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Aspirin Use and Awareness for Cardiovascular Disease Prevention Among Hispanics: Prevalence and Associations with Health Behavior Beliefs

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Abstract

Cardiovascular disease (CVD) persists as the leading cause of death and disability in many Americans including Hispanics. Primary prevention for CVD may be achieved through regular aspirin use in high risk individuals. This study examined regular aspirin use and specific attitudes and social norms toward CVD and aspirin use within an urban Hispanic population in Minnesota. A sample of primary prevention Hispanics aged 45–79 years were surveyed about CVD history and risk factors, aspirin use, demographic characteristics, and health beliefs and social norms in relation to CVD and aspirin. Relative risk estimation using Poisson regression with robust error variance was used to examine associations with aspirin use. In this sample of 152 Hispanics (55% women), the mean age was 53 years, 70% had a regular healthcare provider, and 22% used aspirin. Aspirin discussions with a regular healthcare provider were strongly associated with aspirin use (adjusted risk ratio 3.02, 95% CI 1.20–7.60). There was a positive association between health beliefs and social norms that affirm preventive behaviors and aspirin use (adjusted linear risk ratio 1.23, 95% CI 1.04–1.45) while uncertainty about the role of aspirin for individual use and in the community was negatively associated with aspirin use (adjusted linear risk ratio 0.85, 95% CI 0.70–1.03). This growing population may benefit from health education about CVD risk and the role of aspirin in prevention.

Keywords Aspirin · Prevention · Cardiovascular disease · Hispanics · Health behavior

Introduction

Cardiovascular disease (CVD) persists as a major public health issue within the United States and continues to be the leading cause of death and disability. [1] In the Hispanic population, CVD is the most common cause of death, but mortality rates are lower compared to non-Hispanic Whites. [1] In health literature, this has been described as the Hispanic paradox since Hispanics are more likely to experience traditional CVD risk factors such as diabetes, hypercholesterolemia, physical inactivity and lower socioeconomic status, [2–4] which makes the reasons for the lower mortality rates unclear.

One recommended strategy to prevent CVD is the use of low dose aspirin. Aspirin works to prevent heart attacks and strokes through inhibiting platelet aggregation and preventing thrombotic cardiovascular events. It is a low cost, easily accessible option for CVD prevention. The United States Preventive Services Task Force (USPSTF) 2016 recommendations state that adults between the ages of 50–69 who

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have not suffered a CVD event (primary prevention) should consider regular aspirin use in the setting of elevated risk for a CVD event ($\geq 10\%$ 10-year CVD risk) and low bleeding risk; [5] however, recent studies have questioned aspirin use being appropriate for primary prevention due to concerns of overuse, bleeding risks, and the harms potentially outweighing the possible benefits. [6–9] Secondary prevention aspirin use in those who have experienced a prior CVD event is a well-established therapy. Although aspirin recommendations have been in place for many years, regular primary prevention aspirin use in those with moderate to high risk is suboptimal, with little impact from guideline publications. [10] In addition, the use of aspirin as a cardiovascular preventive medication differs greatly among different racial and ethnic populations [11–18], yet little is known about why this variation exists.

Previous studies looking at preventive aspirin use in Hispanic populations are limited and vary in their scientific approaches [11–19]. Overall, Hispanics have lower rates of aspirin use when compared to non-Hispanic Whites, [11–18] which may illustrate a population in need of increased education about appropriate aspirin use. Potential barriers to dissemination of public health information include limited materials in the appropriate primary language, lower health literacy and a deficiency in cultural competency on the part of the educators.

This study examined CVD risk and aspirin use patterns among an urban Hispanic population and investigated associations between demographic characteristics, physician-related aspirin discussions, and health behavior beliefs and social norms with regular aspirin use for primary prevention.

Methods

Study Population

A survey was administered from April to July 2017 in the Minneapolis- Saint Paul metropolitan areas. Men and women ages 45–79 years who identified as a race other than White were recruited with the help of community health workers with prior experience working in communities of color. Recruitment sites included churches, gyms, public events (community and health fairs), senior housing and community centers. All eligible individuals gave verbal informed consent, and were offered a \$10 gift card to participate.

Survey data were collected from a total of 797 individuals. For this analysis, only participants who identified themselves as Hispanic were included ($n = 198$). Participants residing outside of Minnesota ($n = 6$), missing aspirin use information ($n = 5$), or having a previous CVD history ($n = 35$) were excluded. This resulted in a final sample of 152

Hispanic primary prevention participants. The University of Minnesota Institutional Review Board (IRB) evaluated and approved this study.

Data Collection/Definitions

Qualified community health workers administered a 10-min, in-person survey to individuals meeting the study criteria. The survey was conducted in English or Spanish depending on participant preference. Overall, 114 out of 797 surveys (14.3%) were administered in Spanish, of which 77 out of 152 (50.7%) are included in this analysis. The survey queried information on demographics, CVD history, CVD risk factors—diabetes mellitus, hyperlipidemia, hypertension, and smoking status (current, former, never)—aspirin use, health care provider information, and health behavior beliefs and social norms. A history of CVD was defined as the self-reported history of a heart attack, stroke, or peripheral artery disease, or an endovascular or surgical procedure to revascularize coronary, carotid, or limb arteries. All referrals to aspirin use in this manuscript assumes self-reported regular aspirin use, defined as daily or every other day use in order to prevent a heart attack or stroke. Aspirin contraindications included a self-reported history of a gastrointestinal bleed/peptic ulcer, an aspirin allergy, or other antithrombotic use such as warfarin or clopidogrel.

Health behavior beliefs and social norms were examined through nine questions formulated on the theory of planned behavior. [20] Questions based on this theory have been used to evaluate health behaviors related to CVD and aspirin use in prior studies. [21–24] The nine health behavior belief questions examined CVD risk perceptions and aspirin beliefs/perceptions using a 4-point Likert scale: “Strongly Agree”, “Agree”, “Disagree”, and “Strongly Disagree”. Participants could respond with “Don’t Know” as well. For this analysis, “Strongly Agree” and “Agree” were grouped together as one category (“Agree”), and “Strongly Disagree” and “Disagree” were combined to form another category (“Disagree”).

Statistical Analysis

Categorical variables are presented as frequency (percent); age is presented as mean \pm standard deviation (SD).

Since aspirin use was a common outcome in this sample ($> 10\%$), relative risk estimation using Poisson regression with robust error variance estimation [25] was used to examine age-adjusted, univariate associations between demographic characteristics and cardiovascular risk factors and aspirin use. Those variables associated with aspirin use were then included in a multivariable model.

For the health behavior belief questions, the proportion of “Agree”, “Disagree” and “Don’t Know” responses to

each of the nine questions are presented; aspirin use was recorded for each category. Poisson regression was used to examine the age-adjusted and multivariable associations of total number of "Agree" and "Don't Know" responses with aspirin use. The total number of "Agree" and "Don't Know" responses were modeled as tertiles and as a linear variable. A sensitivity analysis was performed that excluded those who had any aspirin contraindications. All analyses were performed using Stata version 15 (Stata Corp, College Station, Texas, USA).

Results

The characteristics of the Hispanic participants are shown in Table 1. Mean age was 53 years; over half were 45–49 years old. The sample consisted of 55% women. Almost half of the Hispanic participants were married and did not graduate from high school. Many of the individuals (40%) had no self-reported CVD risk factors, and 70% reported having a regular healthcare provider.

Aspirin Use Prevalence and Associations

In this sample, 33 out of 152 participants (22%) were regular aspirin users. There were several factors associated with aspirin use in the age-adjusted models (Table 2). Increasing age and more cardiovascular risk factors (diabetes, hyperlipidemia, and hypertension) were positively associated with aspirin use. The strongest associations with aspirin were seen in participants with ≥ 3 CVD risk factors compared to no risk factors (risk ratio—RR 5.23, 95% CI 2.07–13.22) and those who had an aspirin discussion with a health care provider (RR 4.19, 95% CI 1.83–9.56). The final multivariable model included age, diabetes, hyperlipidemia, hypertension, smoking status, and any aspirin discussion with a health care provider (Table 2). After adjustment, all of the positive associations of each variable in the model were attenuated, although any aspirin discussion with a health care provider still had a strong association (adjusted RR 3.02, 95% CI 1.20–7.60).

Two sensitivity analyses were performed. The first analysis excluded those who had any aspirin contraindications ($n = 25$) and the second adjusted for the number of CVD risk factors instead of each CVD risk factor separately. The results in both analyses were similar to the primary analysis (data not shown).

Attitudes and Social Norms Toward CVD and Aspirin

The responses to the attitudes and social norms toward CVD and aspirin questions are shown in Fig. 1. An "Agree" response was the most common, but many participants chose

Table 1 Characteristics of primary prevention Hispanic participants ($n = 152$)

Demographics	
Age, years	53.0 \pm 8.6
45–49	84 (55.3)
50–59	34 (22.4)
60–69	24 (15.8)
70–79	10 (6.6)
Sex	
Women	83 (54.6)
Men	42 (27.6)
Unknown	27 (17.8)
Education	
<High school graduate	73 (48.0)
High school graduate	25 (16.5)
Some college	32 (21.1)
College graduate/graduate school	18 (11.8)
Other	4 (2.6)
Marital status	
Married	72 (47.4)
Single	26 (17.1)
Divorced	22 (14.5)
Separated	15 (9.9)
Widowed	9 (5.9)
Other	8 (5.3)
Risk factors	
Diabetes	57 (37.5)
Hyperlipidemia	43 (28.3)
Hypertension	56 (36.8)
Smoking status	
Never	110 (72.4)
Former	21 (13.8)
Current	21 (13.8)
Number of risk factors	
None	60 (39.5)
1	37 (24.3)
2	29 (19.1)
3–4	26 (17.1)
Aspirin contraindications	
Gastrointestinal bleed/peptic ulcer	11 (7.2)
Aspirin allergy	4 (2.6)
Anticoagulant use	14 (9.2)
Any contraindications	25 (16.5)
Health provider inquiries	
Regular health care provider	106 (69.7)
Any aspirin discussion with provider	64 (42.1)
Survey administered in Spanish	77 (57.7)

Data are presented as n (%) for categorical variables and as mean \pm standard deviation for age as a continuous variable

Table 2 Age-adjusted and multivariable-adjusted associations of regular aspirin use with demographics and cardiovascular risk factors in Hispanic primary prevention participants

	N	Regular aspirin use n (%)	Age-adjusted RR (95% CI)	Multivariable RR (95% CI)
Overall	152	33 (22%)		
Age, years			1.06 (1.03–1.08)	1.02 (0.99–1.05)
45–49	84	10 (12%)	1 (Reference)	
50–59	34	10 (29%)	2.47 (1.13–5.41)	
60–69	24	8 (33%)	2.80 (1.24–6.32)	
70–79	10	5 (50%)	4.20 (1.79–9.85)	
Sex				
Women	83	12 (14%)	1 (Reference)	
Men	42	14 (33%)	1.82 (0.92–3.59)	
Unknown	27	7 (26%)	1.67 (0.75–3.70)	
Education				
<High school graduate	73	14 (19%)	0.91 (0.36–2.34)	
High school graduate	25	4 (16%)	0.94 (0.28–3.18)	
Some college	32	11 (34%)	1.60 (0.61–4.19)	
College degree/graduate school	18	4 (22%)	1 (Reference)	
Other	4	0 (0%)	–	
Marital status				
Married	72	17 (24%)	1 (Reference)	
Single	26	5 (19%)	0.75 (0.33–1.71)	
Divorced	22	4 (18%)	0.71 (0.27–1.84)	
Separated	15	1 (7%)	0.20 (0.03–1.42)	
Widowed	9	6 (67%)	1.80 (1.01–3.21)	
Other	8	0 (0%)	–	
Diabetes				
Yes	57	22 (39%)	2.71 (1.43–5.13)	1.43 (0.72–2.85)
No	95	11 (12%)	1 (Reference)	1 (Reference)
Hyperlipidemia				
Yes	43	18 (42%)	2.32 (1.23–4.36)	1.66 (0.93–2.96)
No	109	15 (14%)	1 (Reference)	1 (Reference)
Hypertension				
Yes	56	22 (39%)	2.62 (1.33–5.18)	1.27 (0.63–2.57)
No	96	11 (11%)	1 (Reference)	1 (Reference)
Smoking status				
Never	110	19 (17%)	1 (Reference)	1 (Reference)
Former	21	9 (43%)	1.91 (1.05–3.49)	1.44 (0.90–2.32)
Current	21	5 (24%)	1.11 (0.46–2.66)	1.13 (0.49–2.62)
Number of risk factors				
None	60	5 (8%)	1 (Reference)	
1	37	6 (16%)	1.85 (0.60–5.64)	
2	29	7 (24%)	2.34 (0.83–6.60)	
3–4	26	15 (58%)	5.23 (2.07–13.22)	
Regular health care provider				
Yes	106	28 (26%)	1.94 (0.79–4.81)	
No	46	5 (11%)	1 (Reference)	
Any aspirin discussion with provider				
Yes	64	26 (41%)	4.19 (1.83–9.56)	3.02 (1.20–7.60)
No	88	7 (8%)	1 (Reference)	1 (Reference)

RR risk ratio, CI confidence interval

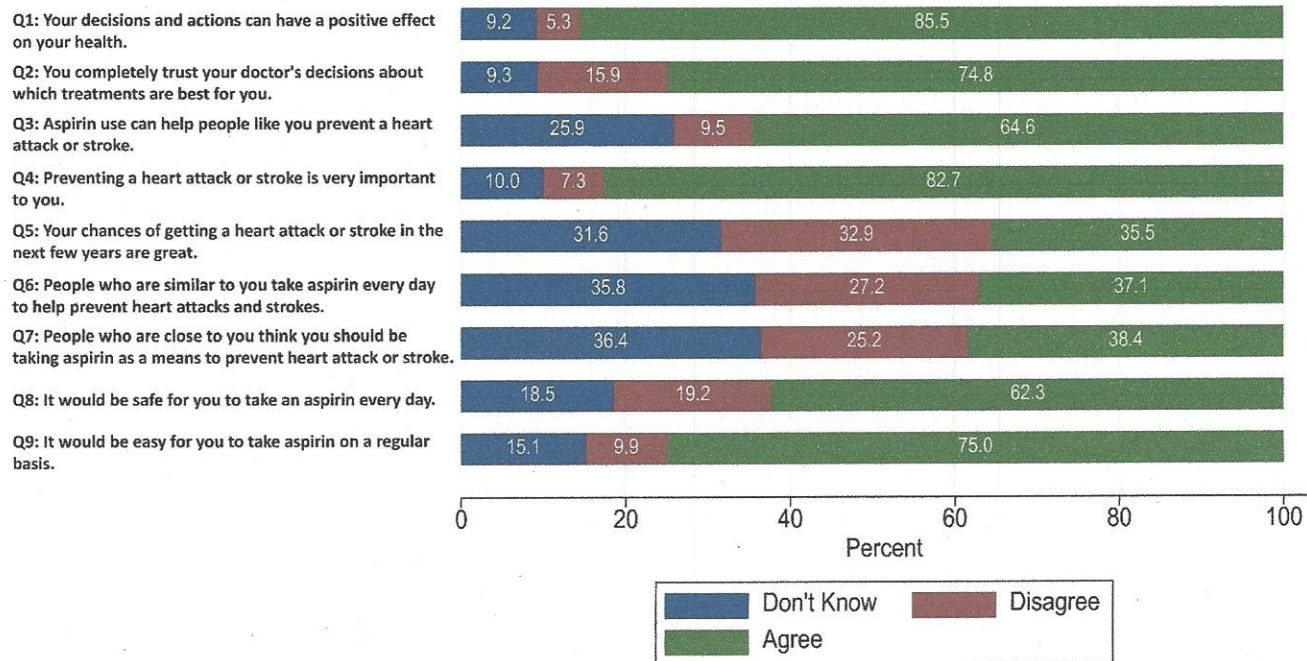


Fig. 1 Health behavior question responses in Hispanic primary prevention participants

“Don’t Know”, especially for the questions pertaining to aspirin use (Q3, Q6–Q9). Over one quarter of participants answered “Don’t Know” in response to questions about aspirin effectiveness (Q3) and social norms around aspirin use (Q6–7). Aspirin use was highest in the participants who answered “Agree” compared to other responses (Table S1).

In Table 3, the number of “Agree” responses (possible range 0–9) was positively associated with aspirin use in the multivariable model (linear RR 1.23, 95% CI

1.04–1.45). The number of “Don’t Know” responses was negatively associated with aspirin use after age adjustment (linear RR 0.77, 95% CI 0.63–0.93). This association was attenuated in the multivariable model (linear RR 0.85, 95% CI 0.70–1.03). Similar results were found in sensitivity analyses excluding those who had any aspirin contraindications and adjusting for the number of CVD risk factors instead of each CVD risk factor separately (data not shown).

Table 3 Age and multivariable-adjusted associations of regular aspirin use with number of “Agree” and “Don’t Know” responses to health behavior questions in Hispanic primary prevention participants

	N	Number of "Agree" Responses			N	Number of "Don't Know" Responses			
		Regular aspirin use	Age-adjusted	Multivariable		Regular aspirin use	Age-adjusted	Multivariable	
		n (%)	RR (95% CI)	RR (95% CI)		n (%)	RR (95% CI)	RR (95% CI)	
Tertile 1 (<5)	51	4 (8%)	1 (reference)	1 (reference)	Tertile 1 (0)	66	21 (32%)	1 (reference)	1 (reference)
Tertile 2 (5–6)	48	6 (13%)	1.43 (0.42–4.83)	1.00 (0.32–3.13)	Tertile 2 (1–3)	52	9 (17%)	0.56 (0.29–1.08)	0.83 (0.41–1.67)
Tertile 3 (7–9)	53	23 (43%)	4.46 (1.65–12.10)	2.91 (1.05–8.10)	Tertile 3 (4–9)	34	3 (9%)	0.30 (0.09–0.97)	0.51 (0.15–1.67)
Linear	152	33 (22%)	1.36 (1.18–1.57)	1.23 (1.04–1.45)	Linear	152	33 (22%)	0.77 (0.63–0.93)	0.85 (0.70–1.03)

Multivariable regression adjusted for age (as a continuous variable), diabetes, hyperlipidemia, hypertension, smoking status, and any aspirin discussion with a health care provider

RR risk ratio, CI confidence interval

Discussion

In this survey of urban Hispanics from Minnesota, regular aspirin use and attitudes and social norms towards CVD prevention and aspirin were examined within primary prevention participants. Overall, preventative aspirin use was low in this relatively young sample with few CVD risk factors. An aspirin discussion with a health provider was associated with aspirin use after adjustment for age and other CVD risk factors. In addition, those who answered "Agree" to personal and social perspectives on prevention and aspirin use were associated with aspirin use. Many participants were uncertain about the role of aspirin for themselves and their community, and this uncertainty was negatively associated with aspirin use.

Hispanic Aspirin Use

The results seen in this study are similar to previous studies in the literature and illustrate suboptimal use of aspirin in Hispanic populations. [11–19] Any minor differences in aspirin use between these studies may be due to different survey methodologies, different study objectives, different CVD definition criteria to determine a primary prevention sample, and different age ranges of participants, with some having younger individuals before the age of 45 included in their study sample. [11, 12, 15–19] Younger individuals (less than 50 years) are currently not recommended for aspirin use by the USPSTF due to their low risk, although the recent AHA/ACC 2019 guideline recommendations include individuals as young as 40 years. [26] In this study, close to half of the analytic sample were below 50 years old, and almost 40% of individuals did not have any CVD risk factors. While there are concerns of aspirin overuse in low risk individuals and suboptimal aspirin use in high risk individuals, this study suggests that overuse is uncommon in young people and those with few CVD risk factors.

Health Provider Discussion About Aspirin

In this study, we found that a discussion about aspirin with a healthcare provider was associated with aspirin use in multivariable modeling. Two other studies also identified the importance of a healthcare provider discussion in recommending aspirin use. [15, 16] A healthcare provider has the potential to be a strong influence for recommending appropriate preventive aspirin use. In one study, physician recommended aspirin use was much higher than self-initiated aspirin use (20% and 3%, respectively). [16] In this sample, 70% of participants had a regular healthcare provider, which is lower than what was seen in African Americans (> 90%)

from a similar geographic area. [24] Enabling and improving access to a regular healthcare provider for Hispanics may allow the possibility of more aspirin discussions to take place within healthcare settings.

Attitudes and Social Norms Toward CVD and Aspirin

Attitudes and social norms toward CVD and aspirin use have not been studied extensively, especially in Hispanics. The results of this study illustrate the need for education to increase CVD awareness and aspirin's role in CVD prevention. Previous studies have shown that racial disparities exist for CVD awareness, with Hispanics more likely to have lower awareness about CVD (heart disease and/or stroke) [27, 28, 29–36, 37–40] compared to non-Hispanic Whites. A number of issues may affect attitudes and social norms toward aspirin use. Language barriers may exist such as limited English fluency and proficiency or a low health literacy may contribute to ethnic disparities for aspirin and CVD awareness. [31, 33, 34, 38, 41–43] The use of bilingual services and translation of education materials may help in limiting such a barrier. In addition, Hispanic culture needs to be considered and incorporated into any process as traditional outreach methods and programs may not be as effective if they are not tailored specifically to the population to be studied. [36] Finally, a key barrier to both aspirin and CVD awareness is related to confusion in the media, [37] where the media spin of treatment studies may affect an individual's interpretation of the study results. [44].

Strengths/Limitations

This study has several strengths and limitations. The inclusion of health behavior beliefs and social norm questions provided a greater insight into a participant's health education and awareness. This small Hispanic sample from Minnesota may not be widely generalizable to other Hispanic populations throughout the rest of the United States. However, the aspirin use results seen in this study appear to be consistent with previous studies. A bias may exist by surveying participants at community-based sites, as those who are less engaged in the community would not be represented in this sample. Since many of the screening locations were health-based, there is a likelihood that those who were surveyed may be healthier or more interested in their health than those who did not attend these events. Self-reported information about medical history and medication use could not be adjudicated, but there is plausible evidence that supports the accuracy of self-reported aspirin use. [45] We were unable to calculate a CVD risk score in order to determine if an individual was at a high, moderate or low risk for a CVD event. Treating Hispanics as one homogenous group may underestimate any disparities in aspirin use within specific

Hispanic/Latino subgroups, but a previous study found aspirin use to be similar across subgroups in individuals at high risk for a CVD event [19].

Conclusion

This study investigated aspirin use and the health beliefs and perceptions of CVD risk and aspirin in an urban Hispanic population. Overall, an aspirin discussion with a health provider was associated with increased aspirin use, and health behavior responses to CVD and aspirin-related questions also played a role in aspirin use. This growing population may benefit from health education about CVD risk and the role of aspirin in prevention.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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