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A STUDY TO ASSESS THE EFFECTIVENESS OF BRISK - WALKING EXERCISE ON PHYSICAL AND METABOLIC PARAMETERS AMONG THE PATIENTS WITH TYPE 2 DIABETES MELLITUS IN SELECTED URBAN AREA AT CHIDAMBARAM.

M. Janaghi [1], Dr.T. Chandra [2], Dr. S.Shanthi [3]

[1] M.Sc(N), Govt Stanley Medical College, Chennai.

[2,3] Lecturer in Nursing. Govt college of Nursing, Cuddalore.

Abstract:

Background: Diabetes mellitus is an important and increasingly important healthcare concern globally, that has led to high morbidity, death, and economic costs. There is an increased focus on lifestyle-based measures to achieve effective disease management. **Aim:** The aim of the study was to establish the impact of a pre-established brisk walking programme on the selected physiological and metabolic outcomes in the case of adults with T2DM. **Methodology:** A quasi-experimental pre-test and post-test control group design was used which is a quantitative design. The research was conducted in a locality of Chidambaram, which is an urban area. Convenience sampling allowed the recruiting of forty (40) adults in the age range (40-60) diagnosed with T2DM in the experimental group (n=20) and the control group (n=20). The demographic and clinical information, physical (body mass index and waist circumference) and metabolic parameters (fasting and postprandial blood glucose levels) were used as the baseline data. The members of the experimental group were taken to the task of brisk walking of 30 minutes in a day cycle across four weeks whereas the control group was subjected to the regular care. Re-evaluation of outcome measures was done after 28 days. **Findings:** The study analysis showed a significant decrease in the experiment group ($p < 0.001$). Control group, however, has not shown any significant improvement. **Conclusion:** Brisk walking was effective as a regular exercise that should be performed by persons with type 2 diabetes mellitus to improve their physical and metabolic parameters.

Keywords: Type 2 diabetes mellitus, brisk walking, physical activity, BMI.

INTRODUCTION

Diabetes is a long-term metabolic condition that is marked by high blood glucose level owing to the malformation in insulin production, insulin response, or both. The condition interferes with the normal operation of the body in utilizing glucose to generate energy resulting in a series of physiological disbalance affecting various body organ systems in the long run. In contrast to short-term high blood sugar, diabetes is a chronic condition, and one that has to be managed specifically to avert major complications.

The major ones are Type 1, in which the absolute insulin deficiency occurs as a result of autoimmune destruction of pancreatic beta cells, usually in younger people; Type 2, the most common type, is the insulin resistance of insensitivity of tissues (muscle and liver) along with progressive beta-cell-dysfunction, and Type 3, which is a type of diabetes developed during pregnancy due to hormonal interference with insulin sensitivity. Moving exercise has been proven to also improve the physical and metabolic parameters in diabetic patients, which is a viable and low-cost treatment that can be followed in urban locations, such as Chidambaram. Several such interventional research demonstrate results of decreased fasting blood glucose, HbA1c, blood pressure, BMI, and waist-to-hip ratio, and improved insulin sensitivity, VO2max and cardiovascular risk profiles throughout 7-50 weeks of regular sessions (usually 30-60 minutes, 3 times per week).

METHODOLOGY:

Study Design and Setting

A quantitative research approach with a quasi-experimental design was employed for the study. The investigation was carried out in a selected urban locality of Omakulam, Chidambaram. Participants in the experimental group performed brisk walking for 30 minutes each day over a period of four weeks, whereas the control group continued with standard routine care.

Participants and Sampling

The accessible population included those residing in the selected urban area of Chidambaram who met the inclusion criteria. A total of 40 participants were selected using convenience sampling technique, with 20 assigned to the experimental group and 20 to the control group. Both male and female participants on oral hypoglycemic agents for more than two years and willing to participate were included.

Data Collection Procedure

Data were collected from 03-07-2023 to 30-07-2023 after obtaining ethical clearance and informed written consent from participants. Pre-test assessment included demographic and clinical variables, along with physical parameters (height, weight, BMI, waist circumference) and metabolic parameters (fasting and post-prandial blood glucose). The experimental group received demonstration and supervised practice of brisk walking exercise for four weeks, while the control group continued standard treatment. Post-test assessment of physical and metabolic parameters was conducted for both groups after 28 days using the same tools. Statistical analysis included both descriptive and inferential methods.

RESULTS:

The demographics revealed that most of the participants of both the experimental and the control group were women aged 51-55 years, who are married, and in nuclear families. The groups were balanced on the baseline, and no significant differences were observed in the age, gender, education, occupation, income, family structure, and dietary habits ($p > 0.05$). The difference in religion was, however, much stronger in the groups ($p < 0.001$). The outcome of clinical analysis indicated that there was no significant difference between experimental group and the control group in regard to any of the past blood glucose levels, the duration of diabetes, family history of diabetes, compliance with medication or frequency of glucose monitoring ($p > 0.05$), which supported group equivalence before intervention.

The physical measurements showed that BMI of the experimental group was significantly reduced after four weeks of brisk walking ($p < 0.001$), whereas the control group showed no change. On the same note, waist circumference decreased substantially in the experimental group after the intervention ($p < 0.001$) but did not change in the control group.

Metabolic also showed significant decreases on fasting blood sugar (FBS) and postprandial blood sugar (PPBS) in experimental group after brisk walk ($p < 0.001$). The control group, in its turn, had overall gains in FBS and PPBS over the period.

Table 1: Demographic data of patients with type 2 diabetes mellitus.

Demographic data	Experimental Group		Control Group		Chi-square Value	P=value
	F	%	F	%		
Age in years					χ^2=6.722	0.081 (NS)
40 – 45 years	3	15.0	3	15.0		
46 – 50 years	1	5.0	7	35.0		
51 – 55 years	10	50.0	8	40.0		
56 – 60 years	6	30.0	2	10.0		
Gender					χ^2=0.102	0.749 (NS)
Male	8	40.0	9	45.0		
Female	12	60.0	11	55.0		
Religion					**χ^2=15.172**	**0.001*** (S)**
Hindu	9	45.0	20	100.0		
Christian	1	5.0	0	0		
Muslim	10	50.0	0	0		
Others	-	-	-	-		
Educational status					χ^2=6.957	0.073 (NS)
Illiterate	0	0	4	20.0		
Primary education	10	50.0	4	20.0		
Secondary education	9	45.0	10	50.0		
Graduate	1	5.0	2	10.0		
Occupation						
Housewife	12	60.0	8	40.0		

Employed	7	35.0	6	30.0	χ^2=4.448	0.108 (NS)
Agriculture	1	5.0	6	30.0		
Business	-	-	-	-		
Family monthly income					χ^2=5.600	0.133 (NS)
<6000	8	40.0	2	10.0		
6001 – 10000	3	15.0	7	35.0		
1000 – 15000	4	20.0	6	30.0		
>15000	5	25.0	5	25.0		
Marital status					-	-
Married	20	100.0	20	100.0		
Unmarried	-	-	-	-		
Widow / Widower	-	-	-	-		
Separate	-	-	-	-		
Type of family					χ^2=0.476	0.490 (NS)
Nuclear family	15	75.0	13	65.0		
Joint family	5	25.0	7	35.0		
Extended	-	-	-	-		
Type of dietary pattern					χ^2=3.243	0.072 (NS)
Vegetarian	3	15.0	0	0		
Non-vegetarian	17	85.0	20	100.0		

*****Significant at p<0.001 level, NS – Non-Significant**

Table-2: Clinical data of patients with type 2 diabetes mellitus.

Clinical data	Experimental Group		Control Group		Chi-Square Test	P=value
	F	%	F	%		
Have you checked blood glucose level for past one month?					χ^2=1.129	0.288 (NS)
Yes	7	35.0	4	20.0		
No	13	65.0	16	80.0		
Duration of illness for Diabetes mellitus					χ^2=2.789	0.425 (NS)
1 – 2 years	7	35.0	4	20.0		
3 – 4 years	6	30.0	11	55.0		
5 – 6 years	2	10.0	2	10.0		
More than 6 years	5	25.0	3	15.0		
Family history of diabetes mellitus					χ^2=4.871	0.182 (NS)
Parent	4	20.0	6	30.0		
Parents relatives	5	25.0	5	25.0		
No family history	0	0	3	15.0		
None of the above	11	55.0	6	30.0		
History of taking prescribed Drug for DM						
Regular	14	70.0	12	60.0		

Irregular	2	10.0	4	20.0	χ^2=1.354	0.716 (NS)
Rarely	2	10.0	1	5.0		
None of the above	2	10.0	3	15.0		
How often your are monitoring the blood glucose level						
Monthly once	6	30.0	0	0	χ^2=7.400	0.060 (NS)
Two month once	4	20.0	6	30.0		
Three month once	6	30.0	10	50.0		
Occasionally	4	20.0	4	20.0		

Table 3: Comparison of Brisk Walking Exercise on physical parameter (BMI)

Group	Test	Mean	SD	Paired "t" value	P- value
Experimental Group	Pre-test	27.27	3.27	14.695	< 0.001*** (S)
	Post-test	26.22	3.20		
Control Group	Pre-test	26.81	3.05	1.453	0.163 (NS)
	Post-test	26.85	3.02		

*** P < 0.05 is significant**

Table 4: Comparison of Brisk Walking Exercise on physical parameter (WC)

Group	Test	Mean	SD	Paired "t" value	P- value
Experimental Group	Pre-test	99.30	4.26	3.008	< 0.001*** (S)
	Post-test	100.30	3.14		
Control Group	Pre-test	97.15	3.92	-	-
	Post-test	97.15	3.92		

*** P < 0.05 is significant**

Table 5: Comparison of Brisk Walking Exercise on Metabolic parameters (FBS)

Group	Test	Mean	SD	Paired "t" value	P- value
Experimental Group	Pre-test	213.40	48.57	8.097	< 0.001*** (S)
	Post-test	175.50	40.81		
Control Group	Pre-test	214.20	30.17	4.240	< 0.001*** (S)
	Post-test	243.45	38.99		

*** P < 0.05 is significant**

Table 6: Comparison of Brisk Walking Exercise on Metabolic parameters (PPBS)

Group	Test	Mean	SD	Paired "t" value	P- value
Experimental Group	Pre-test	281.35	54.82	8.649	< 0.001***
	Post-test	230.15	46.48		(S)
Control Group	Pre-test	283.50	31.43	3.169	< 0.001***
	Post-test	308.15	27.84		(S)

*** P < 0.05 is significant**

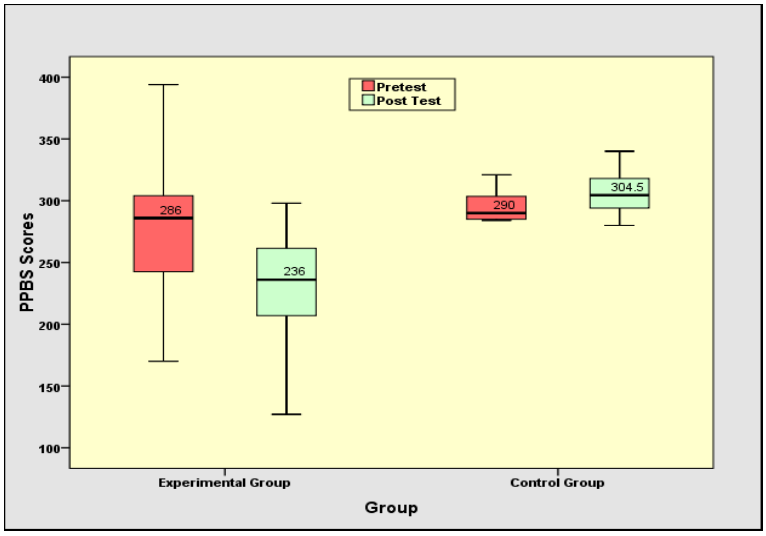

Figure 1: Boxplot showing the comparison of PPBS

DISCUSSION:

The study results revealed that baseline demographic and clinical profiles were homogeneous between the experimental (brisk walking) and control groups, aside from religion ($p < 0.001$). Following four weeks of intervention, the experimental group demonstrated significant reductions in BMI ($p < 0.001$), waist circumference ($p < 0.001$), fasting blood sugar (FBS; $p < 0.001$), and postprandial blood sugar (PPBS; $p < 0.001$), whereas the control group exhibited no physical improvements and rises in FBS and PPBS.

CONCLUSION:

The study concluded that brisk walking is an effective, accessible intervention for improving physical and metabolic parameters in patients with type 2 diabetes mellitus. Recommendations include integrating brisk walking into standard diabetes care protocols as a low-cost exercise strategy, alongside medications, and pursuing longitudinal research on its long-term efficacy and patient adherence.

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