.695	8.365	10.183	13.042	9.846	6.709	7.556
Median	130.00	126.00	125.50	125.50	126.00	127.00	127.00
SEM	.664	1.183	1.440	1.844	1.392	.949	1.069

In the study group the baseline mean value of FBS was 141.59 + 12.312 mg/dl, which decreased gradually to 137.86 + 11.192 mg/dl in first month, 133.85 + 11.028 mg/dl in second month, 130.16 + 11.592 mg/dl in third month, 126.83 + 10.831 mg/dl in fourth month, 122.13 + 16.781 mg/dl in fifth month and 118.34 + 12.234 mg/dl in the last month. Next, the controlled group means FBS at the start of the study was 130.80 + 4.695 mg/dl, which decreased gradually to 121.56 + 13.042 mg/dl in third month. However the mean FBS started increasing in this group from the fourth month 126.52 + 9.846 mg/dl to 128.18 + 6.709 mg/dl in the fifth month and 130.08 + 7.556 mg/dl in the six month.

Sahay (2007) found that fasting blood glucose came down with yoga in short term and long term. Manjunatha, S. (2005) has finding that yoga is help for diabetes Mellitus patients.

In order to test the hypothesis - 2. Diabetes patients show a gradual decrease in PPBS doing yoga exercise regularly. Thus for the purpose of statistical analysis data were tabulated according to study and controlled groups of diabetes patients. This table summarizes the trend of PPBS over 6 months in the study and controlled groups. The obtained results are presented in Table – 2

Table - 2

Case Summaries

Group	PPBS 0 month	PPBS 1 month	PPBS 2 month	PPBS 3 month	PPBS 4 month	PPBS 5 month	PPBS 6 month
Study/N	80	80	80	80	80	80	80
Minimum	184	174	154	150	148	146	130
Maximum	266	256	248	240	230	236	228
Range	82	82	94	90	82	90	98
Mean	213.76	209.59	205.05	198.33	191.68	186.76	178.36
SD	18.788	17.160	18.299	15.940	15.208	16.552	19.484
Median	210.00	208.00	202.00	198.00	190.00	190.00	180.00
SEM	2.101	1.919	2.046	1.782	1.700	1.851	2.178
Controlled/N	50	50	50	50	50	50	50
Minimum	200	132	140	145	160	164	160
Maximum	220	216	218	216	216	220	224
Range	20	84	78	71	56	56	64
Mean	207.00	197.34	194.94	195.22	200.98	201.64	204.16
SD	5.268	16.220	16.173	16.214	12.096	10.811	12.455
Median	208.00	200.00	198.00	200.00	200.00	201.50	202.00
SEM	.754	2.294	2.287	2.293	1.711	1.529	1.761

In the study group, the baseline mean value of PPBS was 213.76 + 18.788 mg/dl, which decreased gradually to 209.59 + 17.160 mg/dl in first month, 205.05 + 18.299 mg/dl in second month, 198.33 + 15.940 mg/dl in third month, 191.68 + 15.208 mg/dl in fourth month, 186.76 + 16.552 mg/dl in fifth month and 178.36 + 19.484 mg/dl in the last month. In the controlled group, mean PPBS at the start of the study was 207.00 + 5.268, which decreased gradually to 195.22 + 16.214 mg/dl in third month. However, the mean PPBS started increasing in this from the fourth month 200.98 + 12.096 mg/dl to 201.64 + 10.811 mg/dl in the fifth month and 204.16 + 12.455 mg/dl in the six month.

Similar results were observed by Malhotra, V. (2005). He reported that after yoga (asana, pranayama, meditation, yog-nidra), there was significant decrease in fast glucose level from basal 208.3 + 20.8 to 171.7 + 19.5mg/di and one hour postprandial blood glucose levels decreased from 295.3 + 22.0 to 269.0 + 19.9mg/dl.

After interpretation and discussion of the results, it becomes obvious that hypothesis no. 1 and 2 are accepted.

Conclusion:

In the light of the results obtained and interpretation of the following conclusion are drawn:

1. Study group of diabetes mellitus patients show the doing yoga exercise regularly and gradual decrease in fasting blood sugar (FBS). And controlled group show decrease and increase fasting blood sugar level.
2. Post Prandial Blood Sugar (PPBS) in the study group has also gradually decreased over six month and controlled group of PPBS has decreased and increased blood sugar level.

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