F. The Use of Glucose-Lowering Agents and Aspirin among Arab Americans with Diabetes

Objective. Little is known about the health outcomes or the quality of care among Arab American patients with diabetes. The objective of this study is to examine the use of glucose-lowering agents and aspirin therapy in this population compared to the drug utilization patterns reported in nationally representative surveys.

Research Design and Methods. A random sample of adult Arab American patients with self-reported diabetes was selected. Complete medication histories were recorded during a face-to-face interview. Medication utilization of the glucose-lowering agents and aspirin were compared to data from the Third National Health and Nutrition Examination Survey (NHANES) and the Behavioral Risk Factor Surveillance System (BRFSS).

Results. The study sample consisted of 53 participants (20 males, 33 females) with mean age ± SD of 59.4 ± 12 years and A1C levels of 8.0 ± 2%. Compared to US adults, Arab American patients with diabetes were less likely to be treated with insulin (27% vs 17%) and more likely to receive oral hypoglycemic agents (65% vs 81%). Similar proportions of participants were maintained on insulin-oral hypoglycemic-combined therapy (10% US adults vs 9% Arab Americans). Aspirin use was significantly lower among the study participants (23%) compared to the reported national prevalence of aspirin intake (64%).

Conclusion. The therapeutic management of diabetes in the Arab-American patients with diabetes is suboptimal. The use of insulin and aspirin was lower than that reported by participants in the NHANES and BRFSS national databases. More aggressive approaches for the management of hyperglycemia and the prevention of cardiovascular diseases are needed to improve health outcomes in the Arab-American community. (*Ethn Dis*. 2007;17[Suppl 3]:S3-42–S3-45)

Key Words: Diabetes, Glucose, Aspirin

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INTRODUCTION

Patients with diabetes have a two- to four-fold increased risk of developing cardiovascular disease (CVD). Death from cardiovascular disease accounts for 65% of all diabetes-related deaths, rendering CVD the number one cause of mortality in the United States.[1] Several mechanisms contribute to the link between diabetes and CVD. Hyperglycemia is independently associated with an increase in diabetes-related complications including CVD. Progressive loss of beta cell function leads to the deterioration of glycemic control in patients with diabetes over time.[2] To achieve and maintain glycemic targets, combination therapy with two or more oral hypoglycemic agents are often required.[3] In patients with longstanding diabetes who have sustained significant decline in beta cell function and endogenous insulin secretion, insulin therapy remains the most effective treatment. Additionally, aspirin therapy reduces the risk of CVD in diabetic patients with and without existing CVD.[4–6] Therefore, the prevention of diabetes-related cardiovascular complications requires aggressive use of glucose-lowering agents and anti-platelet therapy.

Arab Americans have a high prevalence of diabetes and other cardiovascular risk factors such as obesity and dyslipidemia.[7–9] Similar to other minorities, Arab American individuals are often faced with cultural barriers, which may hinder their ability to receive recommended medical care and attention. Given the youthfulness of this community, the burden of diabetes and its associated cardiovascular consequences will increase as the population ages, imposing a substantial public health challenge.

The purpose of our study was to examine and compare the use of aspirin and glucose-lowering agents in Arab Americans with diabetes to national trends in the United States.

METHODS

This was a cross-sectional, population-based study conducted in Arab Americans. The methods for this study have been described in detail elsewhere.[7] Briefly, non-pregnant adults, 20 to 75 years of age, and with a self-reported ancestry of Arab descent were chosen via random sample in two areas of Dearborn, Michigan. Subjects were considered to have diabetes if they reported a previous medical diagnosis of the disease and/or they were using oral anti-diabetic agents or insulin. For the purpose of this study, only individuals with previously diagnosed diabetes were included.

Trained bilingual interviewers administered standardized questionnaires, translated into Arabic, to capture self-reported information, such as demographics, medical diagnoses and medications. The use of medications was further documented by examining all prescription and over-the-counter medication containers during the scheduled home visits. Interviewers recorded the names and the dosages of all prescribed medications.

Medication utilization patterns for aspirin and glucose-lowering agents in Arab Americans with diabetes were compared to nationally representative population-based reports. The use of aspirin in these patients was compared to the 2003 database of the Behavioral Risk Factor Surveillance System (BRFSS).[10] The BRFSS is an annual

Table 1. Demographics and characteristics of Arab Americans with diabetes

	Total	Men	Women
N	53	20	33
Age (yrs)	59.4 ± 12	53.7 ± 12.4	62.9 ± 10.2
Duration of diabetes (yrs)	9.2 ± 7.4	7.8 ± 7.3	10.0 ± 7.5
HbA1C	8.0 ± 2.2	7.8 ± 2.4	8.1 ± 2.1
Cardiovascular History (n)			
Hypertension	23	9	14
Dyslipidemia	24	12	12
CHF	6	3	3
Angina	6	1	5
Stroke	1	0	1
MI	2	1	1
PVD	7	2	5

CHF: congestive heart failure, MI: myocardial infarction, PVD: peripheral vascular disease.

random state-based telephone survey of participants aged ≥ 35 years. Participants who reported using aspirin were then asked whether aspirin was being used for pain relief or for the prevention of a cardiovascular event. Participants were also asked whether they had a diagnosis of diabetes.

The utilization of glucose-lowering agents in Arab Americans was compared to a database of The National Health and Nutrition Examination Survey (NHANES), collected from 1999–2002.[11] This survey was conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention and included participants ≥ 18 years of age. Household interviews were conducted and patients were identified as having diabetes if they reported being previously diagnosed with the disease.

Statistical analysis was performed to estimate the rates of aspirin and hypo-glycemic agents use among Arab American patients with diabetes compared to the reported national surveys. Mean and standard deviations (SD) were calculated.

RESULTS

Among the random sample of 542 Arab Americans, 53 individuals had a previous diagnosis of diabetes. Demographic characteristics for the study population are presented in Table 1. According to the 2003 BRFSS survey, 25,549 of the 84,538 participants surveyed reported taking aspirin daily or every other day and diabetes was present in 10.5% of participants. The 1999–2002 NHANES survey reported 998 of the 11,441 subjects surveyed as having diabetes.

According to the BRFSS sample, 64% of participants with diabetes, 40 years or above, were receiving aspirin therapy. In comparison, the prevalence of aspirin use among Arab Americans was 22.6% (Table 2). Arab American men were more likely to receive preventative therapy with aspirin than women were. Furthermore, two of the subjects received anti-platelet therapy with Plavix, while no combination therapy with aspirin and Plavix was reported.

The NHANES survey reported that 65.3% of those with diabetes were being treated with oral glucose-lowering agents, 27.4% were on insulin alone and 10.4% were on combination therapy with oral agents and insulin together. In comparison, 81.1% Arab American participants were receiving oral glucose-lowering agents, 43.4% received monotherapy and 37.7% were on combination oral agent therapy (Table 2). Insulin use was reported in 17% of Arab Americans and only 9.4% were on combination therapy with oral agents and insulin. The use of oral agents as monotherapy, as well as in combination with other oral agents was similar in Arab American men and women. Insulin use, however, was higher in women than men.

DISCUSSION

The present study demonstrates an underutilization of aspirin therapy among Arab American patients with diabetes. The observed aspirin use in this population is considerably lower than the reported prevalence of aspirin intake among general US patients with diabetes. Additionally, the use of insulin was also lower in Arab Americans with diabetes compared to national estimates. The mean HbA1C level of 8.0% was above the American Diabetes Association (ADA) recommended goal of <7% and reflected the underutilization of combination therapy of glucose-lowering agents in this population. Arab American men were more likely to be treated with

Table 2. Results: Use of insulin and OHA in Arab Americans with diabetes

	Total N (%)	Men n (%)	Women n (%)
Aspirin therapy	12 (22.6)	8 (40.0)	4 (12.1)
Oral agents	43 (81.1)	16 (80.0)	27 (81.8)
Monotherapy	23 (43.4)	9 (45.0)	14 (42.4)
Combination therapy	20 (37.7)	7 (35.0)	13 (39.4)
Insulin therapy	9 (17.0)	2 (10.0)	7 (21.2)
Insulin alone	4 (7.5)	1 (5.0)	3 (9.0)
Insulin + oral agent	5 (9.4)	1 (5.0)	4 (12.1)
No glucose-lowering therapy	6 (11.3)	3 (15.0)	3 (9.0)

aspirin, whereas women were more likely to be treated with insulin.

The increased risk of cardiovascular disease in patients with diabetes is the result of a pro-coagulant state, which can be attributed in part to increased platelet aggregation.[12] The production of thromboxane A2 (TXA2) is elevated in patients with diabetes and is responsible for promoting platelet aggregation.[13] TXA2 is also a potent vasoconstrictor. Aspirin therapy prevents the synthesis of TXA2 and irreversibly inhibits the activity of platelets.[14] A large meta-analysis of 145 randomized controlled trials conducted by the Antiplatelet Trialists' Collaboration included patients with pre-existing cardiovascular diseases. This analysis demonstrated that anti-platelet therapy in these high-risk individuals was effective in preventing recurrent cardiovascular events in those patients with or without diabetes.[4] Studies involving patients with diabetes without a prior history of cardiovascular disease have also demonstrated the protective effects of aspirin in lowering the incidence of cardiovascular endpoints, such as myocardial infarction and stroke.[5,6] It was further estimated that increasing the prevalence of aspirin intake to 90% from the current 66% in diabetic patients receiving care from the Department of Veterans Affairs heathcare systems could potentially prevent 11,000 myocardial infarctions and save over 8,000 lives.[15] These studies prompted the recommendation by the ADA for the use of aspirin therapy in all patients with previous CVD for secondary prevention and in those greater than 40 years of age or who have additional risk factors, for primary prevention. While the mean age of Arab American participants in the present study was 59.4 ± 12 years, only 22.6% were receiving aspirin. In addition, only 3.78% of participants reported receiving alternative anti-platelet therapy with Plavix, which is also recommended by the ADA if patients cannot tolerate aspirin. The

majority of patients in this survey were not treated with an anti-platelet agent, thereby increasing their risk of cardiovascular events and death.

The United Kingdom Prospective Diabetes Study (UKPDS) demonstrated that intensive glycemic control prevents or delays the progression of diabetes complications.[16] In addition, the study provided compelling evidence that the progressive loss of functioning beta cells resulted in the gradual increase in HbA1C levels over time and that the effective normalization of hyperglycemia would slow down the decline of these beta cells. Therefore, one of the key messages of the UKPDS was to institute and continually reassess effective hypoglycemic strategies. In order to maintain the targeted HbA1C goal, aggressive use of combination therapy with oral agents and/or insulin is often required in the majority of patients. Combination therapy with oral agents was used by 37.7% of the study participants. The use of insulin was lower in Arab Americans compared to national US data. Insulin and oral agent combination therapy was also underutilized in the present study.

The under-utilization of aspirin, insulin and combination therapy in this population may be attributed to a number of factors, namely linguistic, cultural, social and health belief barriers. System impediments including accessibility and availability of culturally appropriate healthcare and lack of resources may also exist. The high prevalence of diabetes in the Arab American population has been attributed in part to a lack of acculturation in this group of minorities.[17] Whether or not the lack of acculturation has an effect on sub-optimal pharmacologic therapy is not known.

There are some limitations to the present study. First, different population-based surveys with different methodologies were used for data comparisons in this study. The BRFSS was a phone survey, whereas the Arab-American and

the NHANES data were collected during one-on-one interviews. Second, the study participants were exclusively immigrant and therefore may not be representative of US-born Arab Americans.

In conclusion, the use of aspirin and glucose lowering pharmacological strategies in Arab American patients with diabetes is unacceptably suboptimal compared to the nationally representative surveys and does not conform to the ADA recommendations. Targeted efforts to increase aspirin use in Arab American patients with diabetes are needed. In addition, more aggressive glucose-lowering strategies that incorporate combination oral agents and early use of insulin are required. Given the high prevalence of diabetes and cardiovascular risk factors in Arab Americans, strategies focusing on optimization of aspirin and glucose-lowering therapies are imperative for the reduction of cardiovascular burden and other diabetes-related complications.

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