

# Educating Underserved Latino Communities about Family Health History Using Lay Health Advisors

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## Key Words

Family health history · Health disparities · Latinos · Lay health advisors

## Abstract

**Background:** Family health history (FHH) is a tool used to inform individuals about inherited disease risk. Due to their disproportionate morbidity and mortality from some common chronic diseases, U.S. Latinos are an important audience for FHH information. This study examined the effects of a culturally-tailored intervention led by lay health advisors (LHAs) in delivering information about FHH on participants' intentions, self-efficacy, and conceptual knowledge. **Methods:** 474 Spanish-speaking Latino participants were enrolled in the study. Individuals in the intervention group participated in a single group educational session using discussion and interactive activities to build skills for discussing FHH with one's family members and doctor, while individuals in the comparison group had a brochure read aloud to them. Pre- and post-test questionnaires were verbally administered. **Results:** Primary dependent variables were intentions and self-efficacy to discuss FHH with family members and doctors; these increased in both groups. Multivariate analyses demonstrated that the intervention led to a significantly

greater increase in self-efficacy to discuss FHH with family members ( $p = 0.03$ ). LHA participants were also more than twice as likely ( $OR = 2.6$ , 95%  $CI = 1.3–5.0$ ) to correctly understand the purpose of a FHH and found FHH information more useful ( $p < 0.0001$ ). **Conclusions:** A communication intervention delivered by LHAs shows promise as an effective means of educating underserved Spanish-speaking Latinos about the importance of FHH for disease prevention. Such community-based approaches can help to close knowledge and skills gaps about FHH and increase confidence in using this information to improve the health of those most at risk.

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As our understanding of the genomic basis of common, complex diseases advances, there is a pressing need for lay individuals to have access to information about both the inherited and environmental factors that might place them at risk for developing these diseases. In the future, as genetic testing becomes more widely adopted, health care providers will likely be able to provide individuals with personalized genetic susceptibility information for multiple diseases with the goal of motivating them to engage in preventive behaviors [1]. At present, however, family health history (FHH) serves as an acces-

sible public health genomics tool that can inform individuals about both inherited and shared environmental risks [2, 3].

In recognition of the usefulness of family history information in disease prevention, nationwide initiatives have been launched to educate U.S. adults about FHH. These initiatives encourage adults to collect this information and share it with health care providers to gain a deeper understanding of their personal disease risks [4]. However, awareness of FHH and use of related tools is still relatively low in the U.S. [5]. Furthermore, linguistic and cultural barriers could slow the dissemination of this information to underserved populations, such as recent immigrants. Development of culturally competent methods for educating individuals about genomic risk and family history is therefore critical to preventing a divide between those who have access to information about their inherited risk and those who do not.

Latinos are a particularly important audience for culturally competent family history initiatives as they constitute the largest and fastest growing minority group in the U.S. They also face greater morbidity and mortality burdens from chronic diseases, such as diabetes, when compared to non-Latino whites [6]. Despite these health burdens, Latinos use fewer health care services than either White or Black Americans, often due to lack of access to a regular doctor, inadequate health insurance coverage, and language barriers [7, 8]. A shortage of bilingual and culturally-competent health care providers and health information materials has also contributed to this population being underserved by the medical and public health communities [9].

In addition, factors such as low levels of formal education and limited literacy, both in English and in their native language, can negatively affect the health and health-seeking behaviors of many Latinos [10]. A 2003 national assessment found that, compared to adults from all other racial and ethnic groups, Hispanic adults had lower average health literacy skills. Almost one half (41%) of Hispanic respondents scored at the 'below basic' level of proficiency, meaning that they might have difficulty with tasks such as locating the date on a medical appointment slip [11]. Education and literacy are strong and consistent predictors of health outcomes in the U.S. [12]. Although the mechanisms underlying these associations are not yet fully understood, they seem to be at least partly due to individuals with lower educational attainment and limited literacy being outside a societal flow of health information [13]. These individuals often have less access to health information, and, when they do have access, they

are often presented with health information that is beyond their skill levels. In the context of family history in particular, Latino immigrant communities may lack access to the health information that is transmitted through traditional health care system channels [14]. This disparity in access to health information highlights the potential importance of community-based information channels.

Prior research has investigated how best to communicate with Latino populations on various health topics [e.g., 15–17]. To date, however, few studies have examined how to communicate effectively about family history with individuals from underserved communities, such as members of racial and ethnic minority groups. The limited research that does exist suggests that, among U.S. Latinos in particular, there is a general lack of knowledge about and limited awareness of issues related to inherited risk [18]. For example, a national survey showed that, when compared to non-Hispanic Whites, Blacks, and others, Hispanics were least likely to actively collect FHH information for the purposes of developing a family history [19]. It is therefore especially important for the public health genomics community to develop communication initiatives that can reach this audience and present information about family history in an understandable and usable form appropriate for individuals with limited health literacy. The approach of using community members called lay health advisors (LHAs), who are trained to convey health information to their peers in a clear and culturally competent way, holds particular promise as an effective channel of communication. Previous studies have demonstrated that the LHA model can successfully reach Hispanic audiences with health information [17, 20, 21]. However, this communication approach has not been studied in the context of family history.

The present study examined whether a LHA-led communication intervention using an educational session known in Spanish as a 'charla' could educate members of Spanish-speaking Latino communities about the importance of collecting one's FHH and sharing it with one's doctor. The study used a conceptual framework that maps the ways in which a communication intervention affects information seeking behaviors; this framework guided the selection of study measures [22]. The primary purpose of the study was to compare the effects of a culturally-tailored charla communication intervention to those of a comparison brochure group on the following outcomes: participants' intentions to discuss FHH with their family and doctor, their self-efficacy to have these FHH discussions, and their conceptual knowledge about

FHH (i.e., their understanding of what information is yielded by a FHH). We hypothesized that conceptual knowledge and increases in intentions and self-efficacy to discuss FHH with both family members and doctors would be higher among charla group participants than among comparison group participants.

## Methods

### *Study Design*

This study employed a 2-group design. Participants in the 2 groups were recruited from the same places in the same manner, but were assigned to a group based on the day on which they were enrolled. In order to be able to examine the feasibility of the charla approach, participants were recruited using a 2:1 ratio so that approximately twice as many individuals were recruited for the charla group as for the comparison group. During the single study session, all participants completed one educational activity (charla or a brochure). In addition, pre-test and post-test questionnaires were verbally administered immediately before and after the educational activity. The study was approved by the Institutional Review Boards at the National Human Genome Research Institute and California State University at Long Beach.

### *Participants*

Spanish-speaking individuals aged 18 years and older were eligible to participate in the study. LHAs affiliated with 2 community health centers in Oakland, CA and Washington, DC recruited participants using an in-person approach. In order to reach individuals with a range of sociodemographic characteristics, LHAs approached potential participants at health fairs, parenting groups, women's and men's health groups, churches and other community-based organizations serving Spanish-speaking Latinos. Due to the limited literacy levels of some individuals in these communities, no written materials (e.g., advertisements, flyers, handouts) were used during recruitment; all recruitment was done in person. Almost one-third (27%) of participants were recruited from parenting and English as a Second Language classes affiliated with local schools, a quarter (23%) from community-based organizations, and the remainder from health clinic waiting rooms (18%), support groups (13%), local churches (13%), and health fairs (6%). All participants gave verbal consent to participate in the study. 487 participants were recruited; 13 individuals were excluded due to extensive missing data, yielding a final sample of 474.

### *Intervention Design*

*Formative Research.* The LHA intervention was based upon formative research that was conducted within the 2 target communities in order to develop an educational approach that would be acceptable to community members and tailored to their needs. As members of the target communities and experts in their area, input on intervention content, delivery and acceptability was sought from LHAs at multiple time points and incorporated into the final product. In the initial phase of the formative research, 27 community members and 31 LHAs participated in 8 focus groups. Participants were asked about their understanding of ge-

netics, FHH, genetic testing, comfort discussing genetics-related issues, health information seeking behaviors, and learning preferences. The findings revealed that a focus on family history was more meaningful to community members than was a focus on genetics. This research also indicated that having LHAs use an illustrated guide to deliver interactive small group educational sessions (known in Spanish as charlas) would be an effective means of engaging community members and communicating with them about FHH. These observations were consistent with prior studies that have shown that, when receiving health information, Hispanic audiences often prefer an interactive group discussion format that imparts 'hands on' skills and uses easily understood printed materials and visuals to illustrate difficult concepts [23–25]. As a result of this initial phase of formative research, a team of genetics experts and Latino health experts was convened to create the content for a family history flip chart guide and accompanying LHA manual. The educational content was created with the aims of helping the target audience improve their understanding of inheritance and how FHH reflects shared inherited and environmental risk. An artist was hired to design culturally tailored illustrations for the flip chart, as previous studies have demonstrated the importance of culturally relevant tailoring for diverse audiences [26]. Prior research has also shown that lay audiences find illustrated explanations of scientific concepts and risk to be more understandable [27]. Both the flip chart and the accompanying LHA charla manual were designed and developed in Spanish. Finally, in the second phase of formative research, the resulting charla session was pilot tested with 86 community members.

*LHA Training.* Both participating community health centers employed an existing team of LHAs who were experienced in delivering health information to the communities. For this study specifically, LHAs completed a 3 day content-specific training led by 2 members of the study team. This training covered information on FHH, genetics, and basic research methodology, utilizing group discussion, role playing activities, and teach back strategies. A genetics content expert was available to answer questions. Less experienced LHAs were paired with more experienced LHAs. All LHAs practiced administering the intervention and the 2 questionnaires until they were deemed proficient by the training facilitators. Supervision and regular oversight of the LHAs was provided by an onsite coordinator at each of the participating community health centers.

*Charla Educational Group.* Participants in the charla group took part in a one-time educational session. Each session was delivered by one or 2 LHAs to a group of between 5 and 10 community members and lasted approximately one hour. During the charla sessions, the LHAs guided participants through a series of activities, using the culturally tailored flip chart to visually illustrate the key concepts of shared environmental and inherited risk. During the charla, participants were also introduced to the Spanish print version of the 'My Family Health Portrait' tool developed by the Office of the U.S. Surgeon General in 2004 to assist people in creating an accurate written record of their FHH to share with their health care provider [28]. Role playing activities focused on building skills related to having conversations about FHH with family members and, to a lesser extent, with health care providers. The charla sessions involved extensive small-group discussions and utilized interactive activities such as asking participants to call out examples of risk factors associated with a person's life-

style, physical environment, and genetic inheritance, and practicing building rapport when asking a relative about their health history (e.g., 'Where were you born?' 'What homemade remedies did your family use while you were growing up?').

*Comparison Group.* Participants in the comparison group received a session wherein the LHA read aloud a Spanish language brochure developed by the U.S. Surgeon General's Family History Initiative entitled 'Family History Is Important for Your Health' [29]. The main objective for the comparison group was to deliver FHH information to participants in a manner similar to how it might be delivered in a health care setting (i.e., through a brochure). However, the information in the brochure was verbally delivered rather than read due to literacy considerations. The brochure contained similar content to the charla session in that it provided participants with information about the importance of knowing one's family history, the purpose of a FHH, and gave basic instructions on how to collect their FHH and share it with their doctor. The brochure was also somewhat culturally tailored in that it was available in Spanish and featured an illustration of a Latino family. Participants were provided with an opportunity to ask questions of the LHAs after they had completed the post-test questionnaire.

#### Measures

All participants completed pre-test and post-test questionnaires. Questionnaires were developed in English, translated into Spanish, and then back-translated into English by a professional translation service. The Spanish versions were reviewed by native Spanish speakers from various countries of origin so that they would be understandable to individuals from different Latino communities. The LHAs verbally administered all questionnaire items by reading aloud both the questions and the response options to participants.

*Primary Dependent Variables.* The primary dependent variables were participants' intentions to discuss their FHH with their family members and with their doctors (e.g., 'How likely are you to talk with your family members about your FHH?'). These 2 items were assessed at both pre- and post-test using 5-point Likert scales (from 'not at all likely' to 'extremely likely').

*Secondary Dependent Variables.* Secondary dependent variables included self-efficacy to discuss FHH (FHH self-efficacy), conceptual knowledge, and usefulness of the FHH information. FHH self-efficacy was assessed at both pre- and post-test using two 5-point Likert scale items that asked participants, 'How sure are you that you could talk with your family members/a doctor about your FHH if you wanted to?'; response options ranged from 'not at all sure' to 'completely sure.' Conceptual knowledge was assessed at post-test only using 4 agree/disagree items based on key concepts conveyed in the educational activities. These questions aimed to assess participant understanding of FHH as an indicator of inherited susceptibility, but not deterministic disease risk (e.g., 'FHH tells you which diseases you will certainly develop'). Number of knowledge items answered correctly was summed. Usefulness of the information was measured at post-test only using one 5-point Likert scale item (e.g., 'The information about FHH was ...') with response options ranging from 'not at all useful' to 'very useful.'

*Covariates.* The variables genetic self-efficacy, genetic causal beliefs, awareness of FHH, and fatalism were measured at pre-test only. We assessed genetic self-efficacy using three 5-point

Likert scale items developed by Parrott et al. (2004) (e.g., 'I can explain genetic issues to people like me.'). Scores were averaged [30]. Genetic causal beliefs were measured using three 5-point Likert scale items that assessed the extent to which participants believed certain disease outcomes are caused by genes (e.g., 'How much do you believe that diabetes is caused by a person's genes?'). Prior awareness of FHH was measured with a single yes/no item (e.g., 'Before today, had you heard of a family health history?'). We also included 2 items adapted from a scale developed by Cuellar et al. (1995) to measure fatalistic attitudes about disease and lifestyle (e.g., 'It doesn't do any good to try to change the future because the future is in the hands of God') [31].

Access to health care was assessed with 2 yes/no items inquiring about the participant's health insurance status (e.g., 'Do you have health insurance in the United States? If yes, is it through your job?'). Time since last doctor's visit was also assessed, along with one question asking if they visited their doctor regularly. One item asked if their doctor spoke Spanish. Participants also responded to 6 yes/no items about their family history and personal history of cancer, heart disease, and diabetes (e.g., 'Do any members of your family have diabetes?'). Additional sociodemographic variables including gender, age, ethnicity, race, language of preference, country of birth, parental country of birth, educational attainment, and marital status were also assessed.

#### Analysis

Data were analyzed using SAS Version 8 for Windows. Descriptive statistics were examined for all variables. Bivariate associations between group assignment and the primary and secondary variables were assessed using  $\chi^2$  tests for dichotomous variables and t-tests for continuous variables. For tested associations with significant bivariate relationships, multivariate linear and logistic regression models were built using backwards elimination with forward checking. Covariates (e.g., language of preference, educational level) that were associated with the dependent variable at  $p < 0.2$  or less were included in the model. Statistical significance of tested associations was assessed as  $p < 0.05$ .

#### Results

As shown in table 1, 66% of participants were female. Over half (51%) were between the ages of 31 and 50. Almost all (96%) of the participants identified their ethnicity as Hispanic, and over three quarters (68%) reported their race as 'Other' when given standard options of White, Black, Asian/Pacific Islander, Native American or Other. About 41% reported having received less than a high school education while 23% had completed at least some education beyond high school. Almost all (94%) were born outside the U.S., with close to half (47%) reporting Mexico as their country of birth. Reflecting differences in demographics between the cities, 86% of the participants who were born in El Salvador were enrolled at the Washington DC site, while 84% of the Mexican participants were enrolled at the Oakland site (data not

shown). Only 18% of the participants had resided in the U.S. for less than 5 years; 32% reported U.S. residence of 5-10 years and 26% between 11 and 20 years. Over half (59%) were married or living with a partner.

As shown in table 2, fewer than half (44%) of participants reported knowing about the concept of FHH before participating in this study. Fifty-five percent reported having a family history of diabetes. Smaller proportions of participants reported family histories of heart disease (35%) and cancer (24%). Twelve percent of participants had been diagnosed with diabetes. Fewer than half (44%) reported having health insurance, although the majority (61%) reported making regular visits to a health care provider and seeing a doctor who spoke at least a little Spanish (64%).

We first examined bivariate associations between the primary dependent variables (i.e., intentions) and study group (i.e., charla or brochure). As shown in table 3, intentions to discuss FHH with family members and with doctors increased in both study groups between pre- and post-test. This increase was significantly greater among the charla group than the comparison group for intention to discuss FHH with family members ( $p = 0.003$ ), but not for intention to discuss FHH with doctors.

Bivariate analyses also showed some significant associations between the secondary dependent variables (i.e., FHH self-efficacy, conceptual knowledge, and usefulness) and study group. Although FHH self-efficacy to discuss FHH with family members and doctors increased in both groups, this increase was significantly greater among charla participants ( $p = 0.0003$  and  $p = 0.0008$ , respectively). As shown in table 4, although mean knowledge score at post-test did not differ significantly by group, charla participants were more likely to correctly answer 2 of the 4 conceptual knowledge items. Finally, participants in the charla group rated the FHH information as significantly more useful at post-test ( $p < 0.0001$ ) than did the comparison participants.

We then examined these significant bivariate associations in multivariate analyses, controlling for baseline differences between study groups. In multivariate models, the increase in intentions to discuss FHH with family members and with doctors did not differ between groups, controlling for other variables. However, post-test FHH self-efficacy for family members was significantly greater among charla participants than comparison group participants ( $p = 0.03$ ), controlling for FHH self efficacy at pre-test, recruitment site, age and having previously attended a charla (table 5). Participation in the charla group was also a significant predictor ( $p < 0.0001$ )

**Table 1.** Sociodemographic characteristics of participants

Characteristic	Charla group (n = 305)	Comparison group (n = 169)	Total (n = 474)
<b>Gender</b>			
Female	205 (67%)	105 (62%)	310 (66%)
Male	96 (32%)	63 (37%)	159 (34%)
Missing	4 (1%)	1 (0%)	5 (1%)
<b>Age</b>			
18–30	90 (29%)	45 (27%)	135 (29%)
31–50	158 (52%)	86 (51%)	244 (51%)
50+	46 (15%)	33 (19%)	79 (17%)
Missing	11 (4%)	5 (3%)	16 (3%)
<b>Ethnicity</b>			
Hispanic/Latino	296 (97%)	159 (94%)	455 (96%)
Non-Hispanic	6 (2%)	7 (4%)	13 (3%)
Missing	3 (1%)	3 (2%)	6 (1%)
<b>Race</b>			
White	40 (13%)	36 (21%)	76 (16%)
Black, Asian-Pacific Islander or Native American	15 (5%)	11 (7%)	26 (5%)
Other	215 (71%)	106 (63%)	321 (68%)
Missing	35 (11%)	16 (9%)	51 (11%)
<b>Education</b>			
Less than high school	126 (41%)	66 (39%)	192 (41%)
Some high school, high school diploma or GED	107 (35%)	57 (34%)	164 (35%)
Some education beyond high school	67 (22%)	44 (26%)	111 (23%)
Missing	5 (2%)	2 (1%)	7 (1%)
<b>Country of birth</b>			
El Salvador	66 (22%)	39 (23%)	105 (22%)
Mexico	144 (47%)	77 (45%)	221 (47%)
Other	82 (27%)	35 (21%)	117 (25%)
United States	13 (4%)	18 (11%)	31 (6%)
Missing	0 (0%)	0 (0%)	0 (0%)
<b>Duration of U.S. residence</b>			
Less than 5 years	52 (17%)	33 (19%)	85 (18%)
5–10 years	111 (36%)	42 (25%)	153 (32%)
11–20 years	84 (28%)	40 (24%)	124 (26%)
20+ years	28 (9%)	31 (18%)	59 (12%)
Missing	30 (10%)	23 (14%)	53 (11%)
<b>Marital status</b>			
Married or living with partner	196 (64%)	85 (50%)	281 (59%)
Single	59 (19%)	57 (34%)	116 (24%)
Widowed/divorced/separated	50 (16%)	26 (15%)	76 (16%)
Missing	0 (0%)	1 (0%)	1 (0%)
Percentage values may not total 100% due to rounding.			

**Table 2.** Health-related characteristics of participants

Characteristic	Charla group (n = 305)	Comparison group (n = 169)	Total (n = 474)
Prior awareness of FHH			
Yes	122 (40%)	88 (52%)	210 (44%)
No/Don't know	179 (59%)	74 (44%)	253 (53%)
Missing	4 (1%)	7 (4%)	11 (2%)
Self-reported family history of			
Cancer			
Yes	71 (23%)	44 (26%)	115 (24%)
No/Don't know	225 (74%)	116 (69%)	341 (72%)
Missing	9 (3%)	9 (5%)	18 (4%)
Diabetes			
Yes	167 (55%)	92 (54%)	259 (55%)
No/Don't know	138 (45%)	73 (43%)	211 (45%)
Missing	0 (0%)	4 (2%)	4 (1%)
Heart disease			
Yes	108 (35%)	59 (35%)	167 (35%)
No/Don't know	193 (63%)	103 (61%)	296 (62%)
Missing	4 (1%)	7 (4%)	11 (2%)
Personal diagnosis of			
Cancer			
Yes	9 (3%)	7 (4%)	16 (4%)
No/Don't know	285 (93%)	156 (92%)	441 (93%)
Missing	11 (4%)	6 (4%)	17 (3%)
Diabetes			
Yes	43 (14%)	16 (10%)	59 (12%)
No/Don't know	260 (85%)	146 (86%)	406 (86%)
Missing	2 (1%)	7 (4%)	9 (2%)
Heart disease			
Yes	23 (8%)	12 (7%)	35 (7%)
No/Don't know	275 (90%)	147 (87%)	422 (89%)
Missing	7 (2%)	10 (6%)	17 (4%)
Have any type of health insurance			
Yes	132 (43%)	78 (46%)	210 (44%)
No/Don't know	172 (56%)	87 (51%)	259 (55%)
Missing	1 (0%)	4 (2%)	5 (1%)
Visit a doctor regularly			
Yes	187 (61%)	101 (60%)	288 (61%)
No/Don't know	116 (38%)	63 (37%)	179 (38%)
Missing	2 (1%)	5 (3%)	7 (1%)
Doctor speaks Spanish			
Yes	169 (55%)	91 (54%)	260 (55%)
A little	33 (11%)	11 (6%)	44 (9%)
No	72 (24%)	47 (28%)	119 (25%)
Missing	31 (10%)	20 (12%)	51 (11%)

Percentage values may not total 100% due to rounding.

of perceived usefulness of FHH information, controlling for genetic self-efficacy, recruitment site, education, fatalism, and gender (table 6). Finally, after controlling for genetic self-efficacy, age, recruitment site, family history of cancer, gender, and country of birth, charla participants were more than 2 times as likely (OR = 2.6, 95% CI = 1.3–5.0) to correctly answer the knowledge item about the purpose of a FHH (i.e., ‘A FHH tells someone about the genes they inherited from their ancestors’) than were comparison group participants (table 7).

## Discussion

In this study, we compared the effects of a charla group educational approach to a comparison approach, in which a brochure was read aloud to individuals, in delivering information about the importance of discussing FHH with family members and doctors to Spanish-speaking Latinos. After controlling for baseline differences between the groups, we observed that charla participants demonstrated a significantly greater increase in FHH self-efficacy related to holding discussions with family members. Charla participants also found the information more useful and experienced significantly greater increases in some areas of conceptual knowledge.

We hypothesized that charla group participants would have greater increases in intentions to engage in FHH discussions than comparison group participants because a number of the activities in the charlas were focused on skill building (e.g., role playing). We observed, however, increases in behavioral intentions to engage in these discussions in both groups, and differences between groups were not significant. This finding may be due to higher baseline intentions among comparison group participants, and it may therefore be possible that significant effects of the charla approach would be observed in a randomized trial. It is also possible, however, that multiple charla educational sessions rather than a single session may be required to affect changes in these behavioral intentions. Further, allowing time between sessions for mastery practice of activities, such as discussions with family members, might also be important for building self-efficacy and skills, which might improve the LHA approach used here [32].

Although we observed increases in FHH self-efficacy for both family members and doctors among both groups, FHH self-efficacy increased significantly more for charla group participants than comparison group participants. This finding suggests that the skill-based focus of the

**Table 3.** Bivariate associations between dependent variables and study group

Variable	Charla			Comparison			p value
	mean (SD) pre	mean (SD) post	mean (SD) change	mean (SD) pre	mean (SD) post	mean (SD) change	
Intention to discuss FHH							
With family members (n = 470)	3.1 (1.3)	3.8 (1.1)	0.77 (1.4)	3.4 (1.2)	3.8 (1.0)	0.42 (1.1)	0.003
With doctor (n = 466)	3.1 (1.3)	3.8 (1.2)	0.67 (1.4)	3.3 (1.3)	3.8 (1.1)	0.49 (1.1)	0.11
Self-efficacy to discuss FHH							
With family members (n = 465)	3.2 (1.3)	3.8 (1.1)	0.66 (1.4)	3.6 (1.2)	3.8 (1.0)	0.24 (1.0)	0.0003
With doctor (n = 463)	3.1 (1.3)	3.8 (1.1)	0.69 (1.3)	3.5 (1.2)	3.8 (1.0)	0.30 (1.1)	0.0008

**Table 4.** Conceptual knowledge scores and usefulness ratings at post-test

Variable	Charla	Comparison	p value
Mean usefulness rating (n = 466)	3.56	3.27	<0.0001
Mean knowledge score (n = 462)	2.37	2.2	0.33
Proportion answering knowledge items correctly			
1 FHH tells you about inherited genes (n = 470)	89.7%	81.0%	0.007
2 FHH tells you which diseases you will certainly develop (n = 470)	27.7%	29.3%	0.71
3 FHH indicates an inherited tendency towards developing disease (n = 469)	87.5%	79.5%	0.02
4 FHH is based on a family's physical environment (n = 469)	31.6%	29.7%	0.67

**Table 5.** Predictors of self-efficacy to discuss FHH with one's family members at post-test in a multivariate linear regression model (n = 357)<sup>a</sup>

Parameter	Beta coefficient	p value
Group assignment <sup>b</sup>	0.22	0.03
Self-efficacy at pre-test	0.32	<0.0001

<sup>a</sup>Controlling for recruitment site, age and having previously attended a charla session. <sup>b</sup>Charla group compared to comparison group.

**Table 6.** Predictors of usefulness rating at post-test in a multivariate linear regression model (n = 342)<sup>a</sup>

Parameter	Beta coefficient	p value
Group assignment <sup>b</sup>	0.35	<0.0001
Average genetic self-efficacy score	0.059	0.03

<sup>a</sup>Controlling for recruitment site, education, fatalism, and gender. <sup>b</sup>Charla group compared to comparison group.

charla sessions did have an impact on some aspects of self-efficacy. The difference observed between FHH self-efficacy related to family members and related to doctors may be due to the core focus of the charla activities. The skill building activities focused primarily on discussions with family members and reducing barriers to holding these discussions. In contrast, although participants were introduced to the 'My Family Health Portrait' tool and the importance of sharing this information with doctors

was discussed, role playing these conversations was not one of the charla session's main objectives. Greater focus on skill building related to doctor-patient discussions specifically might have a stronger effect on self-efficacy, thereby potentially improving intervention effectiveness. In addition, multiple charla sessions with more time for mastery practice might increase FHH self-efficacy to a greater extent, perhaps then impacting behavioral intentions and, ultimately, behaviors.

**Table 7.** Predictors of answering purpose of FHH knowledge item correctly at post-test (n = 391)<sup>a</sup>

Parameter	OR	95% CI
Group assignment <sup>b</sup>	2.57	1.31–5.01
Average genetic self-efficacy score	1.33	1.01–1.76
Age	1.04	1.01–1.07

<sup>a</sup> Controlling for recruitment site, fatalism, personal diagnosis with heart disease, gender and country of birth. <sup>b</sup> Charla group compared to comparison group.

We hypothesized that conceptual knowledge would increase more for charla participants than for comparison group participants. Indeed, the study findings demonstrated that charla participants were more likely to understand the primary purpose of a FHH after completing the educational activity than were comparison group participants. Even so, the knowledge questions also revealed that some of the charla's educational objectives were not met. Only about one third of participants answered 2 of the conceptual knowledge items correctly. These results therefore highlight the content areas that may need greater emphasis during the educational sessions in order for participants to develop a more complete understanding of FHH. For example, although the majority of participants understood that a FHH reflected inherited susceptibility, most did not understand that this increased risk was not deterministic. This critical distinction may need to be stressed more clearly in these types of educational sessions focused on family history of common, complex disease outcomes that are likely to be influenced by multiple behavioral, genetic, and environmental risk factors. Reinforcing key points over multiple educational sessions may help to improve participants' knowledge, as well as their self-efficacy. Prior research on LHA interventions related to other content topics has shown that a brief one-time intervention may not be enough to influence knowledge [15].

In addition to the proposed changes to the charla educational session suggested by the study findings, the results also highlight some considerations for future randomized trials on the effectiveness of the LHA approach. It is possible, for example, that the 2 groups were more similar than a true contrast between participating in a group educational session and reading a print brochure. Due to the limited literacy skills of many individuals in these communities, LHAs read aloud to comparison

group participants the information contained in the brochure. As a result, their comprehension of the information was likely much greater than it would have been if they had been asked to read the brochures on their own. It is also possible that LHAs may have provided comparison group participants with additional information after reading the brochure in responding to questions from participants. LHA training focused more on the charla group than the comparison group due to the greater complexity of the charla sessions. More training might be necessary for issues such as how to respond to participant questions without affecting comparisons across study groups.

Further, in reflecting upon the increases in intentions, FHH self-efficacy and conceptual knowledge that occurred in the comparison group, it may be important to consider that in this group the brochure was delivered in a one-on-one setting. It is possible that this mode of delivery, and not the brochure content per se, is what accounted for the results observed in the comparison group. More specifically, perhaps receiving personalized attention from the LHA inadvertently made the comparison group more individualized and tailored than was intended. Future research in this area could employ a design that separates these factors (group vs. individual and brochure vs. LHA) in order to more rigorously tease apart these effects.

Additional research could also explore the mechanisms by which LHA delivery affects outcomes. While LHA interventions have demonstrated some efficacy in improving knowledge and health behaviors, there are still limitations to this research. The LHA approach has been used by researchers and practitioners for decades, yet recent reviews of LHA interventions have concluded that this body of literature is difficult to characterize [33, 34]. There is great variability, for example, in descriptions of LHA training, methods employed or the content of the interventions. As a result, the mechanism through which LHAs achieve effective interventions might not be apparent or replicable. Though some have suggested that the LHAs' natural ability to strengthen existing community networks in a culturally competent manner is what accounts for their effectiveness in health promotion, further research is needed to identify the active ingredients of successful LHA interventions for diverse target communities [35, 36]. For example, one possible explanation for the similarity of the findings between groups might be participants' perceptions of LHAs in this role. Prior research has shown that Hispanic audiences tend to prefer to receive health messages from specific 'trusted mes-

sengers' [37]. Future studies could examine more specifically how participants perceive LHAs versus other possible messengers (e.g., family members, Latino family physicians) for content related to family history and genetics.

In their review of LHA interventions among Hispanic participants, Rhodes et al. (2007) suggest key elements to strengthen the effectiveness of future LHA projects [34]. The majority of the projects deemed successful were designed with active participatory involvement wherein the target community members served as equal partners in the research through mechanisms such as ongoing community advisory boards [38]. In this project, while we involved members of the community at multiple time points during formative research the outcomes might have been strengthened through even more continuous community partnership. Additionally, the review of LHA studies also indicated that participants in successful programs were exposed to LHA messages at multiple time points over a longer intervention duration (typically 3–6 months). As mentioned above, such an approach may improve the effectiveness of LHA approaches focused on FHH.

### Limitations

There are a number of limitations that should be considered in interpreting our results. We did not randomize to group assignment at the level of the individual and although we controlled for measured differences between groups in the analysis, they could have differed on other, unmeasured factors as well. The majority of the participants were from Mexico and El Salvador, had lived in the U.S. for at least 5 years, were connected to community health centers, and volunteered to take part in the study, which might limit the generalizability of these findings to other Spanish-speaking populations. Further, we were not able to collect follow-up data on the actual behaviors of speaking with family members and doctors and, although intention is often one of the strongest predictors of behavior, future studies should measure behavior directly. In this initial study, we were only able to offer a one-session charla intervention; as inherited risk is a complex topic, additional sessions may have strengthened our results. Finally, we limited the number of items on the questionnaires due to time constraints and the oral administration. While limiting the items appeared to contribute to the relatively small amount of missing data, future studies could certainly measure other possible mediators of these educational processes. It also is

possible that participant responses were negatively affected by our use of Likert scales for some items and by verbal administration of the questionnaires by the LHAs. Other researchers may consider employing other methodologies (e.g., open ended questions) that may yield more meaningful results.

### Conclusion

The findings presented here suggest that delivering FHH information through interactive charla sessions delivered by LHAs may be an effective, culturally competent health communication strategy to educate Spanish-speaking Latinos, who might not otherwise have access to this information. The results are encouraging that charlas might increase knowledge and self-efficacy about FHH, and the findings also suggest possible improvements to the charla approach, as discussed above. The study was able to utilize an existing LHA infrastructure at participating community health centers, which provided multiple advantages, including successful recruitment of a large number of participants from underserved communities. Existing LHA infrastructures at organizations like community health centers could also be a valuable channel for dissemination of charla activities to a larger group of Latino communities. We propose that a charla-based approach could be an important component of efforts to educate Spanish-speaking Latino communities with a high burden of disease about the importance of FHH.

Effectively informing the public about inherited risk is a key communication issue that will likely increase in importance over the next decade as our understanding of the genomic basis of disease continues to expand. As we begin large-scale dissemination of information about inherited risk, understanding how to communicate this information effectively to underserved communities is a research area of particular importance. Recently, authors studying Latino awareness of genetic testing for cancer concluded that communicating genetic risk information to Latinos at increased risk may best be done by key informants in these communities, such as LHAs [39]. Proceeding with only print-based interventions delivered through the health care system will likely ensure a widening gap between knowledge 'haves' and 'have-nots', meaning that information about inherited risk will likely benefit only those with the health care access and literacy skills to obtain it [40]. If genomics is to be used to benefit public health, communication research with

underserved populations must play a central role. Despite the challenges in reaching underserved communities, the community members who participated in this study demonstrated great interest and enthusiasm for family history. Continued research on communication approaches such as charlas may help to close the FHH knowledge and skills gap and help ensure that this information can be used to improve the health of those most at risk.

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