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ORIGINAL ARTICLE

To compare the postprandial glucose response of dates and white bread in diabetics and non-diabetics

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A B S T R A C T

Objective: To evaluate the postprandial glucose response of dates and white bread (25g) in diabetics and non-diabetics.

Methodology: It was cross-over/cross observational study done at Shifa International Hospital in May-October 2016. The study subjects were adults with Type 2 diabetes mellitus (DM) of age more than 30 years and the healthy controls. Each group was administered equally weighed (25 g) dates and white bread for two days with one week apart. Post prandial blood glucose measurements for dates and white bread was done in both groups and compared by applying student's t-test.

Results: Each group had twelve participants. The mean blood glucose response for both food groups was significantly higher in diabetics than controls. The peak response for dates in both groups was at 30 minutes and the peak response for bread was 60 and 30 minutes in diabetics and controls respectively. Response of dates and bread in diabetics was not statistically significant. The mean fasting glucose in diabetics and non -diabetics was 131.04 mg/dl and 90.12 mg/dl respectively.

Conclusion: Dates are suitable for diabetics and their consumption bears no added risk or danger over white bread.

Keywords: *Dates, post prandial glucose, diabetes*

Introduction

Diabetes mellitus type II has recently become endemic in Pakistan which is probably related, in part, to the rapid social and lifestyle changes experienced by our people particularly in the past two to three decades. Studies reported the high prevalence of diabetes in urban than rural areas.[1, 2] Reports of the Pakistan National Diabetes Survey have shown considerable increase in prevalence rates of diabetes mellitus. As the life expectancy increases in Pakistan, projected prevalence rates of DM will also increase significantly.[3] We frequently encounter diabetic patients in clinics who ask about intake of different varieties of fruits available in our region. Carbohydrate has the most nutritive caloric value in fruits which is in the form of sugars. Equal amounts of dietary carbohydrates have variable blood glucose response considerably as a function of specific food ingested.[4] The rate of entry of glucose in blood and the duration for which its levels are elevated, affect the magnitude of a number of metabolic and hormonal changes that can modulate many disease- and health-related and parameters.[5] There is an agreement that diet low in glycemic index is pertinent to the prevention and management of diabetes and coronary heart disease along with obesity.[6] The glycemic response of many fruits has been characterized;[7, 8] however, there are certain fruits in our region consumed in a particular month which are less studied.

Dates (Phoenix dactylifera) have great importance in Islam. It is one of the few foods directly referred to in the Muslim's Holy book, Quran and Hadith (sayings of Holy

Prophet) describing the health benefits and nutritional significance. It is taken to break the day long fast during Ramadan.[6] Dates are very sweet in taste and difficult to be refrained by diabetics especially in the month of Ramadan.[9] Miller et al., reported the glycemic response to dates in the normal subjects.[10] However, in diabetics it has not been completely studied. However, in diabetic patients it has not been completely studied, except one study in which Alkaabi M et.al reported oral glucose tolerance comparison which revealed that the glycemic index for dates was not significantly different from the value in control subjects.[6]

Date producing countries cultivate various varieties of date. They are consumed in various stages of ripening and are used to produce range of commercial products. Dates, are available in three forms mostly: soft (about 80% of the dry matter is invert sugars); semi-dry (about 40% of the dry matter is invert sugars and 40% sucrose); and dry (20-40% of the dry matter is invert sugars and 40-60% is sucrose). A 100 g portion of fresh dates is a good source of vitamin C and supplies 230 Kcal (960 KJ); 100 g of dried dates (three weighed with seeds) provides 3 g of dietary fiber.[11]

The suitability of dates as a source of carbohydrate for patients with type II diabetes mellitus is unclear as there have been very few studies regarding glycemic response to date consumption. People generally and some health professionals believe that dates cannot be used by the diabetic patients because they can lead to a postprandial hyperglycemia and worsening of diabetic control.

Our study aimed to evaluate the postprandial glucose response to dates (Phoenix dactylifera) in comparison to 25 g white bread in diabetics and compared postprandial response to dates and white bread in diabetics and non-diabetics.

Methodology

It was a cross over case-control study conducted in the Endocrinology Clinic of Shifa International Hospital Islamabad from May-October 2016. Study population comprised of adult patients with type two diabetes mellitus presenting at the Endocrine Clinic of the hospital within the study duration. 26 patients were included in the study and were split into diabetics and non-diabetic groups (controls).

The study was carried out in two days' time (day one and day two). Eligible participants were instructed not to consume food or beverages (other than water) after 2200hrs the night before the tests. In the morning they were asked to refrain from physical exercise and report to the clinic in a fasting state at 0900hrs for the test. Patients were asked to take their usual anti-diabetic medications before the start of the test. Capillary blood samples were taken using a lancet and measured on a Glucometer (Accutrend, Roche). Every 10th sample was re-validated from the laboratory glucose oxidase method for accuracy of the result. A fasting blood glucose level was used as a baseline measure and was recorded as "start time" of the test. Participants were given a test food (dates and white bread) in accordance with the randomization sequence. The food was consumed in 5-10 minutes along with 150ml of water. Capillary blood samples were taken at 30, 60, 90, 120 minutes for analysis after the start time. Participants were asked to remain seated during the tests. The patients and controls were randomized to have either dates or white bread on day one. This was followed after one week (wash out period) by the second day test. On the 2nd (use same format everywhere "second") day, patients and controls were given different foods from the one they consumed on day one.

The mean glucose blood response of dates and white bread at 30, 60, 90 and 120 minutes was noted after the start time, mean values were calculated. Comparisons between patients and controls were made using t-tests. All data was analyzed and computed on SPSS version 23. Informed consent was obtained from all patients and the study was approved by the Institutional Review Board.

Inclusion Criteria for Patients: Adult patients of age more than 30 years with Type II diabetes mellitus for more than 5 years duration, having well controlled diabetes with HbA1c between 6% - 7% and resident of Islamabad.

Inclusion Criteria for Controls: Adult healthy volunteers with no history of diabetes or impaired glucose intolerance and resident of Islamabad.

Intervention: Commercially available test foods, dates and white bread were taken. Semi dried, dark brown dates of same size and variety were purchased from the vendor. Their seeds were removed and measured on a digital scale to make each serving of 25 g. Control food

(white bread) was purchased from the same vendor and weighed on a digital scale to make each serving to 25 g (both foods equal in weight).

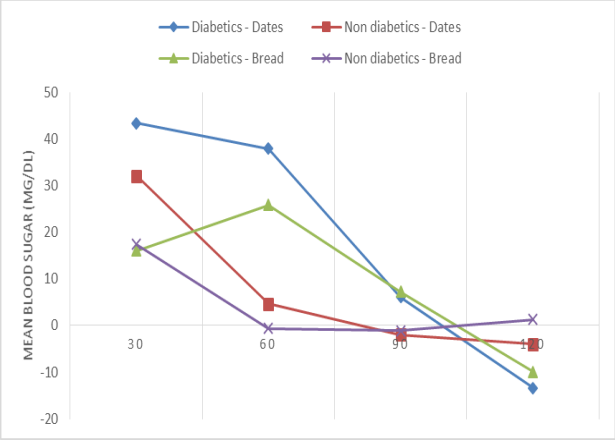
Results

In Type II Diabetics the mean blood glucose response to dates in contrast with bread was considerably higher in the first two time intervals and then lowered in last two intervals, though this difference was not significant at any point in time. Peak response to dates was achieved in 30 minutes while that to bread was achieved in 60 minutes. Beyond 90 minutes both values decreased to sub-basal levels. This decrease was more in case of dates than white bread. Values are illustrated in Table 1 and Figure 1.

Table 1: Response in diabetics (dates vs bread) expressed as mean ± SD

Diet	30mins	60mins	90mins	120 mins
Dates	43.38 ± 26.21	37.92 ± 23.10	6.07± 22.77	-13.38± 20.03
Wheat	16.00 ± 26.17	25.84 ± 29.52	7.23 ± 23.62	-9.92 ± 21.61
p-value	0.015	0.257	0.900	0.676

Figure 1. Mean blood glucose response (mg/dl) curves of the case and controls to dates and bread



The mean blood glucose response to dates and bread was predominantly higher in diabetics with significantly higher values for both food groups. This difference was especially marked for dates. At 60 minutes the p-value of 0.000 and 0.004 for dates and bread respectively was achieved which is statistically significant. The glucose response curve for diabetics fell to sub-basal level in three hours being lesser than non-diabetics concurrently. In both study groups peak glucose response levels for dates was 30 minutes while for bread it was 60 and 30 minutes in diabetics and non-diabetics respectively as shown in Tables 1 and 2.

Table 2. Mean blood glucose response to dates & bread (diabetics vs non-diabetics).

Response to Bread				
	30 mins	60 mins	90 mins	120 mins
Diabetics	16.00 ± 26.17	25.84 ± 29.52	7.23 ± 23.62	-9.92 ± 21.61
Non-Diabetics	17.38 ± 7.17	-0.69 ± 5.55	-1.15 ± 8.60	1.23 ± 9.61
p -value	0.918	0.004	0.241	0.102
Response to Dates				
	30 mins	60 mins	90 mins	120 mins
Diabetics	43.38 ± 26.21	37.92 ± 23.10	6.07 ± 22.77	-13.38 ± 20.03
Non-Diabetics	32.07 ± 29.66	4.61 ± 11.52	-2.07 ± 12.17	-4.38 ± 16.66
p -value	0.313	0.000	0.266	0.225

C max was higher in diabetics for both food groups at all time of points. The mean fasting glucose in diabetics and non-diabetics was 131.04 mg/dl, 90.12 mg/dl respectively.

Discussion

Our study results suggest that although the glucose response to dates and bread in diabetics is higher but is not statistically significant (Table 1). AlGeffari et al also reported no significant fluctuations in the glycemic response by consuming dates.[5] According to the American Diabetic Association (2014) the primary goal in the management of diabetes is the regulation of blood glucose levels near normal concentrations. Whereas the difference between blood glucose responses in two food groups among diabetics and non-diabetics is statistically significant (p-values 0.000 and 0.004 for dates and bread respectively). Study has reported that the utility of

Glycemic Index (GI) is a significant determinant of the mean glycemic response elicited by a range of test meals of varying nutritional composition when tested in a group of subjects.[4]

Our study results depict the comparison made between response to dates and bread between the two study groups, a pattern is established whereby 1) blood glucose rise is consistently higher in diabetics in both food groups than the non-diabetics; 2) blood glucose rise to dates in contrast to bread is higher in both study groups. 3) In both study groups, blood glucose falls to sub basal level in three hours. The fall occurs earlier in non-diabetics, it is steeper and higher in diabetics than the former. In both groups the peak rise in blood glucose response for dates is attained at same time that is 30 minutes which is followed by a gradual fall while peak response for bread is achieved at a variable time being 60 minutes for diabetics and 30 minutes for non-diabetics. It is noteworthy that in non-diabetics sub basal fall in glucose levels is at 60 minutes for the bread while in diabetics the sub basal fall is relatively later at 120 minutes explained by the dysfunctional blood sugar regulation (Figure 1). However, the difference is insignificant at all points in time when the two food groups are compared in diabetics (Table 1).

The insignificant postprandial blood sugar fluctuations observed in our study for dates and bread in diabetics is contradictory to the popular notion that dates are better avoided in diabetics.[11] However direct comparison is not feasible with our study as the amount of test food used in our study was 25 g as opposed to the standard of 50 g.

Conclusion

Both dates and white bread carry an equal index of safety in diabetics. Dates are a suitable food group for diabetics and their consumption bears no added risk or danger over white bread.

References

1. Shera AS, Jawad F, Maqsood A. Prevalence of diabetes in Pakistan. *Diabetes Res Clin Pract* 2007; 76(2):219–22. DOI: http://doi.org/10.1016/j.diabres.2006.08.011
2. A.S.Shera, AbdulBasit, AsherFawwad, RubinaHakeem MYZIIAK. Prevalence of glucose intolerance and associated factors in the Punjab Province of Pakistan Diabetes. *Prim Care Diabetes* 4(2):79–83. DOI: https://doi.org/10.1016/j.pcd.2010.01.003
3. Akhter J. The burden of diabetes in Pakistan: the national diabetes survey. *J Pak Med Assoc* 1999; 49(9):205–6.
4. Wolever TMS, Yang M, Zeng XY, Atkinson F, Brand-Miller JC. Food glycemic index, as given in Glycemic Index tables, is a significant determinant of glycemic responses elicited by composite breakfast meals. *Am J Clin Nutr* 2006; 83(6):1306–12. DOI: http://doi.org/10.1093/ajcn/83.6.1306
5. Alkaabi JM, Gariballa S, Saadi HF, Ghazali M Al, Ahmad S, Al-Dabbagh B. Glycemic indices of five varieties of dates in healthy and diabetic subjects. *Nutr J* 2011; 10(1):1–9. DOI: http://doi.org/10.1186/1475-2891-10-59.
6. AlGeffari MA, Almogbel ES, Alhomaidan HT, ElMergawi R, Barrimah IA. Glycemic indices, glycemic load and glycemic response for seventeen varieties of dates grown in Saudi Arabia. *Ann Saudi Med* 2016; 36(6):397–403. DOI: http://doi.org/10.5144/0256-4947.2016.397
7. Edo A, Eregie A, Adediran O, Ohwovoriole A, Ebengho S. Postprandial glucose response to selected tropical fruits in normal glucose-tolerant Nigerians. *Niger J Clin Pract* 2011; 14(1):79–82. DOI: http://doi.org/10.4103/1119-3077.79270.
8. Contractor Z, Hussain F, Jabbar A. Postprandial glucose response to mango, banana and sapota. *J Pak Med Assoc* 1999; 49(9):215–6.
9. Jalil A, Zakar R, Zakar MZ, Fischer F. Patient satisfaction with doctor-patient interactions: a mixed methods study among diabetes mellitus patients in Pakistan. *BMC Health Serv Res* 2017; 17(1):1–13. DOI: http://doi.org/10.1186/s12913-017-2094-6.
10. Miller CJ1, Dunn EV HI. Glycemic index of 3 varieties of dates. *Saudi Med J* 2002; 23(5):536–8.
11. Al-Said YSMA-KD of FS and N& F. Chemical composition and glycemic index of three varieties of Omani dates. *Int J food Sci* 2009; 51–6. DOI: https://doi.org/10.1080/09637480802389094
12. Critchley J, DeWitt DE, Khan MA, Liaw ST. A required rural health module increase students' interest in rural health careers. *Rural Remote Health* 2007; 7(2):688 DOI: http://dx.doi.org/10.22605/RRH688
13. Okayama M1, Kajii E. Does community-based education increase students' motivation to practice community health care?—a cross sectional study. *BMC Med Educ* 2011; 11:19. DOI: https://doi.org/10.1186/1472-6920-11-19