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Original Research Article

To Study the Effect of Meditation, Diet, and Exercise in Type-2 Diabetic Patients in Mithilanchal Region

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Abstract:

Background: A behavioral therapy that is practiced both in India and all across the world is Raja Yoga meditation (RM). It seems to be a straightforward, feasible meditation method that one might apply on a regular basis.

Methods: All diabetes patients in the age range of 30 to 60, including both sexes, who have been receiving therapy for 5 to 10 years, participated in the current study in the Mithilanchal Region, mostly in the area around Darbhanga, Madhubani, Sitamarhi, etc.

Results: Blood sugar levels pre- and post-intervention showed a significant mean difference in Group A of 34.82±50.53. a number of Tukey test comparisons of the three groups' fasting blood sugar levels. The difference between Group A and Group C was determined to be substantial, indicating that Group A's impact is superior to that of Group C. Using a one-way anova test, post-meal comparisons between and within groups are made. This result is important because the F value was 8.24 and the P value was 0.001. It is a noteworthy finding that in Group C, the mean difference in haemoglobin A1c (HbA1C) levels was 0.86±1.48 with a P value of 0.048.

Conclusion: When used as a supplemental intervention, RM had a better impact on glycemic control than other groups. Additionally, all three interventions meditation, diet, and exercise have a positive impact on HbA1C levels.

Keywords: Diet And Exercise, Meditation, Type-2 Diabetic Patients.

Introduction

Diabetes mellitus is a metabolic disorder with multiple etiologies that is characterized by chronic hyperglycaemia and changes in the metabolism of carbohydrates, proteins, and fats as a result of abnormalities in insulin secretion, insulin action, or both. [1]

The WHO has also forecasted that the number of people with diabetes will more than double by 2030 as a result of population aging and urbanization.[2] The advantages of meditation, exercise, and dietary modifications in the prevention and treatment of type 2 diabetes have lately come to light thanks to clinical trials and cohort studies. A behavioral therapy that is practiced both in India and all across the world is Raja-Yoga meditation (RM). It seems to be a straightforward, feasible meditation method that one might apply on a regular basis. [3] Studies on Raja-yoga meditators have shown that as compared to non-meditators, meditators have improved lipid profiles and increased parasympathetic activity. [4,5] Type 2 diabetes mellitus (T2DM) incidence has been shown to be decreased in high-risk populations, such as those with metabolic syndrome or impaired glucose tolerance (IGT), with increased activity and dietary adjustments.[6] However, there is a dearth of reliable information regarding the effectiveness of dietary therapies for the prevention of type 2 diabetes.[7]

At 6 and 12 months, exercise appears to improve glycated hemoglobin in people with type 2 diabetes.[8] Regular physical activity and exercise are essential for preventing diabetes. Exercise promotes weight loss, enhances insulin action, and reduces blood sugar levels. Because of the association between higher levels of physical activity and a decrease in long-term issues, regular physical activity may have a preventative effect on diabetes. This connection has been proven by the diabetes prevention program (DPP), which encouraged 30 minutes of daily walking on most days of the week.[9] The DPP's "lifestyle exercise"

technique, which breaks exercise into several brief bursts of activity (for example, 10 minutes of brisk walking), is one trend that shows promise.[10]

Materials and Methods

This study was conducted at Department of Physiology, Darbhanga Medical College, Laheriasarai, Bihar from June 2019 to November 2019. There are 50 diabetes patients overall in the 30-60 age range, of both sexes, who have been receiving therapy for 5–10 years.

60 diabetic individuals will be assigned at random to the intervention group. The study group will be divided into three subgroups: (a) RM only, (b) diet and exercise only, and (c) all three subgroups combined. There must be 20 diabetes patients in each subgroup.

In the A group, i.e., RM only, the person shall sit upright and concentrate on a point of white light. There are three stages-

1. Initiation -.In this stage, thoughts in the mind, come in randomly
2. Concentration -.He now, converts all negative thoughts with positive thoughts of peace, happiness, love, bliss, purity, knowledge, and power
3. Realization - this final stage involves feeling the emotions of these positive thoughts.

Result

Every day, RM was exercised for 10 minutes in the morning and 10 minutes in the evening. The subjects were evaluated in the physiology department after every fortnight for the last three months and every weekend for the first three months.

The C group likewise received the same types of RM treatments.

The B group's daily eating schedule consisted of the patients' regular diets supplemented with extra proteins. [11] After the RM orientation workshop, a project dietitian provided nutrition advice and assisted facilitators.

It was suggested to go for brisk 30-minute walks five days a week at dawn or dusk for a period of six months. [9].

The meditation, diet, and activity programmes for the C group were the same [Tables 1–8].

Fasting and post-meal blood sugar was the main follow-up indicators. The HBA1C was a secondary follow-up indicator.

Table 1: Sex-wise distribution of patients in three groups

Male % of patient	Female % of patients
Group A (76.47%)	Group A (23.53%)
Group B (58.82%)	Group B (41.18%)
Group C (64.71%)	Group C (35.29%)

Table 2: Comparison of prandial blood sugar level in three groups

Pre operatively mean PBS level and SD	Post operatively mean PBS level and SD
Group A (268)	Group A (308.41)
Group B (222.47)	Group B (220.29)
Group C (242)	Group C (221.29)

Table 3: The diet regimen planned for this group was as follow

Time of day	Protein	Carbohydrate and fibres	Fats	Vegetables and fruits
Breakfast	Sprouted mung dal	Suji Poha		
Lunch	Roti, Soyabeens/rajma	Rice (preferably unpolished)	Ghee, butter milk	Salad, any vegetable curries with minimal spices
Evening tea time				Mixed seasonal fruits
Dinner	Roti	Isabgul 2tsf in water		Mixed vegetable preparation

Table 4: Age-wise distribution of patients in three groups

Age group (years)	Group A (%)	Group B (%)	Group C (%)	X2
30-40	4(23.53%)	1(5.88%)	1	8.66. p=0.07 (NS)
41-50	2(11.76%)	7(41.18%)	2	
51-60	11(64.71%)	9(52.94%)	14	
Total	17(100%)	17(100%)	17	
Mean±SD	52±10.39	51.64±7.13	54.76±6.33	
Range (years)	32-60	36-40	40-60	

Table 5: Comparison of fasting blood sugar level in three group Pre and post operatively student's paired t-test

	Mean	n	SD	SEM	Mean difference	t
Group A						
Pre t/t	135.00	17	51.73	12.54	34.82±50.53	2.84, p=0.012(S)
Post t/t	169.82	17	86.75	21.04		
Group B						
Pre t/t	129.58	17	45.18	10.95	2.11±23.45	0.37, p=0.71(NS)
Post t/t	131.70	17	42.71	10.36		
Group C						
Pre t/t	126.64	17	45.44	11.02	10.94±6.23	0.97, p=0.34(NS)
Post t/t	115.70	17	27.44	6.65		

Table 6: Comparison of fasting blood sugar level in three groups postoperatively descriptive statistics

	n	Mean	SD	SE	95% CI for mean		Minimum	Maximum
					Lower bound	Upper bound		
Group A	17	169.82	86.75	21.04	125.21	214.43	54.00	377.00
Group B	17	131.70	42.71	10.36	109.74	153.66	70.00	260.00
Group C	17	115.70	27.44	6.65	101.59	129.81	84.00	172.00

Table 7: Comparison of prandial blood sugar level in three groups postoperatively descriptive statistics

	n	Mean	SD	SE	95% CI for mean		Minimum	Maximum
					Lower bound	Upper bound		
Group A	17	308.48	86.38	20.95	263.99	352.82	170.00	496.00
Group B	17	220.29	67.92	16.47	185.37	255.21	128.00	402.00
Group C	17	221.29	61.29	14.86	189.78	252.80	85.00	313.00

Table 8: Comparison of glycated hemoglobin level in three group Pre and post operatively student's paired t-test

	Mean	n	SD	SEM	Mean difference	t
Group A						
Pre t/t	8.99	17	1.77	0.42	0.24±1.64	2.62, 0.54(NS)
Post t/t	9.24	17	2.09	0.50		
Group B						
Pre t/t	8.79	17	1.74	0.42	0.76±1.49	2.11, 0.051(NS)
Post t/t	8.03	17	2.10	0.51		
Group C						
Pre t/t	8.50	17	1.65	0.40	0.86±1.48	2.41, 0.048(S)
Post t/t	7.63	17	1.65	0.37		

Discussion

Yoga has been shown to enhance glycemic control in some trials when used as a stand-alone diabetes care strategy.[12] In RM, a better type of meditation, the mind is used to naturally reduce tension while the flow of thoughts is encouraged. The results of yoga practise can be affected in people who are at risk for type 2 diabetes. [13]

A total of 17 diabetic patients between the ages of 32 and 60 participated in our study. Significant results were obtained from comparing FBS before and after the intervention. Raja yoga works well as a supplemental intervention to enhance glycemic control.[14] Yoga may help improve stress tolerance, which has been associated to better results in DM2 patients (Carnethon, 2006).

These adjustments support improvements in other risk variables relevant to the management of DM2 and serve to buffer the negative effects of stress, improve glucose control, mood, sleep, and autonomic function.[15,16]

In an intervention trial conducted by Laatikainen et al., 237 people aged 40 to 75 who were at moderate or high risk of developing type 2 diabetes were included. Nurses with the appropriate training administered a structured group programme with 690 minute sessions over the course of eight months in Australian primary healthcare from 2004 to 2006. Fasting plasma glucose and plasma glucose two hours after an oral glucose challenge were the main outcome measurements collected at baseline, three months, and one year. Wilcoxon rank sum tests and paired t-tests were used to examine differences between baseline and follow-up. Participants' mean fasting glucose decreased by 0.14 mmol/l (0.07-0.20) and their plasma glucose two hours after an oral glucose challenge decreased by 0.58 mmol/l at 12 months (0.36–0.79). They came to the conclusion that type 2 DPP is treatable

in primary healthcare settings by lifestyle interventions, with risk factor reductions that are comparable to those shown in clinical trials. [17]

In order to investigate the benefits of yoga on glycemic control in persons with T2DM, Thind et al. did a meta-analysis. The eligibility requirements were met by 23 studies with 2473 participants (mean age = 53 years; 43% women).

Yoga practitioners saw improvements in their FBG (d+ = 0.58, 95% confidence interval [CI] = 0.40, 0.76; k = 20) and PPBG (d+ = 0.40, 95% CI = 0.23, 0.56; k = 14) compared to controls. The majority of studies met the methodological quality (MQ) requirements to an average of 41%; the MQ score was not related to any result (P > 0.05).

In comparison to a control condition, they found that yoga improved glycemic outcomes and other risk variables for complications in persons with T2DM. This conclusion is consistent with our research.[18]

Sato researched large-scale trials like the DPP in the US. The study demonstrated that diet and/or exercise-based lifestyle intervention programmes can slow the progression of IGT to type-2 diabetes. The average daily step count and the delta Metabolic Clearance Rate (MCR) (insulin sensitivity) have been found to be significantly correlated. The results suggested that increases in GLUT4 protein, PI3 kinase, and IRS1 protein in skeletal muscle are responsible for at least some of the enhanced insulin efficacy that results from exercise. It is advised to engage in mild to moderate cardiovascular exercise, such as walking and running, for 10 to 30 minutes per day, five days a week. Diabetes, one of the common lifestyle-related diseases, must be managed with an active lifestyle. [19]

In order to investigate the benefits of yoga on glycemic control in persons with T2DM, Thind et al. did a meta-analysis. The eligibility requirements were met by 23 studies with 2473 participants (mean age = 53 years; 43% women). Yoga practitioners saw improvements in their HbA1c (d + =0.36, 95% CI = 0.16, 0.56; k = 16), FBG (d+ = 0.58, 95% CI = 0.40, 0.76; k = 20), and PPBG (d+ = 0.40, 95% CI = 0.23, 0.56; k = 14) when compared to controls. Even if the effects on other parameters, such as carnitine, were recently explored, exercise therapies were often reported to lower glycosylated haemoglobin A1C (HbA1c). [21] In summarising and interpreting earlier findings, certain meta-analysis has been particularly helpful. Regular aerobic exercise was found to have a statistically and clinically significant effect on HbA1c in a meta-analysis of exercise interventions involving at least 8 weeks of supervised exercise in type 2 diabetic patients [22]. The glycemic control is improved with this type of management, but the body weight is not significantly affected.

The more pertinent research on the interactions between exercise and metabolic consequences was evaluated by Zanuso et al. They assert that aerobic exercise has well-established effects on HbA1c, the key indicator of glycemic management. However, the effect of exercise intensity rather than the benefit of aerobic exercise itself is the most intriguing issue to be addressed today. They came to the conclusion that therapies including more intense aerobic exercise programmes led to higher drops in HbA1c. [23-29]

Conclusion

When used as a supplemental intervention, RM had a better impact on glycemic control than other groups. Additionally, meditation, diet, and exercise all have a positive impact on HbA1C levels.

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