SPECIAL EDITOR
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Does Professional Advice Influence Aspirin Use To Prevent Heart Disease in an HMO Population?

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OBJECTIVE. Aspirin use seems to reduce coronary artery disease events in some groups of patients. Factors associated with use of aspirin to prevent heart disease in an HMO population were examined.

DESIGN. A population-based survey.

SETTING. A large HMO in the midwestern United States.

PARTICIPANTS. 8000 health plan members 40 years of age and older.

MAIN OUTCOME MEASURES. The survey assessed use of aspirin, professional advice to use aspirin, and coronary heart disease risk factors and status. The sample was stratified by whether members had none, one, or more than one of the following chronic conditions: diabetes, hypertension, lipid disorder, or heart disease. The mailed survey had a corrected response rate of 82.4%.

RESULTS. Overall, 38% of respondents reported using aspirin at least three times a week to prevent heart disease. Aspirin use did not vary in owned versus contracted clinics. Aspirin use was 71.3% in patients with and 27.7% in patients without diagnosed coronary heart disease ($P < 0.001$). In logistic regression models, professional advice to take aspirin was strongly associated with self-reported use of aspirin (odds ratio, 13.86) ($P < 0.001$) after adjustment for age, sex, level of education, and chronic disease status.

CONCLUSIONS. Aspirin is widely used by HMO members with coronary artery disease to prevent subsequent coronary artery disease events. Professional advice to use aspirin seems to be strongly related to aspirin use.

Data to support aspirin therapy in the secondary prevention of coronary artery disease events are persuasive both for unstable angina (1–3) and for stable coronary artery disease (4, 5). Diabetic patients who take aspirin also have lower cardiovascular event rates and possibly lower cardiovascular mortality; benefits are greater at lower aspirin doses (6) than at higher doses (7).

However, in groups of patients with lower cardiovascular risk, data to support the efficacy of aspirin therapy in the primary prevention of coronary artery disease events are not yet complete. In the British Doctors' Trial of 5139 men 50 years of age and older, no benefit was obtained with aspirin doses of 500 mg per day (8). In the Physicians' Health Study of 22 071 men 40 years of age and older, a dose of 325 mg of aspirin every other day yielded a 44% reduction in myocardial infarction and no difference in total cardiovascular deaths after an average follow-up of 5 years (9).

The lower the risk for cardiovascular disease in a group of patients, the greater the number that need to be treated for a benefit and the greater the complications of therapy for each adverse event averted. It is useful to think of cardiovascular disease risk as a spectrum that runs from negligible risk of an adverse event to very high risk of an adverse event over a defined period. At some point, a threshold of cardiovascular disease risk can be identified above which aspirin therapy is beneficial but below which it is not beneficial. This threshold is not yet clearly defined. Also undefined is the appropriate dose of aspirin for prevention of coronary artery disease

events, although current studies are focusing on lower doses, such as 100 mg every other day or 75 mg per day. Several large studies that will be reported soon should help clarify the benefit of aspirin in prevention of coronary artery disease events in low-risk groups (10–12).

On the basis of current evidence, aspirin use to prevent future coronary artery disease events in patients with diagnosed coronary artery disease is well justified (1–5). Also justified is aspirin treatment for patients with diabetes (6, 7). Other high-risk groups of patients (such as those with hypertension or dyslipidemia or those who smoke) may benefit, although data are incomplete. Least likely to benefit on the basis of present data are patients at low risk for coronary artery disease events (such as adults with no known cardiovascular risk factors).

Methods

Hypothesis and Design

The study was designed to ascertain the prevalence of aspirin use among HMO members 40 years of age and older and to analyze aspirin use as a function of age; sex; level of education; professional advice to use aspirin; cardiovascular risk factors; and diagnosis of coronary artery disease, diabetes mellitus, hypertension, or dyslipidemia. The purpose of the study was to provide information to the HMO on members' risk for cardiovascular events and to ascertain ways to increase the current use of aspirin in members who might benefit from regular use.

A cross-sectional survey was conducted during the late summer and early fall of 1995 at HealthPartners, a large HMO in the midwestern United States. At the time, the organization had 650 000 members enrolled in owned or contracted clinics. The analyses reported here were designed to explore the a priori, hypothesized, positive association of regular aspirin use with coronary artery disease, other chronic diseases, level of education, and professional advice to use aspirin.

Sample

All members 40 years of age and older who were enrolled in the HMO on 15 December 1994 were categorized by using the International Classification of Diseases, ninth revision (ICD-9) codes. Patients were classified by whether they had a diagnosis of diabetes, heart disease, hypertension, or dyslipidemia in 1994. Heart disease was assigned if the member had one or more of the ICD-9 codes 412 (myocardial infarction), 413.9 (congestive heart failure), 429.2 (angina), or 428.0 (coronary artery disease). Dyslipidemia was assigned if the member had an ICD-9 code of 272.4. Hypertension was assigned if the member had ICD-9 codes 401, 401.1, or 401.9. Diabetes was assigned if the member had any two ICD-9 250 codes or had a prescription filled for diabetes-specific drugs, such as insulin, sulfonylureas, or biguanides. This identification method has an estimated sensitivity of 0.91 and specificity of 0.99 for diabetes and a sensitivity of 0.89 and specificity of 0.99 for heart disease (13). These observations are consistent with the belief that dyslipidemia and hypertension also tend to be underdiagnosed medically (which leads to low sensitivity) but are genuinely present when identified (which leads to high specificity).

By using these criteria, we identified 200 145 members who were 40 years of age or older as having none, one, or more than one of the four chronic diseases. A total of 158 415 members had none of the four chronic conditions; a sample of 3000 of these members (1.89%) was drawn. A total of 34 159 members had one of the four chronic conditions; a sample of 2500 of these members (7.3%) was drawn. A total of 7571 members had two or more of the four chronic conditions; a sample of 2500 of these members (33%) was drawn.

The survey was mailed to the 8000 sampled members in August 1995. A follow-up postcard was sent 7 days later, and a second mailing was sent to nonrespondents on day 21. Those who did not respond to the mailed survey had their responses solicited by up to four telephone calls from the Group Health Foundation's Survey Center. No proxy respondents were permitted. Of the original 8000 members sampled, 533 did not complete the survey because of death, disenrollment, or language barriers and were excluded. The data reported here are based on 6152 respondents who had complete database and survey data for analysis. The corrected response rate for these respondents was 82.4% (6152/7467). The corrected response rate for patients without chronic conditions was 80.1%; for patients with one chronic condition, the response rate was 82.9%; and for patients with more than one chronic condition, the response rate was 84%.

Measures

The 12-page survey contained 60 questions on demographic information, health status, use of preventive services, dental health, health behaviors, and readiness to change health behaviors. The core of the survey items was adapted from the Center for Disease Control and Prevention's Behavioral Risk Factor Surveillance System. The survey tool was pilot-tested in a mail-out, mail-back format, and minor revisions were made on the basis of these results.

Demographic information included sex, age, race, education, and marital status. The education variable was reclassified from a five-level variable (ranging from eighth grade or less to college graduate or more) to a three-level variable: less than high school, high school graduate, and more than high school.

Each survey responder was asked the question: "Have you ever been told by a health professional that

TABLE 1
Characteristics of Survey Respondents

CHARACTERISTIC	PATIENTS (*n* = 6048)	ESTIMATED PERCENTAGE OF ASPIRIN USERS
Mean age (years)	—	58.6
Male sex	2862	46.7
Education		
More than high school	666	10.9
High school graduate	1594	26.1
Less than high school	3842	63.0
Diagnosed heart disease	1246	20.2
Self-reported heart disease	1567	26.3
Diagnosed diabetes	1163	18.9
Diagnosed hypertension	2456	39.9
Diagnosed dyslipidemia	1229	20.0
No diagnosed chronic conditions	2268	36.8
1 diagnosed chronic condition	1944	31.6
2 diagnosed chronic conditions	1702	27.6
3 or more diagnosed chronic conditions	243	3.9
Received professional advice to take aspirin	1898	31.7
Reported regular aspirin use to prevent heart disease	2216	36.5

you have heart disease?" The allowed responses were "yes" or "no." Those who replied "yes" were described in the analysis as having self-reported heart disease. Those who had received a diagnostic ICD-9 code for heart disease in 1994 were described as having diagnosed heart disease in the analysis.

Aspirin use was ascertained on the basis of the question: "In the past 4 weeks, have you used aspirin three or more times a week to prevent heart disease?" Answers were "yes," "no," "unsure," and "prefer not to answer." For purposes of analysis, all "yes" replies were coded as "yes" and all other replies were coded as "no."

Receiving advice from a health professional in the past year was assessed for 10 health behaviors, including exercise, smoking, eating less fat, eating more fruits and vegetables, using seat belts, and using aspirin. The question about professional advice to use aspirin read: "Have you received professional advice to use aspirin to prevent heart disease from…a doctor, nurse, or other health professional?" The answer to this variable was coded as "yes" or "no"; advice from a doctor, a nurse, or any health professional was grouped together as "yes" for analysis.

Analysis

Association of member-reported aspirin use with other variables, including age, sex, chronic disease status, and professional advice to use aspirin, was initially assessed by using chi-square statistics for categorized variables. Multivariate logistic regression models were then constructed to assess the relation of aspirin use (the dependent variable) to independent variables, including age; sex; level of education; presence or absence of coronary artery disease, diabetes, hypertension, or dyslipidemia; and professional advice to use aspirin. Finally, interaction terms were added to the logistic models to assess selected interactions of a priori theoretical interest.

Results

Table 1 shows the characteristics of survey respondents. Compared with survey respondents, nonrespondents were significantly more likely to be members of contracted versus owned clinics (62% vs. 56%), to be men (53% vs. 47%), to be younger (mean age, 54.8 years vs. 58.6 years), and to have fewer chronic conditions.

Both "diagnosed heart disease" and "self-reported heart disease" were strongly associated with self-reported regular use of aspirin (Table 2). Among 1226 patients with diagnosed heart disease, 874 (71.3%) reported regular aspirin use compared with 134 of 4846 (2.7%) patients without diagnosed heart disease (odds ratio [OR], 6.48) ($P < 0.001$). Among 1538 patients with self-reported heart disease, 1063 (69.1%) reported regular aspirin use compared with 1061 of 4359 (24.3%) patients without self-reported heart disease (OR, 6.96) ($P < 0.001$). Bivariate associations of other independent variables with regular aspirin use are presented in Table 2.

There was a strong relation between recalling professional advice to take aspirin and reporting regular aspirin use to prevent heart disease. Among 1873 patients who reported receiving professional advice, 1508 (80.5%) reported aspirin use; among 4042 patients who reported receiving no professional advice, 660 (16.3%) reported aspirin use (OR, 21.2) ($P < 0.001$). Table 3 shows that professional advice to take aspirin was strongly related to aspirin use, regardless of whether a person had heart disease.

Logistic regression models were constructed to further evaluate the association of aspirin use with diagnosed heart disease and with professional advice. After we adjusted for age, sex, and education, professional advice to use aspirin was the factor most strongly relat-

TABLE 2

Association of Various Factors with Patient-Reported Regular Use of Aspirin To Prevent Heart Disease

VARIABLE	PATIENTS	PATIENTS REPORTING REGULAR ASPIRIN USE	*P* VALUE
	n	%	
All participants			<0.001
Men	2829	44.9	
Women	3221	29.1	
Education			<0.001
Less than high school	647	48.4	
High school graduate	1575	38.5	
More than high school	3807	33.7	
Age			<0.001
40–49 years	1684	18.2	
50–59 years	1532	33.9	
60–69 years	1261	45.3	
>70 years	1597	51.2	
Race			<0.009
White	5717	36.9	
Nonwhite	311	29.6	
Recalled receiving professional advice	1873	80.5	<0.001
Did not recall receiving professional advice	4047	16.3	
Diagnosed heart disease	1226	71.3	<0.001
No diagnosed heart disease	4846	2.7	
Self-reported heart disease	1538	69.1	<0.001
No self-reported heart disease	4359	24.3	
Diagnosed diabetes	1143	44.8	<0.001
No diagnosed diabetes	4929	34.6	
Diagnosed hypertension	2422	44.0	<0.001
No diagnosed hypertension	3650	31.5	
Diagnosed dyslipidemia	1218	51.8	<0.001
No diagnosed dyslipidemia	4854	32.6	
Chronic conditions			<0.001
None	2237	18.0	
1	1914	37.7	
2	1682	54.9	
3 or more	238	70.2	

ed to aspirin use (OR, 13.9) ($P < 0.001$), followed by diagnosed heart disease (OR, 1.73) ($P < 0.001$).

Additional logistic models showed that after we adjusted for all other independent variables, attending an HMO-owned clinic or an HMO-contracted clinic was not associated with aspirin use (OR, 0.94) ($P > 0.2$). After we adjusted for other variables, different chronic diseases seemed to be very differently related to likelihood of aspirin use. Diagnosis of heart disease (OR, 2.17) ($P < 0.001$) or dyslipidemia (OR, 1.57) ($P < 0.001$) was associated with a significantly greater likelihood of aspirin use. Diagnosis of hypertension was not associated with increased or decreased aspirin use (OR, 1.12) ($P = 0.12$), and persons who had diagnosed diabetes were actually less likely to use aspirin than those who did not have diabetes (OR, 0.78) ($P = 0.015$). Current smokers had a greater likelihood of aspirin use than nonsmokers (OR, 1.31) ($P < 0.008$), and men were more likely than women to report aspirin use (OR, 1.69) ($P < 0.001$). Logistic models were used to evaluate the interaction between level of education and professional advice to use aspirin, which was not significant (OR, 1.03) ($P > 0.2$). The interaction between professional advice to use aspirin and diagnosed heart disease was also not significant after adjustment for other independent variables (OR, 1.03) ($P > 0.2$). Table 4 shows that similar results were obtained when self-reported heart disease was included in the logistic regression model.

Discussion

Aspirin Use in Patients with Known Heart Disease

Professional advice to use aspirin seems to be strongly related to self-reported regular use of aspirin to prevent heart disease. Among patients with physician-diagnosed or self-reported heart disease, professional advice to use aspirin was associated with a 55% to 60% increase in self-reported aspirin use. The 88% of heart disease patients who reported using aspirin and recall receiving professional advice to use aspirin probably represent almost all patients who do not have a relative contraindication to aspirin use, although specific data on contraindications to aspirin use were not collected in the survey.

The prevention of heart disease in high-risk patients can still be improved, however. About 29% of patients with physician-diagnosed heart disease did not recall receiving professional advice to take aspirin. Some patients may not remember being given advice about aspirin use, and others may not have been advised to use aspirin because of relative contraindications (14–16). However, one third of the patients in this group seemed to tolerate an aspirin regimen that was probably individually initiated, which suggests that some patients who might tolerate aspirin and benefit from it have not yet been advised to use it.

Aspirin Use in Patients with Diabetes

Among patients with diabetes, rates of aspirin use were unexpectedly low. In fact, patients with diabetes reported lower rates of aspirin use than did patients with no chronic diseases. This is surprising, because diabetes is a condition in which aspirin use has been reported to be beneficial (6, 7). These data clearly demonstrate the potential benefit of more widespread use of aspirin in patients with diabetes, although clinical decisions need to be individualized. Other data suggest that patients with diabetes have more adverse behavioral risk profiles than patients with other chronic diseases and are less

TABLE 3

Percentage of Members with Physician-Diagnosed Heart Disease Who Used Aspirin Regularly and Reported Receiving Professional Advice To Take Aspirin

DIAGNOSED HEART DISEASE	RECEIVED PROFESSIONAL ADVICE TO TAKE ASPIRIN	USE ASPIRIN REGULARLY	COUNT (n = 5918)	TOTAL	USE ASPIRIN REGULARLY
				n	%
No	No	No	3154		
		Yes	550	3704	14.8
	Yes	No	266		
		Yes	759	1025	74.0
Yes	No	No	231		
		Yes	110	341	32.3
	Yes	No	99		
		Yes	749	848	88.3

TABLE 4

Association of Various Independent Variables with the Dependent Variable of Self-Reported Regular Use of Aspirin To Prevent Heart Disease

INDEPENDENT VARIABLE	*P* VALUE	ODDS RATIO	INTERPRETATION
Age	<0.001	1.02	Older persons use more
Sex	>0.2	1.70	Women use less
Level of education	<0.001	1.02	Education has no effect
Self-reported heart disease	<0.001	2.36	Persons with self-reported heart disease use more
Received professional advice to use aspirin	<0.001	12.59	Persons who received advice use more
Diagnosed diabetes	<0.001	0.69	Persons with diabetes use less
Number of risk factors	<0.001	1.28	Persons with increased risk factors use more

willing to change these factors (17). If these attitudes and practices extend to aspirin use, special strategies or efforts may be needed to support behavior changes in patients with diabetes.

Aspirin Use in Patients with Other Conditions

A diagnosis of dyslipidemia increased the likelihood of aspirin use, but patients with hypertension were no more likely to use aspirin regularly than were patients with no chronic diseases. Likelihood of aspirin use did increase significantly with the number of chronic diseases a patient had.

Among members with no chronic diseases, about 21.7% reported receiving professional advice to use aspirin to prevent heart disease. Little current data support this practice. Among those who did not receive professional advice to use aspirin, 14.8% reported aspirin use; among those who did receive professional advice, 74% reported regular use. This shows the effect of physician advice, even in a situation when the advice may be somewhat in advance of the data.

Cost Considerations

The price of aspirin therapy compares favorably with the price of blood pressure control and dyslipidemia control, which sometimes involve expensive pharmacologic agents. If aspirin therapy, estrogen therapy, nutrition therapy, and increased physical activity were widely applied, the proportion of adults with significant cardiovascular risk (risk for cardiovascular event or death >5% within 10 years) would decrease substantially, perhaps by as much as 45% according to a recent analysis (18, 19). In the United States, this decline could yield savings of up to $3 billion per year on lipid-lowering medications alone, in addition to savings from reduced cardiovascular events and their associated medical costs. It is not surprising, therefore, that managed care organizations and national health authorities are enthusiastic about aspirin use to reduce cardiovascular risk on a population basis.

Additional Implications

Potential adverse effects of aspirin therapy (including risk for peptic ulcer disease, hemorrhagic stroke, extracranial bleeding, retinal hemorrhage, and adverse renal effects) must also be considered. The risk for adverse effects of aspirin (even with small, regular doses) and simple ways to identify and minimize these risks need further consideration (14–16).

The data presented here provide some useful clues for physicians who may wish to design intervention programs to increase aspirin use in adults 40 years of age and older. First, for those with and for those without heart disease, professional advice seems to be the factor most strongly associated with regular use of aspirin and may be associated with a 50% to 60% increase in aspirin use. Second, in both the primary prevention and sec-

ondary prevention populations, women are much less likely than men to use aspirin. This difference deserves further attention. Third, although a diagnosis of heart disease is associated with more aspirin use, patients with diagnosed diabetes seem to be less likely to use aspirin than those without diabetes. Thus, special attention might be directed to patients with diabetes in an effort to increase their use of aspirin.

The observation that smokers were more likely than nonsmokers to use aspirin will not surprise clinicians. Many tobacco-addicted patients seek creative ways to compensate for their increased occlusive vascular disease risk from ongoing tobacco use. It would be interesting to compare the adherence of smokers and nonsmokers who have dyslipidemia or hypertension to prescribed medical regimens for those conditions. Smokers who seek to lower their cardiovascular risk in other areas may be responsive to specially tailored behavior-change strategies that target smoking (20).

This study has several limitations. The data on aspirin use and on professional advice to use aspirin were self-reported, and recall bias or other factors may influence such reports (21). Furthermore, the study was conducted among patients from many clinics, but all were enrolled in a single HMO in a single metropolitan area, which limits the generalizability of the results. Despite these limitations, the results provide useful information that helps to identify both the need for focused cardiovascular risk factor reduction and methods that may be effective in reaching this goal.

References

1. Collaborative overview of randomised trials of antiplatelet therapy–I: Prevention of death, myocardial infarction, and stroke by prolonged antiplatelet therapy in various categories of patients. Antiplatelet Trialists' Collaboration. BMJ. 1994;308:81-106.

2. Risk of myocardial infarction and death during treatment with low dose aspirin and intravenous heparin in men with unstable coronary artery disease. The RISC Group. Lancet. 1990;336:827-30.

3. Cairns JA, Gent M, Singer J, et al. Aspirin, sulfinpyrazone, or both in unstable angina. Results of a Canadian multicenter trial. N Engl J Med. 1985;313:1369-75.

4. Juul-Moller S, Edvardsson N, Jahnmatz B, Rosen A, Sorensen S, Omblus R. Double-blind trial of aspirin in primary prevention of myocardial infarction in patients with stable chronic angina pectoris. The Swedish Angina Pectoris Aspirin Trial (SAPAT) Group. Lancet. 1992;340:1421-5.

5. Ridker PM, Manson JE, Gaziano JM, Buring JE, Hennekens CH. Low-dose aspirin therapy for chronic stable angina. A randomized, placebo-controlled clinical trial. Ann Intern Med. 1991;114:835-9.

6. Morrish NJ, Stevens LK, Head J, Fuller JH, Jarrett RJ, Keen H. A prospective study of mortality among middle-aged diabetic patients (the London Cohort of the WHO Multinational Study of Vascular Disease in Diabetics) I: Causes and death rates. Diabetologia. 1990;33:538-41.

7. Aspirin effects on mortality and morbidity in patients with diabetes mellitus. Early Treatment Diabetic Retinopathy Study report 14. ETDRS Investigators. JAMA. 1992;268:1292-300.

8. Peto R, Gray R, Collins R, et al. Randomised trial of prophylactic daily aspirin in British male doctors. BMJ. 1988;296:313-6.

9. Final report on the aspirin component of the ongoing Physicians' Health Study. Steering Committee of the Physicians' Health Study Research Group. N Engl J Med. 1989;321:129-35.

10. Manson JE, Stampfer MJ, Colditz GA, et al. A prospective study of aspirin use and primary prevention of cardiovascular disease in women. JAMA. 1991;266:521-7.

11. Meade TW. Low-dose warfarin and low-dose aspirin in the primary prevention of ischemic heart disease. Am J Cardiol. 1990;65:7C-11C.

12. Patrono C. Aspirin as an antiplatelet drug. N Engl J Med. 1994;330:1287-94.

13. O'Connor PJ, Rush WA, Pronk NP, Cherney LM. Identifying diabetes mellitus or heart disease among health maintenance organization members: sensitivity, specificity, predictive value, and cost of survey and database methods. Am J Manag Care. 1998;4:335-42.

14. Weil J, Colin-Jones D, Langman M, et al. Prophylactic aspirin and risk of peptic ulcer bleeding. BMJ. 1995;310:827-30.

15. Sturmer T, Glynn RJ, Field TS, Taylor JO, Hennekens CH. Aspirin use and cognitive function in the elderly. Am J Epidemiol. 1996;143:683-91.

16. Roderick PJ, Wilkes HC, Meade TW. The gastrointestinal toxicity of aspirin: an overview of randomised controlled trials. Br J Clin Pharmacol. 1993;35:219-26.

17. Boyle RG, O'Connor PJ, Pronk NP, Tan A. Stages of change for physical activity, diet, and smoking among HMO members with chronic conditions. Am J Health Promot. 1998;12:170-5.

18. Yudkin JS. How can we best prolong life? Benefits of coronary risk factor reduction in non-diabetic and diabetic subjects. BMJ. 1993;306:1313-8.

19. Avins AL, Browner WS. Lowering risk without lowering cholesterol: implications for national cholesterol policy. Ann Intern Med. 1996;125:502-6.

20. Haynes RB, McKibbon KA, Kanani R. Systematic review of randomised trials of interventions to assist patients to follow prescriptions for medications. Lancet. 1996;348:383-6.

21. Burney KD, Krishnan K, Ruffin MT, Zhang D, Brenner DE. Adherence to single daily dose of aspirin in a chemoprevention trial. An evaluation of self-report and microelectronic monitoring. Arch Fam Med. 1996;5:297-300.

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