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Research Article

A Study to Assess the Effectiveness of Video-Assisted Teaching Module Regarding Knowledge of Sitting Breathing Exercise (Pranayamas) on Blood Glucose Level among Patients with Type 2 Diabetes Mellitus in Selected Hospitals of Jabalpur (M.P)

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Abstract

Aim: A study was to assess the effectiveness of video-assisted teaching module regarding knowledge of sitting breathing exercises (Pranayamas) on blood glucose level among patients with Type 2 diabetes mellitus (T2DM) in selected hospitals of Jabalpur (M.P).

Materials and Methods: A quantitative evaluative research approach is used. The quasi-experimental one-group pre-test and post-test research design used. The study was conducted in the selected hospitals in Jabalpur city. A non-probability purposive sampling technique is considered to be most suitable. Three hundred people with Type 2 diabetes in the Jabalpur, Madhya Pradesh, area who meet the study's inclusion criteria make up the sample size.

Results: The impact of sitting breathing exercises (pranayamas) on blood glucose levels, with a mean score of 100 and a standard deviation (SD) of ± 84.8. Overall post-test means was (100) and SD was (± 85.28). Using a 0.05% *t*-test, the knowledge between the pre- and post-tests was statistically evaluated. The difference is significant if the estimated *t* is greater than the value in the table (1.96). The statistically significant change in pre-test and post-test understanding of the effects of sitting breathing exercises (Pranayamas) on blood glucose levels can be attributed to the use of video-assisted instruction.

Conclusion: The sitting breathing exercise (pranayama's) was a universal experience for Type 2 diabetic patients. Video-assisted teaching improved blood glucose levels in Type 2 diabetics. Thus, it might be a daily lifestyle, so blood glucose can be managed well. Health professionals caring for people with T2DM needed to accept the challenge of reducing blood glucose stress through video-assisted teaching.

Keywords: Blood glucose level, effectiveness, sitting breathing exercise (pranayamas), Type 2 diabetes, video-assisted teaching module

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Introduction

Type 2 diabetes mellitus (T2DM) is first detected by insulin resistance, which is characterized by cells that do not react appropriately to insulin. Diabetes is characterized by elevated blood sugar levels as well as abnormalities in the metabolism of fat, protein, and carbohydrates.[1] Due to its widespread risk factors, chronic nature, and consequences, the prevalence of diabetes mellitus (DM), The most widespread illness in the

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world is rising.[2] Breathing exercises that may be performed anywhere, including at home, for 30 min each day while seated, are included in a fitness program for diabetes patients to reduce hyperglycemia. These exercises are easy, inexpensive, and effective.[3] Breathing exercises help to reduce oxidative stress, which is brought on by an unbalanced level of free radicals and antioxidants. It causes high blood sugar levels, and it subsequently triggers inflammation and insulin resistance, speeding up both short and long-term problems of diabetes.[4]

Diabetes is stressful for the patient, and yoga practice is supposed to help with stress reduction. Type 2 diabetes is largely correlated with factors such as stress and the sympathetic response to stress. When stress management strategies are learned, glycemic status can be improved. Yoga breathing exercises have been proposed to reduce stress, reduce sympathetic drive, and improve cardiac function.[5] Pranayama or yoga breathing techniques regulate or control breathing. By regulating the autonomic nervous system, the slow breathing method used in pranayama changes every aspect of the body's physiology. It stabilizes the fluctuation of the rate of heart as well as the breathing rhythm and pattern.[6] In both healthy and diabetic people, changes in breathing patterns brought on by pranayama can affect glycemic control and insulin sensitivity.[7] According to the findings of a 2008 study using a hyperinsulinemic-euglycemic clamp to compare the immediate impact of yoga or pranayama practice between practitioners and non-practitioners, those who had been practicing yoga for more than a year had significantly larger insulin sensitivity and low fasting insulin levels.[8]

Exercises that improve breathing are simple, affordable, and safe for people with T2DM. If used in conjunction with a medical regimen and lifestyle changes, these exercises can be done for free at home and may reduce the dosage and expense of utilizing insulin and oral hypoglycemic medications. The present investigation's objective was to research how sitting breathing exercises affect blood sugar levels in T2DM patients in Jabalpur, M.P.

Objectives

The objectives of this study were as follows:

- Assess the pre-test knowledge score among patients with T2DM regarding the effect of sitting breathing exercises (pranayamas) on blood glucose level in selected hospitals of Jabalpur (M.P)
- Assess the post-test knowledge score among patients with T2DM regarding the effect of sitting breathing exercises (pranayamas) on blood glucose level in selected hospitals of Jabalpur (M.P)
- Find out the effectiveness of video-assisted teaching program among patients with T2DM regarding the effect of sitting breathing exercises (pranayamas) on blood glucose level in selected hospitals of Jabalpur (M.P)
- Find out the association between pre-test knowledge scores of patient with T2DM with their selected sociodemographic variable.

Hypothesis

- H1 – There will be significant differences between the mean pre-test knowledge score and post-test knowledge score at the level $P < 0.05$
- H2 – There will be significant association between the pre-test knowledge score and selected demographic variables at the level $P < 0.0$.

Materials and Methods

Research approach

The quantitative evaluative research approach is used.

Research design

In the present study, the investigation selected the quasi-experimental one-group pre-test and post-test research design.

Research variables

Independent variable

The independent variable is video-assisted teaching program module.

Dependent variable

The dependent variable is knowledge on patients with T2DM regarding sitting breathing exercises (pranayamas) on blood glucose level.

Extraneous variable

Any previous history of T2DM in the family and dietary habit includes gender.

Setting of the study

- In Jabalpur city's chosen hospitals, this study was carried out
- Population.

Target population

Patients in selected hospitals in the Jabalpur area who have T2DM make up the study's population.

Accessible population

Type 2 DM patients in a few hospitals in the city of Jabalpur constitute the study's accessible population: The Aditya super specialty hospital, The Ashish hospital, The Galaxy super speciality hospital, The kidney hospital, and The life medicity multi speciality hospital of Jabalpur, Madhya Pradesh.

Sample size

The sample consisted of 300 patients with T2DM, which was conducted in Jabalpur, Madhya Pradesh.

Sampling technique

Non-probability purposive sampling approach was used in the study.

Criteria for selection of the sample

Inclusion criteria

The following criteria were included in the study:

- From Selected patients with T2DM
- Patients who are available at the time of data collection

- Those patients who are willing to participate in the study.

Exclusion criteria

The following criteria were excluded from the study:

- Inability to join in a yoga class (e.g., a relevant mental illness)
- Who are non-insulin dependent diabetes patients?
- Contra-indication to physical exercise (e.g., unstable or under-investigated coronary heart disease, disseminated cancer, and severe osteoporosis)
- Inability to understand language sufficiently to participate in the class (major cognitive deficit).

Results

Table 1 shows that the maximum reading was in 46–50 years of age group that was 40%. Majority reading was in postgraduate group that was 40%. Major reading of sample was in 56 kg–61 kg group that was 67%. Maximum reading of socioeconomic status of family (monthly income) was in Rs. 15,000–20,000 group that was 47%. Major reading was in Health Personnel's group that was 40%. Types of diabetes mellitus have started at the age of maximum reading that was in 50 years that were 33%. Any previous history of T2DM in the family the maximum reading was yes that was 70%. Maximum reading was in non-vegetarian diet group that was 40%. Maximum reading was in female that was 60%.

Table 2 indicated the assessment of knowledge by asking total of 30 questions to patients with T2DM in selected hospitals of Jabalpur (M.P)." Score can be categorized into three categories (good, average, and poor).

The data shown in Table 3 clearly indicated the distribution of samples according to knowledge score before intervention. Maximum readings were from poor that was 70%, followed by 28% in average, and minimum readings were from good that was 2%, respectively. The mean (100) and SD (±84.8) also justify the knowledge of samples.

The data shown in Table 4 clearly indicated the distribution of samples according to knowledge score after intervention. Maximum readings were from good that was 71%, followed by 25% in average, and minimum readings were from poor that was 4%, respectively. The mean (100) and SD (±85.28) also justify the knowledge of samples.

The data shown in Table 5 clearly indicated the distribution of samples according to knowledge score before intervention. Maximum readings were from poor that was 70%, followed by 28% in average, and minimum readings were from good that was 2%, respectively.

The data shown in Table 5 clearly indicated the distribution of samples according to knowledge score after intervention. Maximum readings were from good that was 72%, followed by 25% in average and minimum readings were from poor that was 4%, respectively.

Table 1: Frequency and percentage distribution of demographic variables, *n*=300

S. No.	Criteria	Group		*P*-value	χ^2
		n	%		
1.	Age				
	40–45 years	80	26	0.99	1.13 (7.8)
	46–50 years	120	40		(NS)
	51–56 years	90	30		
	Above 60–years	10	4		
2.	Educational status				
	Under graduate	40	13	0.80	4.09 (7.8)
	Graduate	80	27		(NS)
	Postgraduate	120	40		
	Illiterate	60	20		
3.	Weight				
	50 kg–55 kg	70	23	0.50	6.9 (7.8)
	56 kg–61 kg	200	67		(NS)
	62 kg–67 kg	20	7		
	Above 70 kg	10			
4.	Socioeconomic status of family (monthly income)				
	Below Rs. 10,000	80	27	0.50	7.1 (7.8)
	Rs. 15,000–20,000	140	47		(NS)
	Rs. 21,000–30,000	50	16		
	Above-30,000	30	10		
5.	Source of prior information about sitting breathing exercise (pranayamas)				
	Mass media	80	27	0.50	7.0 (7.8)
	Health personnel's	120	40		(NS)
	No information so far	70	23		
	Neighbors	30	10		
6.	Types of diabetes mellitus have started at the age of				
	40 years	40	13	0.95	2.09 (7.8)
	45 years	80	27		(NS)
	50 years	98	33		
	Above 50 years	82	27		
7.	Any previous history of Type 2 diabetes mellitus in the family				
	Yes	210	70	0.80	4.2 (7.8)
	No	90	30		(NS)
8.	Dietary habit includes				
	Vegetarian diet	180	36	0.99	0.001 (7.8)
	Non-vegetarian diet	120	40		(NS)
	Egg-vegetarian	72	24		
9.	Gender				
	Male	120	40	0.99	3.3 (7.8)
	Female	180	60		(NS)
	Transgender	0	0		

Table 2: The allotment of score for assessment of knowledge of samples, *n*=300

Description	Max. score	Good	Average	Poor
Knowledge	30	21–30	11–20	1–10

Table 3: Distribution of samples according to knowledge score before intervention (pre-test), *n*=300

S. No.	Category	Frequency (*n*)	Percentage	Mean	SD
1	Good	5	2	100	±84.8
2	Average	84	28		
3	Poor	211	70		

SD: Standard deviation

Table 4: Distribution of samples according to knowledge score after intervention (post-test), *n*=300

S. No.	Category	Frequency (n)	Percentage	Mean	SD
1	Good	215	71	100	±85.28
2	Average	74	25		
3	Poor	11	4		

SD: Standard deviation

Table 5: Distribution of samples according to knowledge score before and after intervention, *n*=300

S. No.	Criteria	Pre-test		Post-test	
		Frequency	Percentage	Frequency	Percentage
1	Good	5	2	215	71
2	Average	84	28	74	25
3	Poor	211	70	11	4

Table 6: Comparison of knowledge score, *n*=300

S. No.	Test	Mean	Mean difference	SD	*t*-value	Inferences
1	Pre- test	7.75	12.69	±5.2	29.8	S**
2	Post- test	20.44				

SD: Standard deviation

The Table 6 pre-test and post-test knowledge was statistically tested by applying *t*-test method at the 0.05%. In the case, the calculated value of *t* is more than the table value (1.96), the difference between the two conditions is significant.

Table 7 reveals that the association of knowledge scores with their demographic variables. The statistical χ^2 value for the age variable (15.6), educational status variable (23), source of prior information about—sitting breathing exercise (pranayamas) variable (21), and types of DM have started at the age of variable (46), which was more than the tabulated $\chi^2 = 12.5$ revealing significant association of variables with knowledge scores. The statistical χ^2 value for the weight variable (7.5) and socioeconomic status of family (monthly income) variable (3.5) was < the tabulated $\chi^2 = 12.5$ revealing non-significant association of variables with knowledge scores. The table concludes that the statistical χ^2 value for the any previous history of T2DM in the family of variable was 27.5 which was more than the tabulated $\chi^2 = 5.99$ revealing a significant association of any previous history of T2DM in the family of variable with knowledge scores. Dietary habit includes variable (50) and gender variable (9.5) which was more than the tabulated $\chi^2 = 0.78$ revealing that a significant association of dietary habit includes of variable with knowledge scores.

Discussion

The study was performed to assess the effectiveness of a 12-week course for individuals with T2DM. The result was that after fasting, blood glucose significantly decreased. The intervention was followed by a decrease in the level of fasting blood glucose. It is not statistically significant, though. Intervention was immediately followed by a significant decrease in hemoglobin A1 and serum cortisol levels. Following the intervention, the diastolic, systolic, and mean arterial blood pressures all significantly dropped. A significant improvement in verbal memory was seen after intervention.[9]

The efficiency of controlled video-assisted instruction on diabetes patients' understanding and practice in managing their home care. At $P > 0.05$, the repeated *t*-test value is 11.521. The mean knowledge score from the pre-test rose from 5.13 to 15.94 in the post-test, while the practice score rose from 4.00 to 8.80. The link between pre-test knowledge and demographic factors was investigated using the Chi-square test. Research concluded that video-assisted teaching improves patients' home care knowledge and practice.[10]

A study looked at how diaphragmatic breathing exercises affected blood sugar levels and how regular practice affected HBA1C. In the 9th week of breathing exercise, fasting, postprandial, and postinterventional blood sugar levels decreased significantly ($P = 0.009$, $P = 0.002$, and $P = 0.000$). In the 12th intervention week, high significance ($P = 0.000$) was found for the mean difference in fasting blood sugar. HbA1c was not significantly different ($P = 0.963$). It ended. If combined with other exercises or therapies, diaphragmatic breathing exercise can lower blood sugar in Type 2 diabetics. maintaining normal blood pressure requires more than just breathing.[3]

The criteria for inclusion were satisfied by four trials, a total of 440 patients. Practicing yoga significantly reduced levels of fasting plasma glucose (standard mean difference (SMD): −1.87; 95% CI −3.83–−0.09; $P = 0.06$; I2 = 99%), malondialdehyde (MDA) (SMD: −1.4; 95% CI −2.66–−0.13; $P = 0.03$; I2 = 97%), and HbA1c (SMD: −1.92; 95% CI −3.03–−0.81; $P = 0.0007$; I2 = 92%) in patients with type 2 diabetes. No indication of such an influence was seen in SOD (SMD: −1.01; 95% CI −4.41–2.38; $P = 0.56$; I2 = 99%). Based on existing research, yoga appears to be a promising supplementary treatment for T2DM, as it reduces fasting plasma glucose, MDA, and HbA1C. A larger, more comprehensive study is needed to confirm our results and explore the potential long-term benefits of yoga, given the limited quantity and variability of the available research.[11]

There are 30 17–20 years old in each of the study and control groups. The distribution of genders matched. There were 63.3% male (19) and 36.7% female (11) students in each group. Mean fasting blood glucose levels (mg%) before pranayama were and 88.8 ± 11 in the research group and 90.4 ± 0.0 in the control group. In study and control groups, post-meal blood glucose levels were 118.4 ± 12.2 and 118.1 ± 14.8, respectively. Before the intervention, the control and study groups' fasting and post-meal blood glucose levels were compared using the student *t* test. ($P = 0.617$) Statistically

Table 7: Association of knowledge scores with their demographic variables, *n*=300

S. No.	Variable	Good	Average	Poor	Total	df	Chi-value	*P*-value	Inferences
1	AGE								
a	40–45 years	10	20	60	80	6	15.6 (12.5)	0.20	S
b	46–50 years	9	11	100	120				
c	51–56 years	5	15	70	90				
d	Above 60- years	1	2	7	10				
2	Educational status								
a	Undergraduate	10	10	20	40	6	23 (12.5)	0.02	S
b	Graduate	10	10	60	80				
c	Postgraduate	20	20	80	120				
d	Illiterate	10	10	40	60				
3	Weight								
a	50 kg–55 kg	10	20	40	70	6	7.5 (12.5)	0.80	NS
b	56 kg–61 kg	10	30	140	200				
c	62 kg–67 kg	2	0	18	20				
d	Above 70 kg	2	3	5	10				
4	Socioeconomic status of family (monthly income)								
a	Below Rs. 10,000	10	10	60	80	6	3.5 (12.5)	0.02	NS
b	Rs. 15,000–20,000	30	50	40	140				
c	Rs. 21,000–30,000	0	15	35	50				
d	Above-30,000	1	4	25	30				
5	Source of prior information about sitting breathing exercises (pranayamas)								
a	Mass media	10	10	60	80	6	21 (12.5)	0.05	S
b	Health personnel's	5	15	100	120				
c	No information so far	10	10	50	70				
d	Neighbors	5	5	20	30				
6	Types of diabetes mellitus have started at the age of								
a	40 years	5	5	30	40	6	46 (12.5)	0.001	S
b	45 years	10	20	50	80				
c	50 years	8	30	60	98				
d	Above 50 years	6	10	66	82				
7	Any previous history of Type 2 diabetes mellitus in the family								
a	Yes	10	50	150	210	2	27.5 (5.99)	0.80	S
b	No	10	20	60	90				
8	Dietary habit includes								
a	Vegetarian diet	10	40	58	108	4	50 (7.78)	0.001	S
b	Non-vegetarian diet	20	40	60	120				
c	Egg-vegetarian	7	20	45	72				
9	Gender								
a	Male	20	30	70	120	4	9.5 (7.78)	0.30	S
b	Female	10	30	140	180				
c	Transgender	0	0	0	0				

insignificant. Following pranayama practice, the fasting study group and post-meal glucose levels of blood significantly reduced relative to the control group ($P < 0.05$). According to the present study, short-term pranayama interventions can lower blood sugar.[8]

Conclusion

The study came to the conclusion that T2DM patients had a common experience with the sitting breathing exercise. In Type 2 diabetics, video has been shown to lower blood glucose levels. It could therefore be incorporated into a regular schedule or lifestyle, such that blood glucose levels may be effectively regulated. It was crucial for medical practitioners working with DM patients to accept the challenge of reducing patient anxiety about blood sugar levels through video-assisted teaching.

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