

Dietary Patterns and Glycemic Control Among Qatari Adults with Type 2 Diabetes

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ABSTRACT

Background: No studies assess the effect of dietary pattern on glycemic control among Qatari adults with T2DM.

Objective: To assess the association between dietary patterns, and glycemic control among Qatari adults with T2DM.

Method: Data from 1000 adults with known diabetes attending the Qatar Biobank Study were analyzed. Poor glycemic control was defined as HbA1c $\geq 7.0\%$. Dietary pattern was constructed using factor analysis based on habitual food intake data assessed by a food frequency questionnaire. Logistic regression was used to assess the association between dietary patterns and poor glycemic control. The following covariates were considered: education, age, gender, smoking, BMI and medication. All analyses were conducted using STATA 15.

Result: The odds ratio for poor glycemic control was 0.86 (95%CI 0.68-1.08) in men, 0.76(95%CI 0.61-0.95) in women. For men without diabetes medication, fast food pattern was positively but traditional pattern was inversely associated with poor glycemic control 2.35(95%CI 1.13-4.87) ($p=0.021$) and 0.49 (95%CI 0.22-1.07) ($p=0.075$) respectively. And among younger participants, the use of insulin was higher than older participants as it was 77 (SD 30.8%).

Conclusion: Fast food pattern was inversely associated with glycemic control which is most likely linked to medication use. In men who were not under diabetes medication, fast food pattern was associated with poor glycemic control.

INTRODUCTION

Diabetes is a global epidemic and affected approximately 425 million adults in 2017¹. In Qatar the prevalence of diabetes mellitus in adults was 17.4%². Poor control of diabetes is common and increases the risk of complications³. In Qatar, about 50% of people with diabetes had poor glycemic control⁴. There are several factors that affect the diabetes risk and glycemic control including dietary pattern⁵. Little is known about the relationship between dietary patterns and glycemic control in Qatar. So far, only one study assessed the association between dietary patterns and glycemic control based on Qatar Biobank study⁶. We aimed to assess the association between dietary patterns and glycemic control among Qatari adults with diabetes.

METHOD

We randomly selected 1000 Qatari participants (≥ 18 years) with known diabetes attending Qatar Biobank Study. Poor glycemic control as was defined as HbA1c $\geq 7.0\%$. Dietary intake during last year was assessed by a 102-item food frequency questionnaire (FFQ). The food intake was aggregated into 38 food groups. Factor analysis was used to construct dietary patterns. Participants were asked about their medication use for hypertension and diabetes. Multivariable logistic regression was used to assess the association between dietary patterns and poor glycemic control. The confounding variables were adjusted in the models: education (low, medium and high), age, gender, smoking, and leisure time physical activity level. Participants with a BMI of 25 to 29.9 kg/m² were defined as overweight. Obesity was defined as BMI of ≥ 30 kg/m². To compare the differences between groups the chi – square test was used for categorical variables and ANOVA for continuous variables. “p- value” less than 0.05 (two sided) was considered significant. All the data analyses were performed using STATA 15.

RESULTS

The mean age of the participants was 52.3 (SD 11.5) years. Overall, the prevalence of poor glycemic control was 57.6%. Three dietary patterns were obtained (Figure 1). The three factors explained 14.5 % of the variance in intake. High intake of fast food dietary pattern was associated with high education levels and supplementation use but less likely to have hypertension, poor glycemic control or use of medications. Participants with high intake of prudent dietary pattern were more likely to be highly educated, use supplements, frequent intake of fruit and vegetable. Those with older age were more likely to have high intake of traditional dietary pattern.

Fast food dietary pattern was inversely associated with poor glycemic control (Table 1). While, no association between prudent pattern and traditional pattern with glycemic control was found. Moreover, inverse association between fast food pattern and poor glycemic control was mainly seen among those with diabetes duration greater than 10 years.

There were interactions between gender, diabetes medication use with fast food pattern in relation to poor glycemic control (Figure 2). In men not undertaking diabetes medication, fast food pattern was positively associated with poor glycemic control: the OR for poor glycemic was 2.35(95%CI 1.13-4.87) ($p=0.021$). No such association was observed in women.

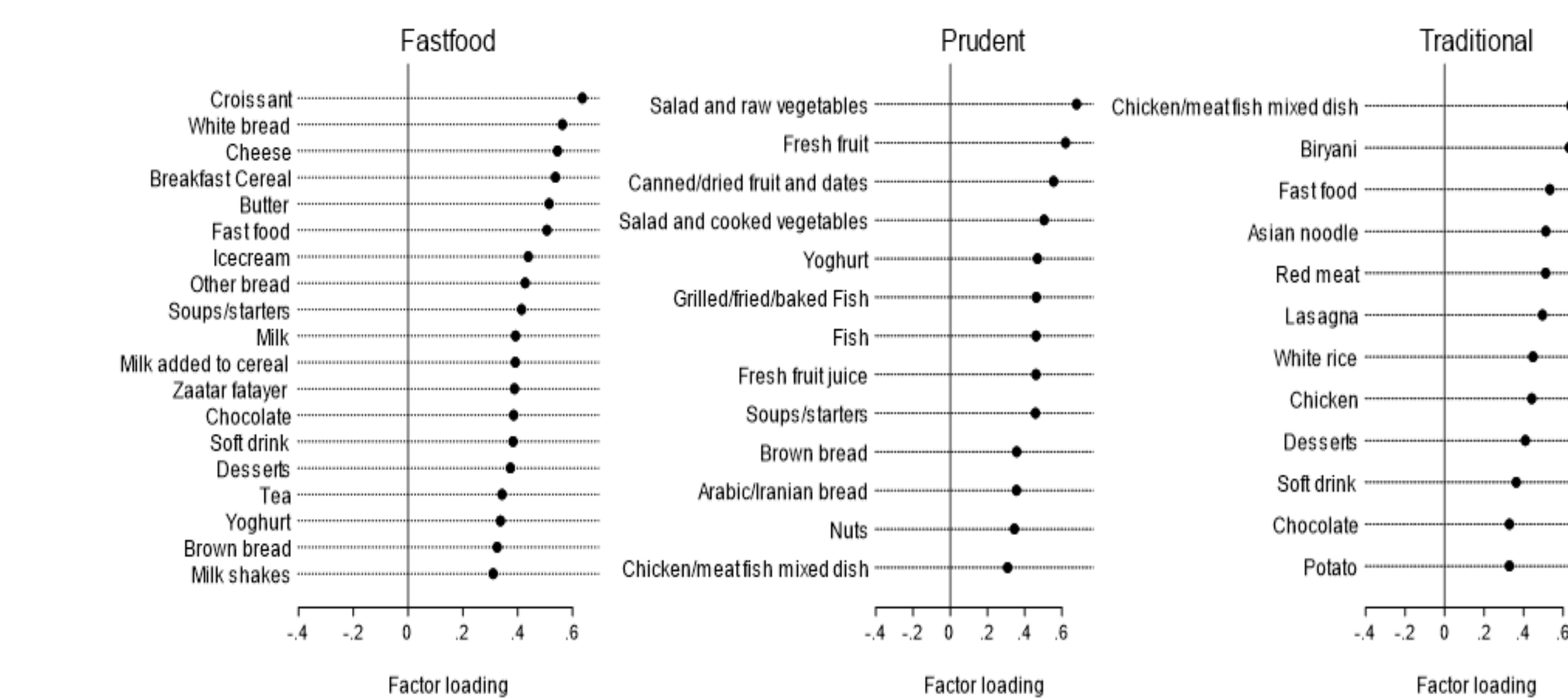


Figure 1 factor loading for dietary patterns

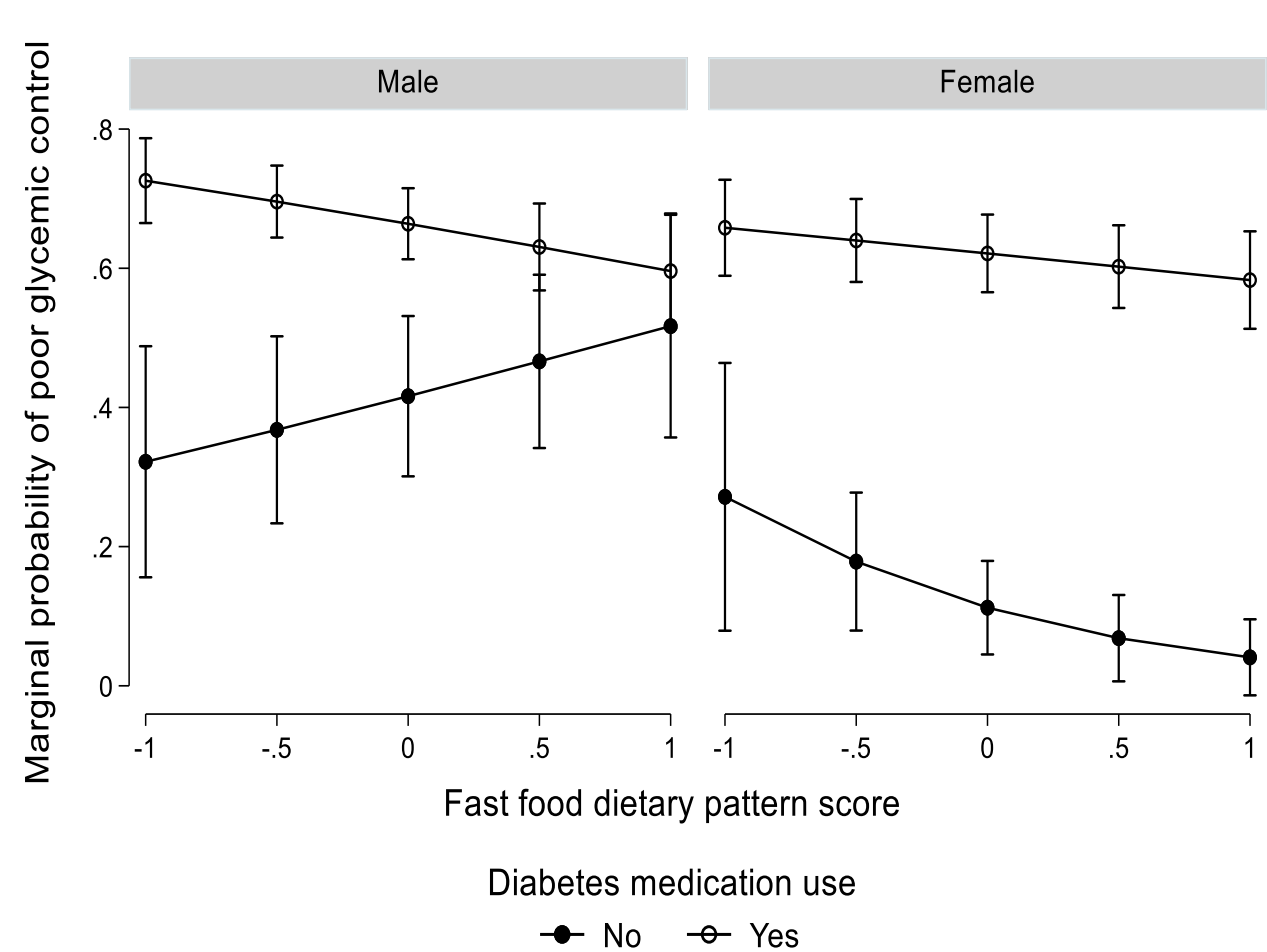


Figure 2 Interaction between dietary patterns, diabetes medication use and gender in relation to poor glycemic control

Table 1 Association between dietary patterns and poor glycemic control

	Fast food pattern	p	Prudent pattern	p	Traditional pattern	p
Both genders						
Model 1	0.82 (0.72-0.94)	0.005	1.10 (0.96-1.26)	0.159	1.04 (0.91-1.19)	0.544
Model 2	0.80 (0.68-0.93)	0.005	1.13 (0.97-1.31)	0.107	1.01 (0.87-1.18)	0.864
Diabetes duration (Model 2)						
≥ 10 years	0.68 (0.52-0.89)	0.006	1.08 (0.85-1.38)	0.535	1.19 (0.89-1.59)	0.247
< 10 years	0.83 (0.63-1.08)	0.160	1.27 (0.98-1.64)	0.066	0.86 (0.68-1.11)	0.248
Men						
Model 1	0.80 (0.65-0.99)	0.039	1.01 (0.83-1.23)	0.906	1.14 (0.94-1.39)	0.171
Model 2	0.86 (0.68-1.08)	0.187	1.11 (0.90-1.37)	0.331	1.02 (0.83-1.26)	0.841
Women						
Model 1	0.84 (0.70-1.01)	0.071	1.16 (0.96-1.40)	0.141	0.95 (0.78-1.15)	0.581
Model 2	0.76 (0.61-0.95)	0.014	1.14 (0.91-1.42)	0.263	1.00 (0.80-1.25)	0.971

Model 1 adjusted for age and gender (except gender specific models)
Model 2 further for education, smoking, physical activity, BMI and hypertension

CONCLUSION

Poor glycemic control is common in adults with known diabetes. Fast food dietary pattern was inversely associated with poor glycemic control. It is likely due to the use of medication. In men who were not under diabetes medication, fast food dietary pattern was positively Promoting healthy eating should be encouraged especially among those under diabetes medication.

REFERENCES

- International Diabetes Federation. IDF Diabetes Atlas - 8th edition. 2017. <https://diabetesatlas.org/resources/2017-atlas.html>.
- Al Thani A, Fthenou E, Paparrodopoulos S, et al. Qatar Biobank Cohort Study: Study Design and First Results. Am J Epidemiol 2019; 188(8): 1420-33.
- Tuttolomondo A, Maida C, Pinto A. Diabetic Foot Syndrome as a Possible Cardiovascular Marker in Diabetic Patients. Journal of Diabetes Research 2015; 2015: 12.
- Shi Z, Badi Abou-Samra A. Association of low serum magnesium with diabetes and hypertension: findings from Qatar Biobank Study. Diabetes Res Clin Pract 2019; 107903.
- de Carvalho GB, Dias-Vasconcelos NL, Santos RKF, Brandão-Lima PN, da Silva DG, Pires LV. Effect of different dietary patterns on glycemic control in individuals with type 2 diabetes mellitus: A systematic review. Critical Reviews in Food Science and Nutrition 2019; 1-12.
- Ullah E, Mall R, Rawi R, Moustaid-Moussa N, Butt AA, Bensmail H. Harnessing Qatar Biobank to understand type 2 diabetes and obesity in adult Qataris from the First Qatar Biobank Project. J Transl Med 2018; 16(1): 99.

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