



EFFECTIVENESS OF Pedometer based walking intervention on quality of life and blood glucose level among type 2 diabetic patients

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ABSTRACT

Background: Type 2 diabetes mellitus has become a major worldwide problem with an exponential rise in numbers in recent decades. Diabetes may affect variety of aspects of quality of life. **Objective:** To determine the effectiveness of pedometer based walking intervention and without pedometer based walking intervention on quality of life and blood glucose level among type 2 diabetes patients. **Methodology:** Twenty patients were recruited, aged from 35 to 55 years. The outcome measurements were blood glucose level and WHOQOL-BREF questionnaire was measured before and after intervention. The 20 subjects were divided into 2 groups; Group A and Group B. group A received pedometer based walking intervention and group B received without pedometer based walking intervention. Treatment last for 8weeks, 4 sessions per week. Each session lasted up to 45 minutes. **Results and Conclusion:** The group A subjects in this study achieved significant improvement in quality of life than group B. And both group showed improvement in fasting blood glucose level control. These results support the value of pedometer based walking in improving quality of life and controlling blood glucose level in type 2 diabetic patients.

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INTRODUCTION

Type 2 diabetes mellitus is a metabolic disease characterized by hyperglycemia due to insulin resistance [1], these patients have less muscular strength associated with loss of physical activities and exercise capacity [2,3]

Exercise is important in the treatment of type 2 diabetes, because it elicits an increased sensitivity and responsiveness of the peripheral tissues to insulin. The American Diabetes Association (ADA) recommends that adults with type 2 diabetes accumulate at least 150 minutes of moderate intensity aerobic exercise and 3 sessions of resistance exercise per week. [4,5]. A pedometer is a device, usually portable and electronic or electromechanical, that count each step a person takes by detecting the motion of the person's hand or hips.

Pedometers are now becoming popular as an everyday exercise measures and motivator. Step counters can give encouragement to complete with oneself in getting fit and losing weight.[6] Thirty minutes of moderate walking are equivalent to 3000 -4000 steps as determined by a Pedometer [6];taking 10000 steps/day will be a reasonable target for

healthy adults it can be a motivation tool for people wanting to increase their physical activity. [7,8]

Quality of life has been defined by WHO as "quality of life is defined as individual's 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." Thus Quality of life evaluation has emerged as an important outcome measure for chronic disease management, it influences the patients self care activates, and has impact on their diabetes control and management. [9, 10]

Pedometer based walking programs gives an objective measure of patient's behavior for evaluating intervention effects, it also provide ready feedbacks to them for behavioral goal setting and helps in monitoring progression towards that goals. [7] Pedometers can be used to motivate individuals to increase their physical activities if they are, encouraged to counts and record daily steps forset specific step count goals. [11]

There are very few studies compare effect of pedometer and without pedometer walking intervention. Aim of this study is to compare the effectiveness of pedometer based walking versus without pedometer based walking intervention in improving quality of life and blood glucose control in people with type 2 diabetes mellitus.

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METHODOLOGY

20 subjects with type 2 diabetes allocated into two different groups by a simple random sampling each containing 10 subjects. With pedometer based walking (Group A) and without pedometer based walking intervention (Group B). Inclusion criteria are sedentary people of Both gender with age between 35 to 55, without any physical activity limitation, and those who are not taking insulin. Subjects were excluded if they required use of an assistive device for ambulation and had history of cardiovascular disease (myocardial infarction, uncontrolled hypertension, and peripheral vascular disease) with diabetic complications and steroid taking.

Hypothesis

Null hypothesis

H0-There exist no significant difference between pedometer based walking intervention and without pedometer based walking intervention in improving quality of life and blood glucose control in people with type 2 diabetes mellitus.

Alternative Hypothesis

H1-There exist a difference between groups and pedometer based walking intervention groups shows greater significance in improving quality of life and blood glucose control in people with type 2 diabetes mellitus.

H2- There exist a difference between the groups and without pedometer based walking intervention group shows greater significance in improving quality of life and blood glucose control in people with type 2 diabetes mellitus.

This quasi experimental study was conducted at - Outpatient department of MOHAMED SATHEK A J COLLEGE OF PHYSIOTHERAPY. Nungambakkam, Chennai.20 subjects who fulfilled the inclusion criteria were divided into two groups of 10 each.Initially both the groups received a brief instruction about diabetes, its causes and complications and effectiveness of exercise as a treatment for impaired glucose tolerance, benefits of walking, barrier to walking, and self regulatory strategies.Group A received pedometer based walking intervention and Group B received without pedometer based walking intervention. Both groups allowed continuing their medication as usual.The duration of the treatment is 45 min per day, 4 sessions per week, total duration of study was 8 weeks for both groups.Results were tabulated and outcomes are analyzed. The study procedures were explained to the subjects and informed consent was obtained prior to study. Before starting the training, pre test scores were measured by using WHOQOL-BREF questionnaire and fasting blood glucose level (laboratory based).

Group-A (With Pedometer Based Walking Intervention)

Participants were provided with a pedometer with brief instruction about its method of use. Participants were encouraged to walk using pedometer to achieve a target of 3000 steps equivalent to 30 minutes of walking 5 minutes warm-up and 5 min cool down included.

Progression was encouraged through increasing ambulatory activity by 250 steps per day every 2 weeks. (Encouraged to increase their step counts up to 4000/30-40 minutes/session and maintain

it till the end of 8 weeks. Participants were encouraged to wear their pedometer on a daily basis and to self-monitor their ambulatory activity using a step per day log.

Group-B (Without Pedometer Based Walking Intervention)

This group instead of receiving pedometers, participants was encouraged to set time based goals designed to match the advice given to the pedometer group. Sedentary individuals were encouraged to try to achieve at least 30 min of moderate intensity physical activity (walking) per day. Those already achieving 30 min of moderate intensity physical activity were encouraged to at least maintain their current activity levels and were informed that health benefits could be achieved by increasing the activity levels further. As with the pedometer group, participants were encouraged to set proximal goals such as increasing moderate intensity activity by 5 min/day every 2 weeks, form action plans and record their daily activity levels

Data Analysis

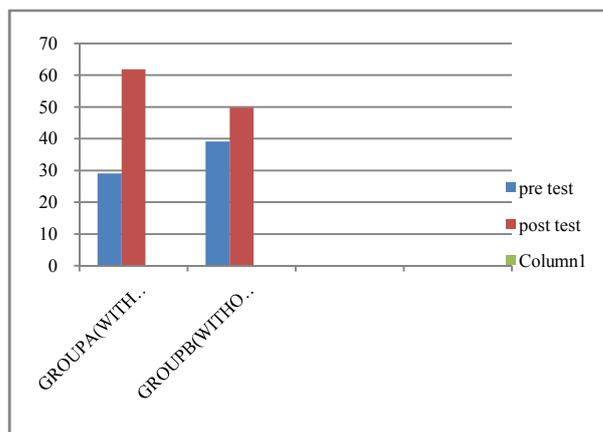
Table 1 Comparison of pretest and posttest of WHO-BREF questionnaire for both groups

	Mean	Mean difference	Standard deviation	T value	P value
Group A pretest	29.06				
post test	61.87	32.81	19.51	0.4810	P<0.001**
Group B Pre test	36.16				
Post test	49.79	10.63	13.80	0.16844	P<0.001*

** At 99.9% confidence level is highly significant
*At 99.9% confidence level is significant

The above table reveals the mean, standard deviation, t-test and p value of quality of life between pre-test and post-test of both group

The group A (with pedometer)P-value P<0.001 is highly significant compare to group B(without pedometer)

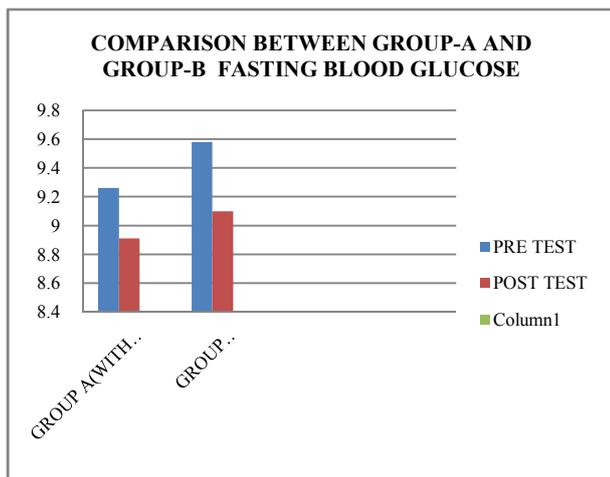


Graph 1 comparison of pre test and post test of WHO-BREF for both groups.

Table 2 Fasting Blood Glucose Level

FBS	Mean	Standard deviation	Mean difference	T value	P value
Group A pretest	9.26	1.90			
post test	8.91	2.01	0.35	-0.06	0.96
Group B Pre test	9.58	4.41			
Post test	9.10	3.40	0.48	-0.11	0.92

Comparison of the baseline and 8 week mean score for fasting blood glucose in each group showed improvement over baseline, but the difference were not statistically significant.



Graph 2 Comparison of Pre Test and Post Test of Fasting Blood Glucose Level

Table 3 Results of Whoqol

	Group A	Group B
t-value	0.481079722	0.168449742
p-value	1.8697	0.000584489
Significance	P<0.001	P<0.001
Results	H0 is rejected H1 is accepted	
H0=0 i.e NO DIFFERENCE BETWEEN with pedometer intervention and without pedometer intervention		
H1≠0 i.e DIFFERENCE BETWEEN with pedometer intervention and without pedometer intervention.		
GROUP-A WITH PEDOMETER intervention is highly significant than GROUP-B without pedometer intervention		

Table 4 Results of Fasting Blood Glucose Level

	GROUP A	GROUP B
t-value	-0.06231	-0.1100
p-value	0.96	0.92
significance	P>0.05	P>0.05
Results	H0 is accepted H1 and H2 rejected	
Difference between group A and groupB were not statistically significant		

RESULTS

The study was done on 20 subjects, which consists of 10 subjects of each group for 8 weeks duration. The result shows that Mean value of group A (with pedometer) pre test (29.06) and post test (61.87) WHOQOL shows high significant difference in improvements than group B (without Pedometer). The mean difference of group A pre test and post test of WHOQOL (32.81) shows high significant difference in improving quality of life of type 2 diabetic patients than group B. Comparison of fasting blood glucose level in each group showed improvement, but the difference were not statistically significant.

DISCUSSION

In this study after 8 week of treatment for 20 patients divided into two groups. Group A received pedometer based walking intervention has shows result in improving quality of life compared with group B. And both groups shows improvement in controlling fasting blood glucose level. A study by Richardson *et al* demonstrated success in increasing participant step counts by implementing a pedometer-based walking program. This program generated motivational messages, step goals, and graphs to show participant progress.

This study demonstrated the potential for immediate-feedback devices, such as pedometers and to assist participants in increasing self-efficacy and weight loss. [12]. The study, by the Murdoch Children Research Institute, Melbourne, involved 592 middle aged adults who took part in a national study to map diabetes levels across Australia between 2000 and 2005. They conclude: "These findings, confirming an independent beneficial role of higher daily step count on body mass index, waist to hip ratio, and insulin sensitivity, provide further support to promote higher physical activity levels among middle aged adults." [13] The Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) recommends 30 minutes of moderate-intensity physical activity most days in order to limit adverse health outcome. From this study concluded that pedometer based walking intervention is more effective method of improving quality of life and control of blood glucose level.

CONCLUSION

From the above study, it concluded that pedometer based walking intervention shows significant improvement in quality of life and blood glucose control in type 2 diabetic patients. Follow up studies can be performed to understand about long term effects of exercise using pedometers with large population.

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