Impact of Rajayoga meditation practice on quality of life (QOL) and metabolic control among type II diabetic patients

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Abstract:
Background: Diabetes is one of the chronic non-communicable diseases. People living with diabetes have compromised quality of life due to disease process and chronic management regimens. This study evaluated the quality of life and metabolic control of type II diabetes living in rural and sub-urban area of Sirohi district Rajasthan.
Objectives : To asses pre and post test quality of life and metabolic control among diabetes and to compare the effectiveness of meditation on quality of life and metabolic control.
Methodology: A Quasi Experimental Design was carried out in rural and sub-urban areas of Sirohi district, Rajasthan. 100 type II diabetes patients, 50 in experimental and 50 in control group was recruited through convenient sampling technique.Data collected using: a) Structured profoma- demographic data & clinical variables. b) World Health organization Quality of life (WHO QOL) BREF questionnaire to assess the QOL. c) Blood investigations: Fasting blood sugar(FBS), Post prandial blood sugar(PPBS) and Glycated haemoglobin (HbA1c).Intervention: Basic Raja yoga meditation followed by "Raja yoga Meditation practice for diabetes" practical session conducted and re-inforced to practice every day for 3 months. Post test for both the groups: Clinical data and blood test[FBS,PPBS&HbA1c]. The collected data was analysed using descriptive and inferential statistical procedure with STATA statistical software version 12.1.
Results: There is statistical significance deference in the post test clinical variables, QOL and metabolic control in experimental group and no significance seen in control group.
Conclusion: The study concludes that type II diabetes patients in experimental group have shown improvements in their QOL and metabolic control by practicing Rajayoga meditation within 3 months duration when compared to non-meditators in control group.
Recommendations: A longer period of meditation practice for greater effectiveness on QOL : Include investigations like Thyroid stimulating hormone(TSH),Cortisol level and lipid profile to effectively measure metabolic control among diabetes.
Keywords: Metabolic control, Rajayoga Meditation,Type II diabetes,WHOQOLBREF.

I.   Introduction

Current scenario showed that there is inexorable raise in the incidence of Type II diabetes. According to International Diabetes Federation (IDF) Atlas 2015 statistics, 415 million (about 8.8% of population) worldwide are diagnosed to have diabetes, aged 20-79. By 2040, it is estimated that 642 million (about 10.4%) to have diabetes. Number of deaths due to diabetes was 5 million in the year 2015. Total health expenditure for diabetes management in 2015 was $673 billion and it will be $802 billion in 2040. In South East Asia it was estimated 8.5%, this is equivalent to 78.3 million people living with diabetes in 2015. In 2040, estimated to be 10.7%, this is equivalent to 140 million people will be living with diabetes. Total health expenditure for diabetes management in 2015 was $7.3 billion and it will be $12.9 billion in 2040. Indian statistics 2015 showed, 69.2 million (8.7%) of population aged 20-79 were found to have diabetes and 1.02 million deaths. By 2040, it is estimated that 123.5 million of 9.3% will have diabetes. In Urban and Rural population, currently there are more people with diabetes in urban (269.7 million) than in rural (145.1 million) areas. In low- and middle-income countries, the number of people with diabetes in urban areas is 186.2 million while 126.7 million live in rural areas. By 2040, globally the difference is expected to widen, with 477.9 million people living in urban areas and 163.9 million in rural areas [1]. Rajasthan Fact Sheet 2011-12 (Census India) in Sirohi district, diabetes statistics shows 354 males and 191 female in rural area out of 1,00,000 population with diabetes[2].

Type II diabetes is characterized by hyperglycemia, insulin resistance and related impairment in insulin secretion. Many studies have revealed that diabetes was significantly associated with increased risk of multiple organ complication and all cause mortality. Diabetes patient has compromised QOL.

Quality of life is defined by the WHO as "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns". It is a broad ranging concept incorporating in a complex way the persons' physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of the environment. This definition reflects the view that quality of life refers to a subjective evaluation, which is embedded in a cultural, social and environmental context [3]. Quality of life can be achieved when a person is physically and mentally healthy. Mind-body therapy such as meditation, relaxation techniques and yoga has been studied in diabetes as a means to decrease stress-related hyperglycemia and its complications.

Meditation is a technique of achieving harmony between the physical, mental, intellectual and spiritual person-alities of man[4]. Raja yoga is one of the techniques of meditation practiced by Brahma kumaris world spiritual University, where a harmonized and channelized thoughts created in mind to practice different stages of meditation through visualization process in a natural way. Regular practice of meditation decreases the physiological and emotional stress. Psychological and emotional stress activates neuroendocrine and sympathetic pathways via the hypothalamus, pituitary, adrenal axis and medullary adrenal sympathetic system, circulating catecholamines and glucocorticoid. Glucocorticoids affect the structure and function in a variety of tissues and induce inflammatory cytokines that is to increase glucagon production and decrease uptake and disposal of glucose in peripheral muscles. (5). Also regular practice of meditation regulates the Neuro-endocrine pathways and reduces the insulin resistance their by improves metabolic control. A good metabolic control will improve wellbeing and quality of life.

Satish K. Gupta et.al(2011) had done a study on Regression of Coronary atherosclerosis through Healthy Lifestyle(HLS) in Coronary Artery Disease Patients. One of the core components in HLS programme was Rajayoga meditation practiced in different stages taught by Brahma kumaris for stress management. Rajyoga meditation harmonizes spiritual, mental and physical energy, thereby increasing inner strength to lead a stress-free and healthy life. It enhances individual's power of determination to manage and practice positive thoughts, emotions, attitudes, memories and adhere to healthy diet, exercise, sleep, medication and cessation of smoking. Overall results revealed that there was healthy changes in cardiovascular, metabolic and psychological parameters, decline in absolute percent in diameter of coronary stenosis and cardiac events among CAD patients who closely adhere to HLS programme.[6]

II. Methodology

A Quasi Experimental Design was carried out in rural and sub-urban areas of Sirohi district, Rajasthan. Using non-probability convenient sampling technique 100 type II diabetes patients, 50 in experimental group and 50 control group with age 20 to 69 years was recruited. After brief explanation about the study pre test data was collected using: a) Structured profoma to collect demographic data and clinical data b) World Health organization Quality of life (WHO QOL) BREF questionnaire to assess the QOL. It consists of 26 items in 5 point likert scale. c) Blood investigations: Fasting blood sugar (FBS), Post prandial blood sugar (PPBS) and glycated haemoglobin (HbA1c) Intervention given for experimental group: Basic Raja yoga meditation followed by "Raja yoga Meditation practice for diabetes" practical session was given using animated video film. Meditation practice was reinforced to practice every day morning and evening for 15 to 20 minutes. Post test was done at 3rd month for both the groups: Clinical data and blood test: FBS, PPBS & HbA1c. Data collection instruments were validated from various fields of experts and reliability of the study was obtained.

The collected data was analysed using STATA statistical software version 12.1. Descriptive statistic used was frequency and percentage to analyze the demographic data, mean and standard deviation to assess the QOL and metabolic control. Inferential statistics used was chi-square to find association and t-test to compare mean scores values.

Ethical Consideration: Ethical clearance certificate obtained from Ethical committee members of Global Hospital & Research Center, Mount abu , Rajasthan. Permission to conduct in study setting was obtained from CMHO of Sirohi district, Rajasthan. Brief explanation and written consent obtained from each participant.

III. RESULTS
Table (1): Frequency and Percentage Distribution of Demographic Variables Of Diabetes Patient in Experimental and Control Group.

N=100

Demographic variables		Group				Chi square test
		Experimental Group		Control Group		
		n	%	n	%	
Age	31 -40 years	5	10.0%	5	10.0%	χ2=0.89 P=0.82 NS
	41 -50 years	12	24.0%	10	20.0%	
	51 -60 years	22	44.0%	20	40.0%	
	61 -70 years	11	22.0%	15	30.0%	
Sex	Male	34	68.0%	34	68.0%	χ2=0.00 P=1.00 NS
	Female	16	32.0%	16	32.0%	
Education status	No formal education	10	20.0%	12	24.0%	χ2=3.09 P=0.54 NS
	School education	24	48.0%	22	44.0%	
	Diploma	1	2.0%	3	6.0%	
	Under graduate	7	14.0%	3	6.0%	
	Post graduate & above education	8	16.0%	10	20.0%	
Type of occupation	Sedentary	27	54.0%	21	42.0%	χ2=3.08 P=0.21 NS
	Moderate	20	40.0%	28	56.0%	
	Heavy	3	6.0%	1	2.0%	
Monthly income	< Rs. 5000	18	36.0%	18	36.0%	χ2=0.25 P=0.88 NS
	Rs. 5001 – Rs. 10,000	18	36.0%	16	32.0%	
	Above Rs. 10,000	14	28.0%	16	32.0%	
Chronicity of illness	< 6 months	5	10.0%	5	10.0%	χ2=3.05 P=0.38 NS
	6 months - 1 year	10	20.0%	8	16.0%	
	1 year – 5 years	13	26.0%	21	42.0%	
	> 5 years	22	44.0%	16	32.0%	
Co-morbid illness	No	17	34.0%	18	36.0%	χ2=0.04 P=0.84 NS
	Yes	33	66.0%	32	64.0%	
Family history of diabetes	No	27	54.0%	29	58.0%	χ2=0.16 P=0.68 NS
	Yes	23	46.0%	21	42.0%	
Treatment	Mono-therapy	23	46.0%	30	60.0%	χ2=1.98 P=0.37 NS
	Combination of oral antidiabetic therapy	24	48.0%	18	36.0%	
	Combination of oral antidiabetic & Insulin	3	6.0%	2	4.0%	

NS- Not Significant, P values are > 0.05

Table (1) shows majority of diabetes patients where males 68%(34) with age 51-60 years in both the groups. Majority 48%(24) in experimental and 44%(22) in control group has done their school education. Very few has done their graduation and above in both the groups. 54% (27) in experimental and 42% (21) in control group are living sedentary life. Most of the patient's 36% (18) are earning monthly income below Rs.5,000/- in both the groups. Highest percentage 44% (22) in experimental and 32% (16) in control group is living with diabetes for more than 5 years. Majority 66% (33) in experimental and 64% (32) in control group are having one or more co-morbid illnesses. Most of the diabetes patients in both the groups have lesser percentage of Family history of diabetes, hence it revealed that diabetes epidemic is mounting to non hereditary cause. In experimental group majority 48% (24) are taking combination of oral anti-diabetic therapy whereas in control

group 60% (30) are taking mono-therapy (single drug).Since the demographic variables has shown non-significance, samples in both the groups were homogenous.

Table (2): Comparison of pre and post test of clinical and metabolic variables of Diabetes patient in experimental group.

N=100

Experimental group	Group				Mean Difference	Student paired t-test
	Pretest		Posttest			
	Mean	SD	Mean	SD		
Height (cm)	163.04	11.08	163.08	11.08	0.04	t=1.00 P=0.32 NS
Weight (kg)	67.44	12.87	66.36	12.58	1.08	**t=5.18 P=0.001*** S**
Body Mass Index(BMI)	26.41	3.61	26.01	3.55	0.4	t=1.04 P=0.30 NS
Waist-Hip ratio	0.95	0.08	0.94	0.08	0.01	t=1.78 P=0.08 NS
Systolic B.P	131.40	16.87	128.40	19.28	3	**t=2.27 P=0.03* S**
Diastolic B.P	85.80	9.92	82.70	8.76	3.1	**t=2.04 P=0.05* S**
Fasting Blood Sugar (FBS)	156.22	59.30	150.88	51.68	5.34	t=1.51 P=0.13 NS
Post Prandial Blood Sugar (PPBS)	210.84	84.44	201.54	80.63	9.3	**t=2.01 P=0.05* S**
Glycated Haemoglobin (HbA1c)	8.71	2.39	8.33	1.92	0.38	t=1.80 P=0.09 NS

NS - Not Significant, S - Significant

Table (2) shows there is statistical significant difference between pre and post test clinical variables like weight at p<0.001; systolic and Diastolic Blood Pressure at p<0.05. For Metabolic variable, PPBS at p<0.05. All other clinical and metabolic variables have no significance.

Table (3): Comparison of pre and post test of clinical and metabolic variables of Diabetes patient in control group.

N=100

Control group	Group				Mean Difference	Student paired t-test
	Pretest		Posttest			
	Mean	SD	Mean	SD		
Height (cm)	162.80	9.40	162.82	9.41	0.02	t=0.41 P=0.67 NS
Weight (kg)	66.35	10.96	66.00	11.22	0.35	t=0.42 P=0.67 NS
Body Mass Index(BMI)	25.07	3.72	24.88	3.88	0.19	t=0.64 P=0.52 NS
Waist-Hip ratio	0.92	0.11	0.92	0.11	0.01	t=1.78 P=0.08 NS
Systolic B.P	130.20	15.97	129.68	18.43	0.52	t=0.26 P=0.78 NS
Diastolic B.P	85.20	14.18	84.80	15.81	0.4	t=0.72 P=0.48 NS
Fasting Blood Sugar (FBS)	154.28	63.36	153.96	63.54	0.32	t=0.64 P=0.52 NS
Post Prandial Blood Sugar (PPBS)	195.66	65.17	194.92	65.94	0.74	t=0.13P=0.89 NS
Glycated Haemoglobin (HbA1c)	8.46	1.81	8.29	1.64	0.17	t=0.73 P=0.46 NS

NS- Not Significant

Table(3) shows there is no statistical difference between pre and post test for all clinical and metabolic variables in control group since p value is >0.05.

Table (4) Comparison of Pre test and Post test QOL domain Score of diabetes patient in Experimental and control group.

N=100

Group	QOL domain	Test				Difference	Paired t-test
		Pretest		Posttest			
		Mean	SD	Mean	SD		
Experiment group	Physical health	22.86	3.05	23.30	3.17	-0.44	**t=2.90 P=0.01** significant**
	Psychological	18.62	2.78	20.32	2.74	-1.7	**t=4.51 P=0.001*** significant**
	Social relationship	10.78	2.16	10.64	1.90	0.14	**t=2.02 P=0.05* significant**
	Environment	26.22	3.83	28.90	4.12	-2.68	**t=3.68 P=0.001*** significant**
	Total	78.48	9.29	83.16	9.61	-6.86	**t=4.72 P=0.001*** significant**
Control group	Physical health	22.30	3.39	22.24	3.07	-0.06	t=0.11 P=0.90 not significant
	Psychological	17.88	2.54	18.46	2.35	-0.58	t=1.32 P=0.19 not significant
	Social relationship	10.96	1.59	10.70	1.93	0.26	t=0.84 P=0.40 not significant
	Environment	26.56	3.65	26.76	4.75	-0.20	t=0.30 P=0.76 not significant
	Total	77.70	9.38	78.16	9.87	-0.46	t=0.31 P=0.75 not significant

Table (4) shows that there is statistically significant difference in pretest and posttest QOL among experiment group at p<0.01 level for physical health domain and p<0.05 for social relationship domain. High statistical significant difference was seen in psychological and environmental domain of QOL at p< 0.001. There is no statistical difference between pre and post test for all four QOL domains in control group.

Figure(1): Comparison of pre and post test percentage of QOL score of Diabetes patient in experimental and control group.
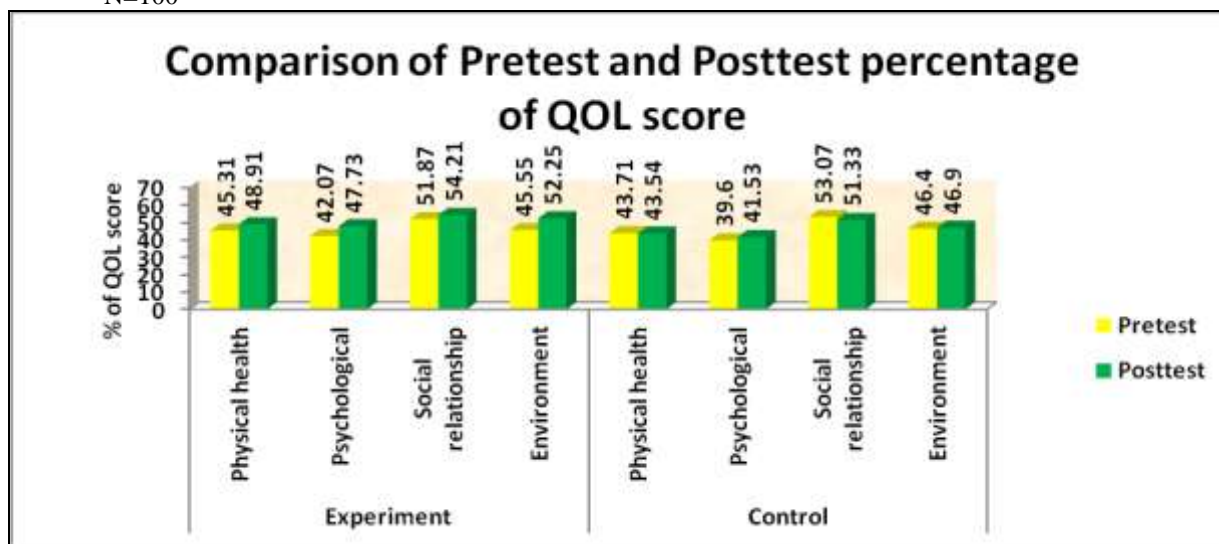
N=100

Figure (1) shows the Comparison of pretest and posttest domain wise percentage of Quality of Life score among experiment and control group of type II diabetes patients. It reveals that there is increase in the percentage of all domain scores of QOL in experimental group and not much change in control group.

IV. DISCUSSION

A quasi experimental study to find the impact of Rajayoga mediation on QOL and metabolic control among type II diabetes patient was assessed. **Table (1)** shows majority of diabetes patients where males 68%(34) with age 51-60 years in both the groups. 54% (27) in experimental and 42% (21) in control group are living sedentary life. Most of the patient's 36% (18) are earning monthly income below Rs.5,000/- in both the groups. Highest percentage 44% (22) in experimental and 32% (16) in control group is living with diabetes for

more than 5 years. Majority 66% (33) in experimental and 64% (32) in control group are having one or more co-morbid illnesses.Most of the diabetes patients in both the groups have lesser percentage of Family history of diabetes, hence it revealed that diabetes epidemic is mounting to non hereditary cause.

This is supported by study conducted by Hakan Demirci et.al with 180 patients diagnosed with type II diabetes and registered at an urban primary health care unit in Turkey, most of diabetic participants (47.7%) were diagnosed to have diabetes 5-9 years. Co-morbid diseases were reported by 83.3% [7].

Table (2) shows there is statistical significant difference between pre and post test clinical variables like weight at $p<0.001$; systolic and Diastolic Blood Pressure at $p<0.05$. For Metabolic variable, PPBS at $p<0.05$. All other clinical and metabolic variables have no significance. **Table (4)** shows that there is statistically significant difference in pretest and posttest QOL among experiment group at $p<0.01$ level for physical health domain and $p<0.05$ for social relationship domain. High statistical significant difference was seen in psychological and environmental domain of QOL at $p<0.001$. There is no statistical difference between pre and post test for all four QOL domains in control group.

This is supported by the study conducted by Harish Kumar Somappa et.al., to assess the Quality of life (QOL) among diabetic patients with respect to anthropometry and blood investigations. Correlation between Quality of life domains and other continuous variables showed that there is significant positive correlation with age for physical, psychological, social and environmental domains ($r = 0.864, 0.396, 0.549, 0.420$ respectively and $p<0.001$). Cholesterol, LDL, FBS, PPBS and HbA1c were positively correlated at a significant level with respect to physical domain [8].

A randomized controlled trial done by Jenny Van Son et.al,. with the objective to determine the effectiveness of group therapy with Mindfulness-Based Cognitive Therapy (MBCT), relative to usual care, for patients with diabetes with regard to reducing emotional distress and improving health-related quality of life and glycemic control. Mixed-models analyses showed that the MBCT group had a significantly more strongly improved mental quality of life ($P = 0.003$; Cohen $d = 0.55$) as well as physical quality of life ($P = 0.032$; Cohen $d = 0.40$) compared with the control group [9].

V. CONCLUSION

Present study has shown statistical significant improvement in quality of life and metabolic control among type II Diabetes patient. Rajayoga meditation is one of the easy and cost effective non- pharmacological therapies through which there is improved quality of life and metabolic control within short duration of time, thus decrease the global burden in the management of diabetes. Continuous practice of Raja yoga meditation for diabetes will enhance physical, psychological, spiritual and socio-environmental wellbeing.

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