

# Sex Differences in Quality of Health Care Related to Ischemic Heart Disease Prevention in Patients With Diabetes

The Translating Research Into Action for Diabetes (TRIAD) study, 2000–2001

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proportion of men in the health plans. We then calculated the risk difference (and 95% CI) between men and women regarding these predicted probabilities.

**D**iabetes is a greater risk factor for ischemic heart disease (IHD) in women than in men (1,2). In the U.S., IHD-related mortality has declined among men with and without diabetes (3). Among women, a decrease in IHD-related mortality has been observed only for those without diabetes (3). This difference may be attributable to biological (4) and behavioral factors (5) or possibly differences in the quality of health care received (3). We investigated whether there were differences between men and women regarding the quality of health care related to IHD prevention in a population-based cohort of patients with diabetes, aged 20–80 years and sampled from 10 managed care health plans and 68 provider groups in the U.S. (6).

## RESEARCH DESIGN AND METHODS

Participants were surveyed using a standardized computer-assisted telephone interview or self-administered written instrument. Of contacted eligible people, 91% responded to the survey. We examined data from the participants for whom medical records were available to document diabetes care. Interrater reliability ( $\kappa$ ) for the main qual-

ity measures derived from medical record data ranged from 0.85 to 0.92. The quality of diabetes care related to IHD prevention received by patients during a 12-month period was measured by the frequency of selected process of care measurements: 1) current use of aspirin, lipid-lowering medications, and antihypertensive medications (documented by review of the medical records); 2) received recommendation to take aspirin to lower cardiovascular disease (CVD) risk (among those not using aspirin; ascertained by self-report); and 3) received lipid profile testing (among those not using lipid-lowering medications), urine microalbumin/protein testing (among those not using antihypertensive medications), and HbA<sub>1c</sub> testing (documented by medical record review). History of CVD was defined according to self-reported myocardial infarction, stroke, coronary artery bypass, or angioplasty. Hierarchical logistic regression models with random intercepts for health plan, to account for the multilevel study design (health plan, provider group, and patient levels), were used to estimate the predicted probability of receiving each process of care measure after adjusting for the

**RESULTS**— There were 1,302 women and 1,564 men with a CVD history and 3,385 women and 2,506 men without a CVD history. Because women had a history of CVD (27.8%) less often than men (38.4%), analyses were stratified by CVD history. Among patients with a CVD history and patients without a CVD history, as compared with men, women were more likely to be aged >65 years (55.5 vs. 51.6% and 36.5 vs. 31.1%, respectively), to be from U.S. minority racial/ethnic groups (56.6 vs. 50.9% and 61.9 vs. 57.7%), to report less than high school education (33.4 vs. 25.0% and 24.4 vs. 17.6%), to have a diabetes duration  $\geq$ 10 years (59.9 vs. 52.2% and 44.8 vs. 38.1%), and to use insulin alone or in combination with hypoglycemic oral agents (41.4 vs. 33.4% and 30.6 vs. 24.2%, respectively).

As shown in Table 1, most process of care measures, except for lipid profile and HbA<sub>1c</sub> testing, occurred more frequently in patients with CVD. Sex differences in process of care measures, except for urine testing, were similar in patients with and without CVD. Specifically, women were significantly less likely to use aspirin than men, with or without a CVD history. Women were also less likely to be advised to take aspirin; however, the risk differences were statistically significant only among patients without CVD. The use of lipid-lowering medications was significantly less frequent in women among patients with CVD, and lipid profile testing was significantly less frequent in women among patients without CVD. The use of antihypertensive medications was similar in men and women with CVD, but it was significantly more frequent in women

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**Abbreviations:** CVD, cardiovascular disease; IHD, ischemic heart disease.

A table elsewhere in this issue shows conventional and Système International (SI) units and conversion factors for many substances.

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**Table 1—Predicted probabilities and risk differences between men and women for selected treatments and processes of diabetes care received during a 12-month period: the TRIAD study, 2000–2001**

	With CVD				Without CVD			
	Predicted probability		Risk difference (%)	95% CI	Predicted probability		Risk difference (%)	95% CI
	Men (%)	Women (%)			Men (%)	Women (%)		
Aspirin used	39.0	33.2	5.8	2.1–9.4	16.4	14.0	2.4	0.4–4.4
Aspirin advised in those not using aspirin	58.1	55.2	3.0	–2.0 to 8.0	32.5	27.0	5.5	2.6–8.3
Lipid medications used	57.6	51.5	6.1	2.3–9.9	35.9	34.8	1.1	–1.4 to 3.6
Lipid profile tested in those not using lipid medications	54.8	53.2	1.6	–4.2 to 7.4	58.3	54.4	3.9	0.5–7.3
Antihypertensive medications used	86.2	86.4	–0.2	–2.7 to 2.3	66.9	72.0	–5.1	–7.6 to –2.6
Urine microalbumin/protein tested in those not using antihypertensive medications	43.0	40.1	2.9	–6.8 to 12.6	32.3	34.9	–2.6	–7.2 to 1.9
HbA <sub>1c</sub> tested	83.8	81.2	2.6	–0.5 to 5.7	81.8	82.5	–0.7	–2.9 to 1.5

Data are generated from hierarchical logistic regression model accounting for clustering within health plan and adjusted for the proportion of men in the health plans. CVD history defined by self-reported myocardial infarction, stroke, coronary artery bypass, or angioplasty.

among patients without CVD. Urine microalbumin/protein testing was less frequent in women among patients with CVD and more frequent in women among those without CVD, although none of these differences were statistically significant. HbA<sub>1c</sub> testing was slightly less frequent in women than in men among patients with CVD. These results were not altered after adjusting for age, race/ethnicity, education, diabetes treatment, and time since diabetes diagnosis (data not shown).

**CONCLUSIONS**— In our population, nearly 95% of the patients with diabetes were  $\geq 30$  years of age; thus, nearly all patients should have been advised to take aspirin to prevent CVD according to the American Diabetes Association recommendations (7). Nevertheless, we found a surprising underuse of aspirin. Underuse of aspirin has been reported in individuals with CVD (8) and those with diabetes (9), although sex differences in the use of aspirin have been previously observed only among individuals with CVD (8).

Although women with diabetes are more likely to have dyslipidemia than men (10,11), we found that women were less likely to use lipid-lowering medications and to receive a lipid profile. Underuse of lipid-lowering medications among diabetic patients, especially women, has been previously reported (12). It has been reported that women with IHD experience less screening for lipids than men

(13), but no studies have investigated sex differences in lipid testing among patients with diabetes.

The higher predicted probability of being treated with antihypertensive medications observed for women without CVD is consistent with the findings that women with recent diagnosed diabetes are more likely to have hypertension than men (14). Although treatment of microalbuminuria reduces the risk of renal failure and IHD, the predicted probability of being screened was low.

Although the reasons for the sex differences regarding aspirin use or recommendations and use of lipid-lowering medications or lipid testing are unclear, it is possible that clinicians perceive CVD risk to be lower for women than men (15), despite diabetes diagnosis. Given the proven effectiveness of aspirin (16), lipid-lowering therapy (17), and ACE inhibitors (18) in preventing IHD and that diabetes is a substantial IHD risk factor, recommendations to use aspirin and measurements of lipid profile and urine microalbumin/protein should occur more frequently among both men and women.

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