D. Diabetes and the Metabolic Syndrome in Arab Americans: A Community-Based Sample

Linda A. Jaber, PharmD

Introduction

Numerous population-based studies have demonstrated that the incidence of diabetes is increasing among the Arab populations of the Middle East. The prevalence of diabetes varies from 3% in Sudan to 35% in Bahrain.[1,2] Higher rates were observed in urban areas and are often associated with sociodemographic transition.[3]

The Arab-American community in metropolitan Detroit, populated mostly by Middle-Eastern immigrants, is undergoing a western lifestyle transition that may increase its risk for type 2 diabetes. The aims of two studies conducted during 2000 and 2002 were to examine the epidemiology of diabetes and other categories of glucose intolerance, dysglycemia-associated risk factors, and metabolic syndrome in a representative, cross-sectional, sample of Arab Americans.[4]

Methods

Sample

A randomly selected sample of non-pregnant adults, 20–75 years of age with Arab ancestry was selected from a community in southeastern Michigan. An initial sampling frame of all residential housing units in two defined geographic areas was constructed and a random list of households generated. Arab ancestry was determined by self-report. All participants provided written informed consent. The study sample consisted of 542 participants (214 men, 328 women) representing a response rate of 78% for men and 93% for women.[4] The majority were immigrants (95%) with a mean length of stay of 11 years and of Lebanese origin (65%). More men (69%) than women (49%) had completed high school and more men (80%) than women (19%) were employed.

Measurements

All study-related procedures were carried out by trained bilingual staff and conducted at a community center. Standardized questionnaires translated into Arabic were used to assess demographic and socioeconomic characteristics (including ethnic background, education, and employment history), and behavioral factors (such as smoking habits, nutritional status, and physical activity patterns). Glucose tolerance tests of individuals without a history of diabetes was determined by the 2-hr 75-g OGTT and classified according to the 1997 American Diabetes Association diagnostic criteria.[5]

Data Analysis and Results

Statistical analyses were performed. Prevalence estimates used weights determined by the age and sex distribution of the study sample. The age-adjusted prevalence of diabetes was 15.5% (95% CI 12.2%-18.7%) in women and 20.1% (95% CI 15.0%-25.2%) in men (P=.13). Diabetes was less common among men (36%) than women (54%) >60 years of age. About half of those with diabetes had not been previously diagnosed. Impaired glucose tolerance (IGT) and impaired fasting glucose (IFG) were present in 16.8% (12.8%-20.8%) of women and 29.7% (23.4%-35.9%) of men; the difference in these rates was statistically significant (P=.0007). Higher rates of dysglycemia were associated with older age, being male, obese (assessed by BMI) and having central obesity (assessed by waist-to-hip ratio). A reported maternal history

From Wayne State University, Detroit, Michigan.

of diabetes was associated with higher evidence of dysglycemia in men but not in women. Although the majority of study participants reported low physical activity on a routine basis, no association was found between physical activity and the risk for diabetes in either men or women. Obesity (defined as BMI ≥30kg/m²) was alarmingly high, affecting 34% of the study population; this generally increased with age in both men and women.

Acculturation, the process of adaptation to the dominant culture, may affect the health status of any immigrant population. The relationship between dysglycemia and acculturation was examined in the 520 subjects (206 men, 314 women) who were born in the Middle East.[6] In this study, acculturation was assessed by a variety of markers and scales measuring integration into American society. These markers included the type of area an individual lived in as a child; age at immigration to the United States; duration of residence in the United States; language use, proficiency, and preferences; ethnic identification; ethnicity of friends; and food preferences. Less acculturated Arab Americans were generally at greater risk for diabetes than those with greater acculturation. In men, dysglycemia was associated with older age at immigration, unemployment, speaking Arabic with friends, being less active in Arabic organizations, more frequent consumption of Arabic food, and less integration into American society. Being raised in rural areas of the Middle East, older age at immigration, longer length of stay in the United States, not being employed outside the home, less than a high school education, not attending Arabic or American schools, and not being able to read Arabic (or English) were associated with dysglycemia in women. Using multiple regression models, the risk of diabetes was associated with older age, attainment of less than high school education, and less acculturation in men and older age in women.

The metabolic syndrome, also known as the insulin resistance syndrome, represents the clustering of a number of metabolic abnormalities, including obesity, glucose intolerance, hypertension, and dyslipidemia.[7,8] Studies have shown that people with this syndrome are at increased risk for cardiovascular disease, diabetes, and death. Among Arabs, the metabolic syndrome reportedly affects 17% of Palestinians in the West Bank and 21% of Omanis.[9,10] In our studies of the Arab-American community, we examined the prevalence of the metabolic syndrome and its association with insulin resistance.[11] Using the Adult Treatment Panel III (ATP III) diagnostic criteria, the metabolic syndrome was considered present if an individual met ≥3 of the following criteria: waist circumference >102 cm in men and >88 cm in women; fasting plasma glucose ≥110 mg/dL; blood pressure ≥130/85 mm Hg; serum triglycerides ≥150 mg/dL; and serum HDL cholesterol <40 mg/dL in men and <50 mg/dL in women.[12] Insulin resistance was estimated by the homeostasis model assessment (HOMA-IR). The overall age-adjusted prevalence of the metabolic syndrome was 23% (95% CI, 19%-26%) and was slightly but not significantly higher in women (25%) compared to men (20%). The prevalence rose significantly with increasing age and BMI in both sexes. Age-specific rates were similar for men and women aged 20–49 years but significantly higher in women ≥50 years of age. The metabolic syndrome was more common among subjects with diabetes (34%) or IGT/IFG (32%) than those with normal glucose tolerance (12%). Low HDL cholesterol concentration was the most common component of the metabolic syndrome in both men and women. A strong association between IR-HOMA and individual components of the metabolic syndrome was observed.[11] After fitting a model with HOMA-IR as the outcome, waist circumference, triglyceride level, and fasting plasma glucose were significantly associated with HOMA-IR ($P<.01$).

RESULTS

These results extend our knowledge about diabetes and its burden in this largely unstudied and rapidly growing community. They provide the first representative estimates of the prevalence of diabetes and its risk factors. We have shown that diabetes is a major health problem affecting about 18% of the community; about half of them are not aware of the disease and are not being treated for it. We have also shown that an additional 17% of women and 30% of men have prediabetes and are at increased risk for developing diabetes. Older age, obesity, and lack of acculturation appear to be major risk factors for the development of diabetes. Given the relative youth of this population and these accelerated rates of diabetes and prediabetes, it is crucial to develop community-based and culturally appropriate educational programs aimed at increasing public awareness, early detection, and regular surveillance of diabetes, as well as implementing intervention strategies targeting diabetes prevention and proper management.

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