

ORIGINAL RESEARCH

Comparative study of effect of short walk after meals to that of single daily half an hour walk in type 2 diabetes**¹Dr. Prabhjot Singh, ²Dr. Jamil Ul Hussain**¹MBBS, MD, Assistant Professor, Department of Physiology, Government Medical College and Associated Hospital, Rajauri, J & K, India²MBBS, MD, Associate Professor, Department of General Medicine, Government Medical College and Associated Hospital, Rajauri, Jammu & Kashmir, India**Corresponding author**

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ABSTRACT**Background:** Increased physical activity is recommended as the mainstay therapy for type 2 diabetic patients especially those who are overweight or obese. To compare and evaluate effect of short walk after meals to that of single daily half an hour walk in subjects with type 2 diabetes.**Materials & methods:** 100 subjects were randomly assigned to one of the two groups, Group A and Group B. Group A - A 30-minute morning walk each day. Group B - A 10-minute walk following each main meal. Each intervention lasted 15 days followed by a 30-day break. The participants then crossed over to the other group, they had not yet received. The fasting blood glucose levels were tested using glucose meter on day 1, day 7 and day 15 in both groups. Analysis of the results was done using SPSS software.**Results:** Among the patients of Group A, mean blood sugar levels at day 1, day 7 and day 15 was 161.2 mg/dL, 142.9 mg/dL and 138.4 mg/dL respectively. Among the patients of Group B, mean blood sugar levels at day 1, day 7 and day 15 was 162.7 mg/dL, 139.4 mg/dL and 129.1 mg/dL respectively. While comparing the fasting blood sugar levels among the two study groups at day 15, significant results were obtained.**Conclusion:** 10-minute walk after a meal can significantly lower the blood glucose levels, thus emphasizing that simple lifestyle changes would benefit people with diabetes.**Key words:** Short walk, Diabetes,**INTRODUCTION**

Though today's fast paced world of urbanisation and technology has eased and reduced many of our laborious activities, it has been at the cost of rising prevalence of non-communicable diseases including obesity, metabolic syndrome, diabetes mellitus and hypertension. Type 2 diabetes mellitus (T2DM) currently accounts for majority of the world-wide burden of non-communicable diseases.¹ The incidence and prevalence of diabetes is increasing world-wide, especially in the low and middle income countries, with an estimate that by 2030, approximately 366 million people in the world will have diabetes.^{2,3} In spite of plethora of anti-diabetic medications available for the treatment of T2DM, exercise and dietary modifications are, and will always remain the key advice in the management of T2DM, because it is effective at all stages of the disease, reduces HbA1c by approximately 0.51–0.89%, and is cost effective.⁴

Increased physical activity is recommended as the mainstay therapy for type 2 diabetic patients especially those who are overweight or obese.⁵ Recent studies demonstrate that increased physical activity by walking after meal (post-meal walking) for 10–20 minutes can reduce postprandial plasma glucose (PPG) better than walking before meal.^{6,7} Colberg et al showed that post-dinner walking in type 2 diabetic subjects decreased PPG at 1 hour after meal about 40 mg/dl compared with those

without.⁸ Pahra et al and Reynolds et al respectively demonstrated that HbA1c and glycated albumin were reduced with 10–15 minutes walking after three main meals for two and eight weeks.^{9,10} The effect on PPG reduction has been observed since first time of walking and is not insulin dependent.¹¹ Nutrition is another important factor to consider when attempting to improve the glycemic response to a meal. While the meal characteristics may widely vary in daily life, the studies assessing the effects of postprandial exercise on glycemia have rarely attempted to evaluate the effects of exercise after different mixed meals. A large body of research focused on the effects of postprandial exercise after the consumption of an oral glucose tolerance test (OGTT), thus inducing a different glycemic response compared with that of a mixed meal,¹² which better resembles what is often consumed in daily life. When the use of a mixed meal was implemented, it was consistently shown that 30 min of step cadence paced moderate-intensity walking is effective in improving the glycemic response to a meal providing 1 g of CHO per kg of body weight.¹³⁻¹⁶ However, it is currently unclear how the effectiveness of a typical postprandial walking session (e.g., 30 min of brisk walking) would change in relation to meals with different CHO content and composition. Hence, this study was conducted to compare and evaluate effect of short walk after meals to that of single daily half an hour walk in subjects with type 2 diabetes.

MATERIALS & METHODS

The randomized crossover study was conducted among 100 type-2 diabetic subjects attending diabetic clinic. Type-2 diabetic people with coexisting hypertension, fasting blood glucose levels greater than 180 mg/dL and unable or unwilling to comply with required physical activity were not included. The subjects were randomly assigned to one of the two groups, Group A and Group B. Group A - A 30-minute morning walk each day. Group B - A 10-minute walk following each main meal. Each intervention lasted 15 days followed by a 30-day break. The participants then crossed over to the other group, they had not yet received. The fasting blood glucose levels were tested using glucose meter on day 1, day 7 and day 15 in both groups. Analysis of the results was done using SPSS software.

RESULTS

Among the patients of Group A, mean blood sugar levels at day 1, day 7 and day 15 was 161.2 mg/dL, 142.9 mg/dL and 138.4 mg/dL respectively. Among the patients of Group B, mean blood sugar levels at day 1, day 7 and day 15 was 162.7 mg/dL, 139.4 mg/dL and 129.1 mg/dL respectively. While comparing the fasting blood sugar levels among the two study groups at day 15, significant results were obtained.

Table 1: Comparison of fasting blood sugar levels (mg/dL) on day 1, day 7 and day 15

Time interval	Group A	Group B	p- value
Day 1	161.2	162.7	0.42
Day 7	142.9	139.4	0.74
Day 15	138.4	129.1	0.01 (Significant)

DISCUSSION

Type 2 Diabetes Mellitus (T2DM) is one of the most common metabolic disorders worldwide and its development is primarily caused by a combination of two main factors: defective insulin secretion by pancreatic β -cells and the inability of insulin-sensitive tissues to respond to insulin.¹⁴ Insulin release and action have to precisely meet the metabolic demand; hence, the molecular mechanisms involved in the synthesis and release of insulin, as well as the insulin response in tissues must be tightly regulated. Therefore, defects in any of the mechanisms involved can lead to a metabolic imbalance that leads to the pathogenesis of T2DM. Hence, this study was conducted to compare and evaluate effect of short walk after meals to that of single daily half an hour walk in subjects with type 2 diabetes.

In the present study, Among the patients of Group A, mean blood sugar levels at day 1, day 7 and day 15 was 161.2 mg/dL, 142.9 mg/dL and 138.4 mg/dL respectively. Among the patients of Group B, mean blood sugar levels at day 1, day 7 and day 15 was 162.7 mg/dL, 139.4 mg/dL and 129.1 mg/dL respectively. A study by Pahra D et al, Group A patients showed a significant improvement in five

point blood glucose profile and HbA1c after performing post-meal exercise ($p < 0.001$), which was mitigated after switchover to one-time daily exercise ($p < 0.001$). While, group B patients showed improvement in glucose profile and HbA1c ($p < 0.001$) after performing post-meal exercise, as compared to one-time daily exercise. Further, on pooled analysis (post-meal versus one-time daily exercise group) the beneficial effect of post-meal exercise on glucose profile and HbA1c was consistent as compared to one time daily exercise and the significance persisted on comparison between the two groups. No hypoglycemic events were noted between the groups during the study period. Post-meal exercise is more effective than routine one-time daily exercise for glycemic control in T2DM patients.⁹

In the present study, while comparing the fasting blood sugar levels among the two study groups at day 15, significant results were obtained. Another study by Reynolds AN et al, the iAUC was significantly lower when participants walked after meals compared with on a single daily occasion (ratio of geometric means 0.88, 95% CI 0.78, 0.99). The improvement was particularly striking after the evening meal (0.78, 95% CI 0.67, 0.91) when the most carbohydrate was consumed and sedentary behaviours were highest. One participant died during the 30 day washout period between interventions, but participation in this study was not judged to contribute to this unfortunate event. The benefits relating to physical activity following meals suggest that current guidelines should be amended to specify post-meal activity, particularly when meals contain a substantial amount of carbohydrate.¹⁰ Previously, many studies have been performed to evaluate various exercise regimens for glycemic control in diabetes and their effect on cardiovascular risk factors. Balducci et al¹⁵ showed that a supervised, facility-based exercise training program, when added to standard treatments for T2DM yielded better results than does simple counselling of the patients. Besides the duration of exercise, type of exercise performed also matters as shown in a study on 262 sedentary men and women by Church et al. In this study, reduction in HbA1c achieved by either aerobic or resistance exercise done alone was less than that achieved when both were done together.¹⁶ The mechanisms contributing to improved glycemic control after exercise at anytime include increased peripheral glucose consumption due to enhanced muscle glycogenolysis (contraction-mediated) as well as insulin-independent glucose uptake in the muscle by increasing GLUT 4 (glucose transporter) expression on cell surface through activation of 5'-AMP-activated protein kinase. Further, with the post-meal exercise additional mechanisms include suppression of hepatic glucose output and fatty acid oxidation due to rising glucose and consequent increase in insulin-glucagon ratio following meal.¹⁷ In addition, despite similar improvement in cardiorespiratory fitness irrespective of post-meal or one time daily walk, the glycemic profile is better with post-meal exercise than one time daily exercise. It is attributed to increased energy expenditure with multiple short daily sessions, as compared to single daily session which is associated with decreased energy expenditure.¹⁸

CONCLUSION

Under the light of above obtained results, the authors concluded that 10-minute walk after a meal can significantly lower the blood glucose levels, thus emphasising that simple lifestyle changes would benefit people with diabetes.

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