

# The role of religion in early hyperglycemia among various ethnic groups

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## BACKGROUND

The association between religiosity and early hyperglycemia in various ethnicities is unknown.

## METHODS

This cross-sectional study includes a population of north Israel that is characterized by various ethnic groups. Visitors arriving at the Galilee Medical Center (GMC) without a known diagnosis of diabetes were recruited to the study and examined for early detection of diabetes by measuring their glucose levels with an institutional glucometer. Subjects with blood glucose levels of 126 mg/dl and above, more than 4 hours of the last caloric intake, and glucose levels of 200 mg/dl and above, less than 4 hours of the last caloric intake, were not included in the study. Therefore, we decrease the possibility that patients with diabetes were included in the study. Pre-prandial hyperglycemia was defined as a glucose level of 100 mg/dl and above but less than 126 mg/dl and over 4 hours since the last caloric intake. Postprandial hyperglycemia was defined as a glucose level of 140 mg/dl and above but less than 200mg/dl and less than 4 hours since the last caloric intake.

## RESULTS

Study participants were belonged to the following ethnic groups: 1722 (54.3%) Jews, 726 (22.9%) Muslims Arabs, 504 (15.9%) Druze Arabs, 168 (5.3%) Christians Arabs, 23 (0.7%) other and 27 (0.9%) with no data. The average age of participants was 48.9 years old (SD=16 years, median 50 years, and range 18-96 years). Participants average body mass index (BMI) was 27.3 kg/m<sup>2</sup> (SD=4.9 kg/m<sup>2</sup>, median 26.8 kg/m<sup>2</sup> and range 13.7-68.9 kg/m<sup>2</sup>), and 787 (25.3%) of were identified as obese.

We found an association between risk factors for T2DM and early hyperglycemia. Including male, obesity, hypertension treatment, smoking, high systolic blood pressure, low education (less than 12 years of education) as well as feeling not calm or relaxed in the past year (table 1). Among 3170 visitors to the GMC without knowing diabetes, we found more hyperglycemia in secular compare to religious in Arabs but not Jews. Association between religiosity and hyperglycemia adjusted for age, sex and BMI was found to be significant among Muslims Arabs (secular compared to religious, OR 1.72, 95%CI 1.11-2.7, p=0.02) and among Druze (secular compared to religious, OR 1.96, 95%CI 1.04-3.7, p=0.04) (table 2). While a similar trend was seen among Christians Arabs but not statistically significant (secular compared to religious, OR 2.86, 95%CI 0.84-10, p=0.09).

**Table 1: The association between T2DM risk factors and hyperglycemia\***

	Total	Hyperglycemia	No Hyperglycemia	P
Male % (n)	52.5 (1629)	57.8 (249)	51.6 (1380)	0.02
BMI>30 % (n)	25.3 (787)	37.4 (163)	23.3 (624)	<0.001
Hypertension Treatment % (n)	19.2 (560)	27.1 (108)	18 (452)	<0.001
Smoking % (n)	29.8 (849)	34.4 (132)	29 (717)	0.04
Systolic HTN % (n)	12.1 (283)	16 (46)	11.6 (237)	0.04
More than 12 years of education % (n)	42.5 (1329)	35.3 (153)	43.7 (1176)	0.001
Daily Sugar-Sweetened Beverage Consumption % (n)	43.3 (1358)	43 (188)	43.4 (1170)	0.92
Daily fresh vegetable consumption % (n)	86.2 (2702)	86 (376)	86.2 (2326)	0.94

\* 2-sided chi square test

**Table 2: Multivariable analyses for the association between religiosity and hyperglycemia in the different ethnic groups, adjusted for Age, Sex and BMI. Secular compare to religious**

		independent variable	OR	95% CI for OR	p
Model 1	Jews	religiosity	1.1	0.82-1.47	0.54
Model 2	Muslims	religiosity	1.72	1.11-2.7	0.02
Model 3	Druze	religiosity	1.96	1.04-3.7	0.04
Model 4	Christians	religiosity	2.86	0.84-10	0.09

Reference group: religious

## CONCLUSIONS

Among 3170 visitors to the Galilee Medical Center without a known diagnosis of diabetes, we found more hyperglycemia among the secular than religious participants. An association was found between religiosity and early hyperglycemia in Arabs but not Jews in Israel's northern peripheral population