

A STUDY ON EFFECT OF YOGA ON REACTION TIME, GLYCEMIC CONTROL AND WELLNESS SCORE OF DIABETIC POLICE PERSONNEL

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Abstract

Yogic practices may help in the preventive and administration of diabetes mellitus (DM) and enhance the wellness. The motivation behind the investigation to assess the impact of yoga therapy on reaction time and wellness score of police faculty with diabetes. 15 diabetic police staff accepting standard therapeutic treatment for type-2 DM were chosen. The chose subjects were experienced yoga program involving 3 times per week sessions for about a month and a half. A post mediation, review wellness survey aggregated by ACYTER was utilized to assess the similar sentiments of the subjects after the yoga program. The preparation impact of yogic practices prove noteworthy impact over the reaction time, glycaemic control and wellness score.

Key Words - Yoga, Reaction Time, Diabetes Mellitus

1.1 INTRODUCTION

Yoga is the antiquated science created a huge number of years back in India. As an all-encompassing science worried about all parts of human working, yoga science gives a bringing together edge work by which stress can be comprehended and endured. Yoga includes a precise technique by which one can start to grow attention to these procedures and in this way start to pick up control over them. In this way, in an extremely reasonable sense, yoga gives the apparatus and methods by which one can grow one's cognizant mindfulness into the oblivious piece of the brain so as to end up mindful of the examples and propensities which prompt pressure. Yogic way of life alteration produces striking enhancements and can make an apparent commitment to essential counteractive action and in addition administration of way of life maladies. (1)

It is presently perceived that diabetes mellitus is a way of life and psychosomatic issue in which factors, for example, inactive propensities and physical, enthusiastic and mental pressure assume a noteworthy part. Indeed, even a short way of life alteration and stress administration training program in view of yoga diminishes chance variables for cardio vascular malady and DM. With no calculable reactions and numerous security benefits, yoga is sheltered, is easy to learn and can be rehearsed by even sick, elderly or impaired people. Be in safe straightforward and conservative therapy, it ought to be considered as a valuable adjuvant for DM patients. (2) The present investigation has been attempted to assess the impacts of about a month and a half yoga therapy program on reaction time, glycaemic control and wellness score of diabetic police staff.

1.2 MATERIALS AND METHODS

The present examination has been led as a piece of an extensive report on the impacts of yoga therapy on DM. 15 male police constables matured 40 – 50 years accepting medicinal treatment for Type-2 DM were enrolled for this investigation by unintentional testing strategy and advise assent acquired from them. None of the subjects had beforehand occupied with yoga hone. The reaction time, glycaemic level and wellness score were tried when the multi week think about period.

Reaction time

Reaction time (RT) contraption (Anand Agencies, Pune) was utilized for the investigation. The instrument has a fabricated – in 4 digit chronoscope with a show precision of 1 ms. It highlights four boosts, two reaction keys and a prepared flag. Switch for choosing right or left reaction key for any boost is given. Recording were taken in a cooled research center 2 h after a light breakfast. To keep away from the impact of lateralized boost, visual and sound-related signs were given from the front of the subject who was told to utilize his correct hand first and after that left hand while reacting to the flag. In the present examination sound-related reaction time (ART) were recorded for sound-related blare tone jolt and visual reaction time (VRT) for red light boost. The subjects were told to discharge the reaction key when they saw the jolt. The signs were given from the front of the subjects to maintain a strategic distance from the impact of lateralized jolt and they utilize their predominant hand while reacting to the flag. All subjects were given satisfactory presentation to the gear on two distinct events to acclimate them with the system of RT estimation. This was done in light of the fact that RT is more reliable when subjects have heard satisfactory practice. RT was acquired with a precision of 1 ms. In excess of ten preliminaries were recorded and mean of three comparative perceptions was taken as a solitary incentive for factual investigation.

Glycaemic Level

Glycaemic examinations were done at the Clinical Lab where blood was drawn from an antecubital vein in post absorptive state. Upon the arrival of the blood gathering, subjects were requested to decline yoga hone. Fasting blood glucose (FBG) and 2-h postprandial blood glucose (PPBG) were ordered and assessed when the investigation time frame.

Wellness score

A post mediation, review wellness survey assembled by ACYTER was utilized to assess the near sentiments of the alerts after the therapy program. Five distinct reactions extending from 'more terrible than previously' up to 'finish alleviation – add up to fulfilment' were used to assess different physical and mental parts of the patient's condition. The survey was settled in counsel with a twelve part group comprising of three prominent medicinal professionals, two clinicians, two yoga specialists, two famous yoga therapy experts, two educationalist and one coherent anthropologist.

Yoga therapy program

The subject had an underlying meeting session and they were given yogic directing and way of life change exhortation. An exhaustive yoga therapy program was conferred to the subjects by qualified yoga teachers for the term of a hour thrice seven days for about a month and a half. Subjects were encouraged to hone without over stressing relying upon the individual limit. The calendar is given in (Table-1)

Table – 1
Sequence and duration of yoga techniques practiced by our subjects.

Yoga technique	Duration (min)
Surya namaskar	10.0
Tadasan	0.5
Parivritta trikonasana	1.0
Padahasthasana	0.5
Ardh-kati-chakrasana	1.0
Vakrasana	1.0
Pashchimottasana	0.5
Padmasana	2.0
Ardha halasana	0.5
Bhujangasana	0.5
Dhanurasana	0.5
Viparitalasana	1.0
Chandranadi pranayama	2.0
Pranay pranayama	4.0
Nadi shuddhi	2.0
Savitri pranayama	3.0
Kavakriya	10.0
Shavasana	10.0
Rest period in-between practices	10.0
Total	60 m

1.4 ANALYSIS AND INTERPRETATIONS

STATISTICAL TECHNIQUE - 1

Statistical analysis was done using students t (paired) test and *P* values less than 0.05 were accepted as indicating significant differences between pre and post – intervention data.

Results

Reaction time

The results are given in (Table-2)

Table - 2
Effect of six weeks yoga therapy on visual reaction time (VRT) and auditory reaction time (ART) from right and left hands of type 2 diabetes mellitus patients before (B) and after (A) the study period

	B	A	% change	P value
VRT (ms)				
Right hand	250.82 ± 7.42	241.07 ± 5.92	-3.89	0.1096
Left hand	259.80 ± 7.72	251.44 ± 4.20	-3.22	0.1931
ART (ms)				
Right hand	196.87 ± 9.25	178.04 ± 6.36	-9.56	0.0357
Left hand	193.31 ± 6.19	179.44 ± 5.03	-7.18	0.0583

Values are mean ± SEM for 15 subjects

Yoga Training diminished ART and VRT from both right and left hands. Be that as it may, the decline was measurably critical ($P=0.0357$) just for ART from the correct hand (from 196.87 ± 9.25 to 178.04 ± 6.36 ms). The decline in ART from left hand from 193.31 ± 6.19 to 179.44 ± 5.03 ms was considerable (7.18%) however missed factual importance ($P=0.0583$). The abatement in VRT from perfectly fine as left hand was not factually noteworthy [Table 2].

Glycemic level

Table - 3

Effect of six weeks yoga therapy on fasting blood glucose (FBG), postprandial blood glucose (PPBG), in patients of type 2 diabetes mellitus before (B) and after (A) the study period

	B	A	%change	P value
FBG (mg/dl)	160.07 ± 15.65	127.07 ± 10.24	-20.62	0.0035
PPBG (mg/dl)	244.20 ± 17.12	208.73 ± 16.07	-14.52	0.0012

FBG decreased significantly ($P=0.0035$) by 20.62% from 160.07 ± 15.65 to 127.07 ± 10.24 mg/dl.

PPBG also decreased significantly ($P=0.0012$) by 14.52% from 244.20 ± 17.12 to 208.73 ± 16.07 mg/dl.

Wellness questionnaire

The post mediation by and large wellness scores of the members are given in Table-4. The consequences of the aggregate generally speaking review wellness scores demonstrated that 7% achieved finish alleviation and aggregate fulfillment after the therapy program while 27% were greatly improved than previously. 42% were better than anyone might have expected while 23% revealed no adjustment in their condition. The state of 1% was more regrettable than previously.

Table - 4

Post intervention % responses of the participants to retrospective wellness questionnaire

	Worse than before	Same as before	Better than before	Much better than before	Complete relief/ totally satisfied
Ability to concentrate	-	28.57	28.57	21.43	-
Control of anger/loss of temper	-	35.71	28.57	28.57	7.14
Appetite	-	33.33	25	25	16.67
Confidence level	-	28.57	42.86	21.43	7.14
Ease of breathing	-	28.67	40	28.67	6.67
Energy levels	-	33.33	33.33	33.33	-
Enjoyment of life	-	20	60	6.67	13.33
Feeling calm and fresh	-	33.33	33.33	26.67	6.67
Feeling of hopelessness	-	40	40	20	-
Feeling of loneliness	-	6.67	60	33.33	-
General flexibility	-	13.33	53.33	26.67	6.67
General mood	-	8.33	50	33.33	8.33
General sense of relaxation	-	14.28	50	28.57	7.14
General wellbeing	-	7.69	38.46	35	-
Joint mobility	-	13.33	40	33.33	13.33
Nervousness	-	28.57	57.14	14.29	-
Pain levels	-	13.33	53.33	26.67	6.67
Performance of day-to-day activities	-	21.43	42.86	35.71	-
Sleep quality/duration	13.33	20	26.67	40	-
Stress levels	9.09	27.27	36.36	27.27	-
Total wellbeingscore	1.07	22.80	42.19	26.76	7.13

STATISTICAL TECHNIQUE - 2

Statistical analysis was done using students t (paired) test and P values less than 0.05 were accepted as indicating significant differences between pre and post – intervention data.

Results

Reaction time

The results are given in (Table-2)

Table - 5

Effect of six weeks yoga therapy on visual reaction time (VRT) and auditory reaction time (ART) from right and left hands of type 2 diabetes mellitus patients before (B) and after (A) the study period

	B	A	% change	P value
VRT (ms)				
Right hand	250.82 ± 7.42	241.07 ± 5.92	-3.89	0.1096
Left hand	259.80 ± 7.72	251.44 ± 4.20	-3.22	0.1931
ART (ms)				
Right hand	196.87 ± 9.25	178.04 ± 6.36	-9.56	0.0357

Left hand	193.31 ± 6.19	179.44 ± 5.03	-7.18	0.0583
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Values are mean ± SEM for 15 subjects

Yoga training diminished ART and VRT from both right and left hands. In any case, the reduction was measurably noteworthy ($P=0.0357$) just for ART from the correct hand (from 196.87 ± 9.25 to 178.04 ± 6.36 ms). The diminishing in ART from left hand from 193.31 ± 6.19 to 179.44 ± 5.03 ms was obvious (7.18%) however missed factual noteworthiness ($P=0.0583$). The decline in VRT from perfectly fine as left hand was not measurably huge [Table 5].

Glycemic level

Table - 6

Effect of six weeks yoga therapy on fasting blood glucose (FBG), postprandial blood glucose (PPBG), in patients of type 2 diabetes mellitus before (B) and after (A) the study period

	B	A	%change	P value
FBG (mg/dl)	160.07 ± 15.65	127.07 ± 10.24	-20.62	0.0035
PPBG (mg/dl)	244.20 ± 17.12	208.73 ± 16.07	-14.52	0.0012

FBG decreased significantly ($P=0.0035$) by 20.62% from 160.07 ± 15.65 to 127.07 ± 10.24 mg/dl. PPBG also decreased significantly ($P=0.0012$) by 14.52% from 244.20 ± 17.12 to 208.73 ± 16.07 mg/dl.

Wellness questionnaire

The post intervention overall wellness scores of the participants are given in Table-4. The results of the total overall retrospective wellness scores indicated that 7% attained complete relief and total satisfaction after the therapy program while 27% were much better than before. 42% were better than before while 23% reported no change in their condition. The condition of 1% was worse than before.

Table - 7

Post intervention % responses of the participants to retrospective wellness questionnaire

	Worse than before	Same as before	Better than before	Much better than before	Complete relief/ totally satisfied
Ability to concentrate	-	28.57	28.57	21.43	-
Control of anger/loss of temper	-	35.71	28.57	28.57	7.14
Appetite	-	33.33	25	25	16.87
Confidence level	-	28.57	42.86	21.43	7.14
Ease of breathing	-	26.67	40	26.67	6.67
Energy levels	-	33.33	33.33	33.33	-
Enjoyment of life	-	20	60	6.67	13.33
Feeling calm and fresh	-	33.33	33.33	26.67	6.67
Feeling of hopelessness	-	40	40	20	-
Feeling of loneliness	-	6.67	60	33.33	-
General flexibility	-	13.33	33.33	26.67	6.67
General mood	-	8.33	50	33.33	8.33
General sense of relaxation	-	14.28	50	28.57	7.14
General wellbeing	-	7.69	38.46	35	-
Joint mobility	-	13.33	40	33.33	13.33
Nervousness	-	28.57	57.14	14.29	-
Pain levels	-	13.33	33.33	26.67	6.67
Performance of day-to-day activities	-	21.43	42.86	35.71	-
Sleep quality/duration	13.33	20	26.67	40	-
Stress levels	9.09	27.27	36.36	27.27	-
Total wellbeing score	1.07	22.80	42.19	26.76	7.13

1.5 DISCUSSION

In a prior work, we have announced that diabetic patients have a more drawn out RT when contrasted with typical subjects. In the present work, we have exhibited that an exhaustive multi week yoga therapy program delivers a noteworthy shortening in ART in diabetic patients. To the best of our insight, this is the main such report. Shortening of RT can be clarified by increment in tangible engine conduction speed as well as speedier data handling in the focal sensory system. This has physiological and in addition clinical importance as quicker RT implies better execution of games work force, exactness specialists and different experts. Here, it is fascinating to take note of that we have beforehand detailed a prompt shortening of RT following the act of nine rounds of mukha bhastrika, a roars kind of yoga relaxing.

Fasting and in addition post-prandial blood glucose levels diminished essentially in our subjects following the yoga therapy program. This is predictable with prior investigations that have revealed that yoga preparing results in a decrease in both FBG and PPBG levels and better glycemic control. Sahay has detailed a change in insulin affectability and decrease in insulin opposition in subjects rehearsing yoga while Manjunatha et al., announced that the execution of Asanas prompts an expanded affectability of the β cells of pancreas to glucose signals. It is conceivable that a comparative instrument is in charge of the changes in glucose levels of our subjects. Expanded thoughtful movement, improved cardiovascular reactivity and decreased parasympathetic tone have been emphatically involved in the pathogenesis of insulin obstruction disorder, atherosclerosis and cardiovascular sicknesses. Innes and Vincent have proposed that yoga lessens this hazard profile by diminishing initiation of the sympatho-adrenal framework and the

hypothalamic-pituitary-adrenal hub and furthermore by advancing a sentiment of prosperity alongside coordinate improvement of parasympathetic action by means of vagus nerve. They additionally proposed that yoga gives a positive wellspring of social help that is a factor related with decreased hazard for cardiovascular maladies. Every one of these variables are relevant to our investigation and may clarify the positive changes delivered following the adherence to the thorough yoga therapy program.

It has been accounted for that a short way of life adjustment and stress administration instructive program prompts surprising change in the emotional prosperity scores and can accordingly make an obvious commitment to essential counteractive action and in addition administration of way of life diseases. Majority of our patients detailed a change in craving, capacity to think, control outrage, certainty levels, simplicity of breathing, vitality level, pleasure in existence with quiet and crisp inclination [Table 4]. They additionally revealed a lessened sentiment of misery, apprehension and dejection. They announced upgrades when all is said in done adaptability and joint portability alongside better broad temperament, feeling of unwinding and prosperity. There was an abatement in feelings of anxiety with enhanced quality and term of rest. This is like an ongoing report that yoga enhances mental results in type 2 diabetes patients with enhanced prosperity and lessened anxiety. Yoga might enhance mental and passionate segments of the identity and abstract prosperity announced by our members might be a contributing psycho-physiological factor in the attractive changes appeared by our patients. The potential advantages being contributed by the diverse practices in our examination might be estimated as takes after. Surya namaskar enhances metabolic capacity, helping in using abundance glucose while conditioning up the musculoskeletal framework. Tadasan brings out a feeling of security and adjust both physically and rationally while Asanas, for example, parivritta trikonasan, padahastasan, ardha-kati-chakrasan, vakrasan, paschimottanasan, pavanamuktasan, bhujangasan and dhanurasan by their curving and pressure unwinding activities might invigorate intra-stomach organs, for example, liver and pancreas subsequently delivering benefits in the lipid profile. Ardha halasan and viparitakarani might blend psycho-neuro-endocrine capacity as found in reaction time while chandranadi pranayam might standardize autonomic adjust. Pranav pranayam, nadi shuddhi and savitri pranayam may contribute toward a feeling of serenity that improves inborn recuperating possibilities while kayakriya and shavasana make a feeling of mind body amicability that amends the psycho-physical segment of DM.

1.6 CONCLUSION

The fundamental quality of present investigation is the astounding consistence and normality of the yoga hone by the patients both amid the specifically managed sessions 100% participation. Thus the inside and out advantages acquired can be credited to the devoted and normal routine with regards to our extensive yoga therapy program. The fundamental downside of our investigation is absence of a control gathering and the incidental inspecting technique utilized. As our members were likewise accepting standard healing facility pharmaceutical, it is hard to decide the relative impacts of yoga and therapeutic administration. Notwithstanding, as there was no adjustment in the therapeutic administration convention that had effectively balanced out the clinical status of our patients, we can sensibly presume that the extra advantages are because of the yoga therapy program. It is proposed that further randomized control studies ought to be done to affirm these discoveries and encourage a more profound comprehension of the systems fundamental such useful outcomes. All in all, our investigation demonstrates that a complete multi week yoga therapy preparing program produces noteworthy change in reaction time, blood glucose and wellness score. A far reaching yoga therapy program can possibly improve the helpful impacts of standard therapeutic administration of DM and can be utilized in a compelling correlative or integrative therapy program.

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