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A comparative study of effect of short walk after meals to that of single daily half an hour walk in type 2 diabetes

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Abstract
Introduction: Type 2 diabetes mellitus (T2DM) currently accounts for majority of the world-wide burden of non-communicable diseases. 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. 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. **Materials and Methods:**The randomised crossover study was conducted among 100 type-2 diabetic subjects attending diabetic clinic organized by Department of Medicine. 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 I and Group II. Group I - A 30-minute morning walk each day. Group II - 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. **Results:**In this study, the participants act as their own controls and effect seen is mainly due to walking rather than the influence of other factors like dietary and physical activities. There is decrease in fasting blood glucose levels on day 7 and day 15, when compared to day 1 fasting blood glucose levels in both groups. The study found that when participants walked after meals, the level of fasting blood glucose was 10% to 12% lower than in those who went for a single walk each day. The results were analysed statistically by using t-test. Fasting blood glucose levels were decreased significantly after 10-minute post-meal walking in both groups (p-value <0.001) when compared to single 30-minute morning walk. **Conclusion:**This study can help the current physical activity guidelines to specify post-meal activity particularly when meals contain much carbohydrate in type-2 diabetic subjects. The findings of this small study can help to an inexpensive prevention strategy for prediabetes, which can develop overtime into type-2 diabetes. We can't be sure if the benefits of a post meal walk are long-term because of the short duration of the study. From this study, 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:T2DM, HbA1c, hypertension.

Introduction

Though today's fast paced world of urbanization 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[1]. Type 2 diabetes mellitus (T2DM) currently accounts for majority of the world-wide burden of non-communicable diseases. 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].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[3].

Physical activity can be in any form including aerobic exercise, resistance training or both. Current recommendations for patients with T2DM include walking or physical activity of similar intensity for at

least 150 min/week, is to be performed for meaningful reduction in HbA1c, improvement in cardiovascular risk profile and decrease in body weight[4]. However, the guidelines do not specify regarding the timing of exercise when should be undertaken during the course of the day and its relationship with fasting state versus post-meal state. Post meal physical activity may help in greater reduction in post-prandial hyperglycemia (PPH), and may reduce the CV risk more effectively, than overall glycemic control[5].

Materials and methods

The randomised crossover study was conducted among 100 type-2 diabetic subjects attending diabetic clinic organised by Department of Medicine at Government Medical College Kozhikode Kerala. 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 I and Group II.
Group I - A 30-minute morning walk each day.
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Results

In this study, the participants act as their own controls and effect seen is mainly due to walking rather than the influence of other factors like dietary and physical activities. There is decrease in fasting blood glucose levels on day 7 and day 15, when compared to day 1 fasting blood glucose levels in both groups. The study found that when participants walked after meals, the level of fasting blood glucose was 10% to 12% lower than in those who went for a single walk each day. The results were analysed statistically by using t-test. Fasting blood glucose levels were decreased significantly after 10-minute post-meal walking in both groups (p-value <0.001) when compared to single 30-minute morning walk, Figure 1, Figure 2 and Figure 3.
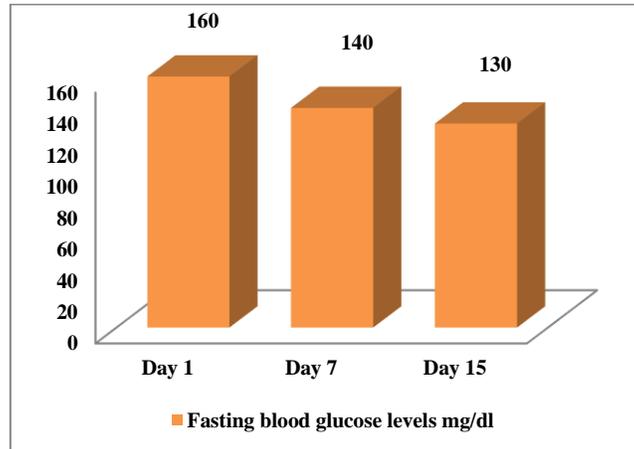

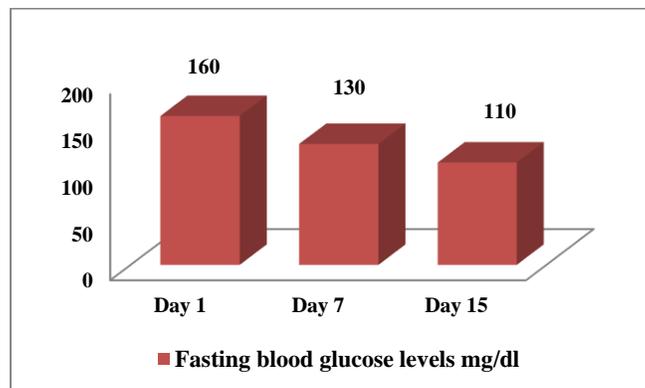Fig 1: Fasting Blood Sugar Levels on Day 1, Day 7 and Day 15 in Group I

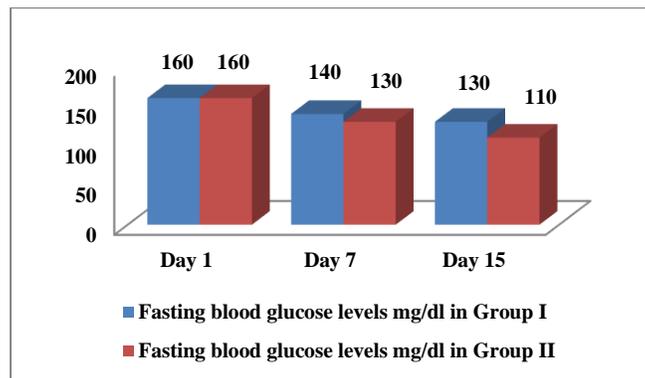Fig 2: Fasting Blood Sugar Levels on Day 1, Day 7and Day 15 in Group II

Fig 3: Comparison of Fasting Blood Glucose Levels in Type-2 Diabetic Patients after a 30-Minute Morning Walk and a 10-MinuteWalk Following Each Main Meal

Discussion

Reduction of postprandial glucose is regarded as an important target in the management of type-2 diabetes mellitus, given its independent contribution to glycaemic control and cardiovascular risk. Physical activity guidelines are a cornerstone of advice to prevent and manage type-2 diabetes mellitus[6].Physical activity has been shown to lower

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blood glucose levels, reduce cardiovascular risk by favorably influencing several metabolic risk factors and help reduce body fatness in many people with type-2 diabetes mellitus who are obese [7].When we do moderate exercise like walking that makes our heartbeat a little faster and breathe a little harder, the muscles use more glucose and overtime this can lower the blood glucose levels and makes the insulin in our body work better. There are a few ways that exercise lowers blood glucose that is, insulin sensitivity is increased, so muscle cells are better able to use any available insulin to take up glucose during and after activity and when muscles contract during activity, the cells are able to take up glucose and use it for energy whether insulin is available or not[8]. This is how exercise can help lower blood glucose in the short term and when diabetic patients are active on a regular basis, it can also lower A1c[9].Thus, physical activity can lower blood glucose levels up to 24 hours or more after workouts by making body more sensitive to insulin. The present study which involved 50 type-2 diabetic adults found that taking shorter, more frequent walks immediately after meals reduce fasting blood glucose levels by around 10% to 12% than with a single 30-minute walk. The evening post-meal walk was the most effective in lowering blood sugar levels for a full 24 hours. Researchers say current physical activity guidelines should be changed to specifically include post-meal activity especially after meals with lots of carbohydrates [10].

Conclusion

This study can help the current physical activity guidelines to specify post-meal activity particularly when meals contain much carbohydrate in type-2 diabetic subjects. The findings of this small study can help to an inexpensive prevention strategy for prediabetes, which can develop overtime into type-2 diabetes. We can't be sure if the benefits of a post meal walk are long-term because of the short duration of the study. From this study, 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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