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Psychosocial Correlates of Meeting National Guidelines for Muscle-Strengthening Activities in Latinas

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Abstract

Background.—Performing regular muscle-strengthening activity has numerous health benefits, including improvements in blood pressure, hemoglobin A1c, and lean body mass. Despite the disproportionate prevalence of lifestyle-related chronic disease in Latinas (diabetes, hypertension, obesity), most do not report meeting the national guidelines for muscle-strengthening activity. Existing physical activity (PA) research in Latinas has focused almost exclusively on aerobic PA. Our study examined Latinas' sociodemographic and psychosocial correlates of meeting muscle-strengthening PA guidelines that can inform future PA interventions.

Method.—A cross-sectional study of participants ($N = 436$) enrolled in a randomized controlled trial promoting PA and cancer screening in Latinas was conducted, and *t* tests examined the associations between sociodemographic and psychosocial factors with self-reported muscle-strengthening activities. Hierarchical regression was conducted in separate blocks guided by the socioecological model (sociodemographic, individual, and interpersonal factors) to examine the independent contribution of each block to the outcome of meeting national guidelines for muscle-strengthening PA.

Results.—Participants who met the national PA guidelines of ≥2 days/week of muscle-strengthening activities reported significantly higher social support for PA ($p < .001$), greater use of behavioral strategies for PA ($p < .001$), and lower barriers to PA ($p < .03$) than those who did not meet the guidelines. Hierarchical binary logistic regression indicated behavioral strategies for PA was the only significant correlate of meeting the national guidelines for muscle-strengthening PA (odds ratio = 1.39, 95% confidence interval [1.18, 1.65], $p < .001$).

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Discussion/Conclusion.—Results support a hypothesis that instructing Latinas to use behavior change strategies could help them increase muscle-strengthening PA.

Keywords

exercise; Hispanic women; muscle-strengthening exercise; physical activity; psychosocial factors; resistance training

To achieve the health benefits of regular physical activity (PA), the National Physical Activity Guidelines for Americans (U.S. Department of Health and Human Services, 2018) recommends that adults perform at least 150 minutes per week of moderate-intensity aerobic PA or 75 minutes per week of vigorous activity, or a combination of both. In addition to aerobic PA, adults should engage in 2 or more days per week of muscle-strengthening activities that work all major muscle groups, such as lifting weights, push-ups, sit-ups, and working with resistance bands (U.S. Department of Health and Human Services, 2018). However, Latina women are less likely to meet these guidelines than non-Latina White women and Latino men, particularly with regard to muscle-strengthening activities, as only 14% of Latinas met the national guidelines for both aerobic and muscle-strengthening activities (vs. 24% each in non-Latina White women and Latino men) and 2.3% met the guidelines for muscle-strengthening PA only (vs. 3.9% in non-Latina White women; Blackwell & Villarroel, 2018). Achieving sufficient levels of muscle-strengthening activity can help reduce the disproportionate burden of PA-related health conditions in Latinas (e.g., diabetes, obesity, cancer), as resistance training has been linked with reductions in cancer mortality and all-cause mortality (Stamatakis et al., 2017), and improvements in blood pressure (Cornelissen et al., 2011), hemoglobin A1c (HbA1c) levels (Church et al., 2010), and lean body mass (Olson et al., 2007). The benefits of muscle-strengthening PA can occur independently of aerobic PA (Ashton et al., 2020; Brooks et al., 2006), but when performed in combination with aerobic PA, even greater health improvements have been documented (Bateman et al., 2011; Church et al., 2010). Despite the health benefits of muscle-strengthening activities, there has been limited research that explores strategies to promote muscle-strengthening PA among in this population.

In a recent review, few muscle-strengthening interventions included Latinas in their samples, and none were designed exclusively for this population (Brooks et al., 2006; Castaneda et al., 2002; Lincoln et al., 2011) or addressed Latinas' unique sociocultural factors, such as perceiving PA as unfeminine (D'Alonzo, 2012), lack of social and family support (Ramirez et al., 2007), fear of immigration enforcement, perceptions of weight affecting PA engagement (Martinez et al., 2009), lack of knowledge on how to exercise (Spector et al., 2013), and family norms about exercise (Abraído-Lanza et al., 2017) that may influence their muscle-strengthening behaviors. Improved understanding of sociocultural and psychosocial factors associated with muscle-strengthening activities in Latinas can inform the development and evaluation of more comprehensive PA interventions (i.e., those that include muscle-strengthening PA). For example, research that examined determinants of aerobic moderate-to-vigorous physical activity (MVPA) indicated factors such as self-efficacy for PA, behavioral and cognitive processes, and social support for PA have been associated with higher MVPA in Latinas. Findings from a web-based MVPA intervention

for Latina women found intervention effects on self-efficacy for PA ($b = 0.43$, $p < .01$), cognitive processes for PA ($b = 0.64$, $p < .01$), behavioral processes for PA ($b = 0.54$, $p < .01$; Larsen et al., 2021), while results from a 12-month homebased MVPA intervention for Latinas showed that the intervention achieved greater increases in MVPA by increasing family social support ($ab = 5.21$, standard error [SE] = 2.94, 95% confidence interval [CI; [0.91, 14.11]) and friend social support ($ab = 6.83$, $SE = 5.15$, 95% CI [0.16, 20.56]; Marquez et al., 2016). Similarly, findings from a meta-analysis on resistance training in men and women in non-Latino populations indicated sociodemographic and psychosocial factors, such as self-efficacy for PA, self-regulation, and behavioral intention, were associated with more strengthening exercise (Rhodes et al., 2017).

Sociodemographic factors (e.g., age, education, income) have also been associated with participation in muscle-strengthening PA in non-Latina populations (Vezina et al., 2014), while similar factors have been associated with MVPA in Latinas (e.g., having some college education was associated with higher odds of meeting PA recommendations; higher body mass index was associated with lower odds of meeting PA recommendations; Chrisman et al., 2015). Thus, examining potential sociodemographic correlates among Latinas can help with developing and tailoring muscle-strengthening interventions for this population. Due to the gap in this area of PA research, it is not known whether the same correlates of muscle-strengthening activities in non-Latino populations, or MVPA in Latinas, would be effective in promoting muscle-strengthening PA among Latina women.

The purpose of this study is to identify sociodemographic and psychosocial correlates of muscle-strengthening PA among a sample of churchgoing Latina women in San Diego County, California. We conducted a cross-sectional analysis to examine associations between self-reported muscle-strengthening activity and (a) sociodemographic factors (i.e., age, education, acculturation, marital status, employment status, number of children, income), (b) individual psychosocial variables (self-efficacy for PA, behavioral strategies for PA, barriers for PA), and (c) an interpersonal psychosocial factor (social support). Selection of these variables was guided by aforementioned literature on psychosocial and sociodemographic factors associated with MVPA in Latinas and muscle-strengthening activity in non-Latino populations. Our analysis was guided by the principles of socioecological models (Bronfenbrenner, 1977; Sallis et al., 2015), especially the principle that multiple levels of influence (i.e., individual, interpersonal, organizational, community, policy) affect behavior. Examining factors that influence Latinas' PA behavior at various socioecological model's levels of influence is necessary for more effectively addressing low PA and related health disparities. For instance, individual level factors such as higher self-efficacy and high education levels (Echeverria et al., 2013) have been associated with greater PA, while interpersonal factors (e.g., social support; Marquez et al., 2016) and environmental and societal factors (e.g., lack of neighborhood safety and safe places to walk, fear of immigration enforcement; Martinez et al., 2009) have also shown to influence PA in Latinas; thus, focusing on only level of influence (e.g., individual) would be insufficient to explain and effectively promote behavior change. This study reports individual and interpersonal level factors that can be used to inform the development of culturally relevant muscle-strengthening PA interventions for Latinas.

Method

Study Design

We conducted a cross-sectional study of baseline data from 436 participants enrolled in *Fe en Acción* (Arredondo et al., 2015; Arredondo et al., 2017), a two-arm randomized controlled trial promoting MVPA and cancer screening in Latina women. Details of the study methods have been previously published (Arredondo et al., 2015; Arredondo et al., 2017). In summary, participants were recruited from 16 Catholic churches in San Diego, California, that offered Spanish-language services. Churches were randomized by study arm (n = 8 MVPA, n = 8 Cancer Screening) with approximately 27 participants enrolled in each church. Inclusion criteria were self-identified as Latina, between the ages of 18 and 65 years, reported attending church at least four times per month, resided within 15 minutes driving distance from their church, and not attending any other churches. Additional eligibility criteria were not meeting PA guidelines of 150 minutes/week of self-reported aerobic MVPA and acquiring less than 250 minutes/week of MVPA as measured by accelerometry. Rationale for the 250 minute/week MVPA cutoff is described elsewhere (Arredondo et al., 2015). Exclusion criteria included being pregnant or having any health condition that limited ability to participate in PA assessed via the Physical Activity Readiness Questionnaire (American College of Sports Medicine, 2005).

Procedure

Measures were collected during two appointments for each participant, which took place at the church of enrollment. At the first visit, trained bilingual and bicultural research assistants, blinded to study condition, assessed anthropometrics (e.g., height, weight) and gave each participant an ActiGraph accelerometer with instructions to wear the device for 7 days and return it at the next visit. Data were processed according to Troiano 2008 cut-points to define MVPA as >2,020 counts per minute (Troiano et al., 2008). The second appointment was scheduled for 7 to 10 days later, in which participants completed self-administered surveys and an interviewer-administered PA assessment based on the Global Physical Activity Questionnaire (GPAQ; see Measures section). Participants received a $25 incentive for their baseline visit.

Sociodemographic Variables

Participants self-reported age, education, marital status, employment status, number of children in the home, household income, ethnicity, and acculturation. Age was reported as a continuous variable. To confirm self-reported age, participants reported their date of birth, then current age was calculated based on the difference between the date of measurement and the date of birth. Education was assessed according to the highest degree or level of school completed in the United States or any other country, then collapsed to either “less than high school” or “high school or more” for the current analysis. The marital status question consisted of seven response categories (e.g., married, living with spouse, divorced, widowed, single) that were then collapsed into “married/living as married” or “not married.” The employment status question contains 11 response categories, including “working full-time 35 hours or more weekly,” “working part-time, less than 35 hours weekly,” “employed in seasonal labor,” and “do not work or unable to work,” which were then collapsed to either

"employed (full-time, part-time, self-employed, seasonal)" or "not employed (all others)." An open-ended question assessed the number of children younger than the age of 18 years who live in the household, which was reported as a continuous variable. The monthly household income question consisted of income categories in $500 increments, with an option for "don't know." Income was then categorized as "less than $2,000" or "$2,000 or more." Participants' ethnicity was assessed using a single question that consisted of six response categories, including Mexican, Mexican American, Hispanic, Latino/a, Chicano/a, and None.

Acculturation was measured using the *Bidimensional Acculturation Scale BAS) for Hispanics* (Marin & Gamba, 1996). This 24-item scale was composed of six questions on English and Spanish language use, 12 questions on English and Spanish proficiency, and six questions about use of electronic media in English and Spanish. Response options used a 4-point Likert-type scale ranging from 1 to 4 (*almost never* to *almost always*). Average scores were calculated to determine adherence to each domain (i.e., Hispanic domain, non-Hispanic domain), with a cutoff score of 2.5 or higher used to indicate adherence to Hispanic domain and 2.5 or higher for adherence to non-Hispanic domain. Scores of 2.5 or higher on both cultural domains were interpreted as biculturalism. BAS shows high internal consistency (α = .9 for Hispanic domain and .96 for non-Hispanic domain) and high validity coefficients; and works well with Mexican Americans and Central Americans (Marin & Gamba, 1996).

Psychosocial Variables

The following psychosocial variables were assessed: self-efficacy for PA, behavioral strategies for PA, barriers to PA, and social support. Self-efficacy for PA was assessed using the *Perceived Efficacy for Group Exercise* questionnaire, a self-reported measure developed in-house. This six-item measure assessed participants' perceived efficacy for group exercise and included the following items: if participant has ever participated in group exercise classes, number of classes, and confidence in her ability to participate in exercise classes when presented with certain barriers (e.g., lack of child care, lack of transportation, feeling self-conscious). The Perceived Self-Efficacy for Group Exercise questionnaire is scored by calculating the mean of six items with 5-point Likert-type response options ("*I know I cannot*"; "*I probably cannot*"; "*Maybe I can*"; "*I probably can*"; and "*I know I can*"). In the current study Cronbach's alpha coefficient was .88.

The *Behavioral Strategies for PA* scale was a 13-item measure that inquired about actions and behavioral strategies related to purchasing PA equipment, enrolling in PA programs, and approaches for increasing PA that participants have taken/not taken over the past month (e.g., enrolled in a gym, bought a pair of shoes for exercise, set short-term goals for PA). The behavioral strategies were based on a previous measure (Saelens et al., 2000) and were adapted for the current study. A sum score of all items was then calculated, with a possible total score range of 0 to 12. Cronbach's α was .74 in the current study.

Barriers to PA were assessed via the San Diego Health and Exercise Questionnaire (Sallis et al., 1989), an index that evaluated 15 potential barriers to engaging in exercise. This scale was adapted for *Fe en Acción* to include three additional items: (a) lack of money, (b) lack

of exercise clothing or gear, and (c) family caregiving obligations (children/elders). The original 15-item Cronbach's α = .841. With the additional three items, Cronbach's α = .852. Items on the index were summed to provide a total score of barriers to PA, with a possible total score ranging from 0 to 63.

Social support was assessed via the *Social Network for Exercise* (Marquez et al., 2014), a self-administered questionnaire that assessed the number of persons providing social support for PA. This measure allowed respondents to list up to six individuals who provided them with support for exercise and indicated their relationship to the respondent. For the current study, social support was measured as the number of individuals providing social support for PA, with a possible total score range from 0 to 5.

Physical Activity

Self-reported muscle-strengthening PA was assessed via the GPAQ (Armstrong & Bull, 2006), a measure developed by the World Health Organization for PA surveillance that assesses frequency, duration, and intensity of PA. GPAQ moderate and vigorous minutes correlated with accelerometer moderate (r = .28) and vigorous (r = .48) PA (Herrmann et al., 2013). The GPAQ was adapted for *Fe en Acción* to include the following additional items on muscle-strengthening activities: (a) "In a typical week, on how many days do you do activities to strengthen your muscles?" with response options to this question listed as 0 to 7 days, and (b) "What are some of those activities? Do you do . . .?" Various examples of strengthening activities (e.g., push-ups, sit-ups) were provided with response categories to include "yes," "no," and "other." Total reported days of performing muscle-strengthening PA were dichotomized to either meeting PA guidelines (≥2 days/week) versus not meeting guidelines (i.e., ≤ 1 day/week) of muscle-strengthening PA.

Data Analysis

IBM SPSS Version 26 (IBM Corp., Armonk, New York) was used for analyses. Demographic characteristics of the study sample were examined (i.e., age, body mass index, years in the United States, ethnicity, employment, marital status, education, income, number of children). Independent samples t tests were used to examine bivariate associations between muscle-strengthening PA (i.e., meeting vs. not meeting the national guidelines) and sociodemographic and psychosocial variables. Differences in categorical variables (i.e., marital status, employment, household income, and acculturation) with muscle-strengthening PA were examined using chi-square tests. Bivariate correlation analysis was conducted to examine relationships among psychosocial and sociodemographic variables.

Hierarchical binary logistic regression was used to examine associations of sociodemographic and psychosocial variables with meeting the national guidelines for muscle-strengthening PA. Our model analyzed three separate blocks of variables based on socioecological model levels of influence to examine the independent contribution of each block to our outcome (i.e., meeting muscle-strengthening PA guidelines of ≥ 2 days/week). The first block consisted of the sociodemographic factors of age, education, acculturation, marital status, employment, children in household, and income. The second block included individual-level psychosocial factors of perceived efficacy for PA, behavioral strategies for

PA, and barriers to PA. The third block focused on the interpersonal psychosocial factor of social support (i.e., number of persons providing social support). Blocks were ordered based on the socioecological model's theoretical contribution to meeting the guidelines for muscle-strengthening PA. Sociodemographic factors are most proximal to behavior, followed by individual-level psychosocial factors and then the interpersonal-level factors (i.e., social support). Results were reported as odds ratios (*OR*s) with 95% CIs.

Results

Demographic characteristics of participants are provided in Table 1. The majority of participants were married or living with a partner (77%), had at least one child younger than 18 years living in the household (76%), and were employed in full-time, part-time, or seasonal work (66%). Forty-five percent of the women completed a high school education or higher. Only 9.9% of participants reported living in the United States for less than 10 years, with the majority living in the United States for more than 20 years (mean = 21 years). The most common types of muscle-strengthening activities that participants reported engaging in were sit-ups ($n = 56$, 12.9%), leg lifts ($n = 59$, 13.6%), squats ($n = 42$, 9.7%), and free weights ($n = 40$, 9.2%), and lunges ($n = 37$, 8.6%). Other types of activities included, but were not limited to, push-ups, chair lifts, and weight machines. Eighty-three (19%) participants reported meeting the national guidelines for muscle-strengthening PA of 2 or more days per week.

Sociodemographic Variables

Results of bivariate analyses indicated that participants who reported meeting the guidelines for muscle-strengthening PA did not differ significantly on sociodemographic factors of age, education, income, marital status, employment, number of children, and acculturation compared with those who did not meet the guidelines.

Psychosocial Variables

Results from *t* tests indicated participants who performed muscle-strengthening PA on 2 or more days per week reported significantly greater use of behavioral strategies for PA ($p < .001$), higher social support for PA ($p < .001$), and lower barriers to PA ($p = .03$) than those who did not meet the guidelines. No other significant associations were observed (Table 2). Correlations among the psychosocial variables indicated behavioral strategies for PA and perceived efficacy for PA were weakly correlated and behavioral strategies for PA and barriers to PA were also weakly correlated. No other significant correlations were observed (Table 3). Listwise missing deletion was used to remove missing data for all variables used in the analysis.

Hierarchical Logistic Regression

After participants were excluded due to missing data, the analytic sample for the hierarchical binary logistic regression consisted of 193 participants. Results indicated that the behavioral strategies sum score was the only significant correlate of meeting the guidelines for muscle-strengthening PA ($OR = 1.39$, 95% CI [1.18, 1.65], $p < .001$). Moreover, individual psychosocial variables (Block 2) explained the most variation in the model (R^2 change =

.21; Table 4). The smaller sample size included in the regression analysis (n = 193) was attributed primarily to missing data on the Barriers to PA questionnaire. Thus, we examined results of hierarchical binary regression when excluding the barriers to PA variable. We found no difference with the current results as behavioral strategies for PA remained the only significant correlate.

Discussion and Implications for Future Research

Latinas who met the national guidelines for muscle strengthening PA (2 or more days per week) reported significantly greater use of behavioral strategies for PA, higher social support for PA, and lower barriers to PA, independent of sociodemographic factors, than those who did not meet the guidelines. Results of hierarchical binary logistic regression indicated that individual psychosocial factors (perceived efficacy, behavioral strategies, and PA barriers to exercise) were the largest contributor of variance in our model. While behavioral strategies were the only significant correlate in our model, suggesting it may have the strongest association with muscle-strengthening PA, it may also be related to other variables. Results showed significant correlations between psychosocial variables; however, all correlations were low (<.26); thus, it was deemed appropriate to include psychosocial variables in the same block for this analysis. Additionally, several of the behavioral strategies in our scale addressed barriers often reported by Latinos to engage in leisure-time PA (Stodolska & Shinew, 2010); thus, it was not surprising that participants who reported engaging in more strategies also reported more days of strength training. Our findings on the use of behavioral strategies are aligned prior interventions targeting behavioral strategies (e.g., goal setting, self-monitoring) that have been shown to effectively increase PA in Latina women; however, most of this research was focused on aerobic PA (Albright et al., 2005; Pekmezi et al., 2009). For example, *Seamos Saludables*, a 6-month intervention targeting behavioral strategies (e.g., goal setting, self-monitoring, problem solving barriers, increasing social support, etc.) to promote PA among mostly low-income/low-acculturated Latina women found significant increases in behavioral strategies and access to available PA equipment at home among intervention compared with control participants but no differences in self-report moderate-intensity PA (Pekmezi et al., 2009). Given that study did not focus on changes in muscle-strengthening activities, it is unclear if the behavioral strategies were effective at increasing nonaerobic PA. This finding suggests that future interventions in Latinas could further examine and target the use of psychosocial factors, with particular emphasis on behavioral strategies, in promoting muscle-strengthening PA. Given the prevalence of meeting muscle strengthening guidelines in Latinas is much lower than that of meeting the aerobic PA guidelines (Blackwell & Villarroel, 2018), interventions testing behavioral strategies to promote strength training are needed.

We found that psychosocial correlates of muscle-strengthening PA were similar to commonly-found correlates of aerobic MVPA in Latinas. For instance, social support provided by family and friends (Skowron et al., 2008) and having larger social networks (Marquez et al., 2014) have been associated with higher leisure-time PA in Latinas, while common barriers to aerobic PA (e.g., lack of time, low energy, and lack of motivation; Evenson et al., 2003) were correlates of lower PA in Latinas. One implication is that similar strategies can be used to promote both types of PA, but further research is necessary to

gain greater insight into this topic. Future studies can adapt intervention content on barriers of time, low energy, and lack of motivation to promote muscle-strengthening PA, then use longitudinal studies to examine how these factors mediate changes in muscle-strengthening PA in Latinas over time. Research can also seek to understand how and when such strategies are used for engaging in muscle-strengthening PA. For example, Latinas who are increasing or beginning to engage in muscle-strengthening PA may rely more on certain strategies (e.g., increasing self-efficacy, overcoming barriers to beginning strengthening activities) than those who meet the national PA guidelines and are seeking to maintain their current levels (e.g., focus more on social networks that support regular strength training). Given the paucity of literature on muscle-strengthening PA in Latinas, one recommendation is to conduct qualitative (formative) research for intervention development on the use of such strategies. This will contribute additional insight into culturally relevant factors associated with performing muscle-strengthening PA specific to Latinas.

Unexpectedly, we found participants' sociodemographic characteristics (marital status, age, income, employment, number of children, and acculturation) did not differ significantly between those who engaged in muscle-strengthening activities and those who did not. This finding differs from research showing that high acculturation and high education levels in Latinos (men and women) were associated with higher aerobic and muscle-strengthening PA (Echeverria et al., 2013). Similarly, in a review of correlates of resistance training in non-Latino populations, higher education was linked with more frequent resistance training, but employment and marital status were not consistently associated with participation in resistance training (Rhodes et al., 2017). Inconsistent findings between our results and existing literature in non-Latinas suggest that further investigation on sociodemographic characteristics that may influence muscle-strengthening PA is necessary.

Despite that the majority of participants in our study reported living in the United States for more than 20 years, acculturation levels on the BAS were relatively low. The low acculturation scores on the BAS could be attributed to participants living and working in an environment where English language proficiency may not be essential. San Diego County, where the study was conducted, shares one of the busiest U.S.–Mexico border regions; thus, years in the United States may not be the best representation of language-based acculturation for this particular sample, as many Latino U.S. residents routinely travel between the two countries and may not feel pressure to acculturate to English language use. This is reflected in the 67.8% of participants who do not report adherence to the non-Hispanic domain of the BAS Latinas in our sample.

Among the psychosocial factors, we found no significant association between self-efficacy for PA and muscle-strengthening PA. Past research that examined the association between self-efficacy for PA and overall PA in Latinas (Rhodes et al., 2017) reported inconsistent findings. Our finding could be attributed in part to assessment of self-efficacy via the *perceived efficacy for group exercise* in the current study. The concept of self-efficacy refers to an individual's situation-specific confidence in their ability to perform a task or behavior (Bandura, 1982); thus, self-efficacy measures must assess a specific behavior or situation. The measure used in our study was intended to assess self-efficacy for participating in group exercise because the *Fe en Acción* intervention was delivered via group exercise.

This measure did not specifically address efficacy for muscle-strengthening PA, which may be perceived as more of an individual than group-level activity by Latinas. Thus, it is possible that our measure may not have provided an accurate and specific measurement of participants' self-efficacy for participating in muscle-strengthening activities. This indicates the need for development and/or adaptation of valid measures to assess self-efficacy and other psychosocial correlates of muscle-strengthening activities in Latinas.

Strengths, Limitations, and Conclusion

Our study had a number of limitations and strengths. *Fe en Acción* purposefully recruited a low-active sample of Latinas, which would explain the low prevalence of participants' meeting the guidelines for PA, and potentially limit variability to detect associations. Participants were all churchgoing Latinas, which could potentially influence their availability of social support (e.g., already have established social networks through church). Furthermore, participant eligibility was determined based on accelerometer-measured PA; this could potentially incentivize participants to modify their behavior in order to be eligible for study participation. The use of cross-sectional data further limits the implication of study findings. Additionally, the measures used in our study were not originally developed for muscle-strengthening activity; thus, findings from these measures should not be generalized. Future research can focus on development and validation of measures that are specific to muscle-strengthening PA. Preliminary findings from our study indicated the need for further research to examine how these sociodemographic and psychosocial factors mediate muscle-strengthening PA over time and in other subgroups of Latinas. Further exploration of such variables can guide development or adaptation of culturally tailored interventions that meet the specific needs of diverse Latina populations/communities. Despite these limitations, our findings contribute to the paucity of literature and support the need for further research on psychosocial correlates associated with muscle-strengthening PA in Latinas. This is an important step toward increasing PA and reducing the disproportionate burden of lifestyle-related disease in Latinas.

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References

Abraído-Lanza AF, Shelton RC, Martins MC, & Crookes DM (2017). Social norms, acculturation, and physical activity among Latina women. Journal of Immigrant and Minority Health, 19(2), 285–293. 10.1007/s10903-016-0519-7 [PubMed: 27837288]

Albright CL, Pruitt L, Castro C, Gonzalez A, Woo S, & King AC (2005). Modifying physical activity in a multiethnic sample of low-income women: One-year results from the IMPACT (increasing motivation for physical ACTivity) project. Annals of Behavioral Medicine, 30(3), 191–200. 10.1207/s15324796abm3003_3 [PubMed: 16336070]

American College of Sports Medicine. (2005). ACSM's guidelines for exercise testing and prescription (7th ed.). Lippincott Williams & Wilkins.

Armstrong T, & Bull F (2006). Development of the World Health Organization Global Physical Activity Questionnaire (GPAQ). Journal of Public Health, 14(2), 66–70. 10.1007/s10389-006-0024-x

Arredondo EM, Elder JP, Haughton J, Slymen DJ, Sallis JF, Perez LG, Serranao N, Parra MT, Valdivia R, & Ayala GX (2017). Fe en Acción: Promoting physical activity among churchgoing Latinas. American Journal of Public Health, 107(7), 1109–1115. 10.2105/AJPH.2017.303785 [PubMed: 28520484]

Arredondo EM, Haughton J, Ayala GX, Slymen DJ, Sallis JF, Burke K, Holub C, Chanson D, Perez LG, Valdivia R, Ryan S, & Elder J (2015). Fe en Accion/Faith in Action: Design and implementation of a church-based randomized trial to promote physical activity and cancer screening among churchgoing Latinas. Contemporary Clinical Trials, 45 (Pt. B), 404–415. 10.1016/j.cct.2015.09.008 [PubMed: 26358535]

Ashton RE, Tew GA, Aning JJ, Gilbert SE, Lewis L, & Saxton JM (2020). Effects of short-term, medium-term and long-term resistance exercise training on cardiometabolic health outcomes in adults: Systematic review with meta-analysis. British Journal of Sports Medicine, 54(6), 341–348. 10.1136/bjsports-2017-098970 [PubMed: 29934430]

Bandura A (1982). Self-efficacy mechanism in human agency. American Psychologist, 37(2), 122–147. 10.1037/0003-066X.37.2.122

Bateman LA, Slentz CA, Willis LH, Shields AT, Piner LW, Bales CW, Houmard JA, & Kraus WE (2011). Comparison of aerobic versus resistance exercise training effects on metabolic syndrome (from the studies of a targeted risk reduction intervention through defined exercise—STRRIDE-AT/RT). American Journal of Cardiology, 108(6), 838–844. 10.1016/j.amjcard.2011.04.037 [PubMed: 21741606]

Blackwell D, & Villarroel M (2018). Tables of summary health statistics for U.S. adults: 2017 National Health Interview Survey. National Center for Health Statistics.

Bronfenbrenner U (1977). Toward an experimental ecology of human development. American Psychologist, 32(7), 513–531. 10.1037/0003-066X.32.7.513

Brooks N, Layne JE, Gordon PL, Roubenoff R, Nelson ME, & Castaneda-Sceppa C (2006). Strength training improves muscle quality and insulin sensitivity in Hispanic older adults with type 2 diabetes. International Journal of Medical Sciences, 4(1), 19–27. 10.7150/ijms.4.19 [PubMed: 17211497]

Castaneda C, Layne JE, Munoz-Orians L, Gordon PL, Walsmith J, Foldvari M, Roubenoff R, Tucker KL, & Nelson ME (2002). A randomized controlled trial of resistance exercise training to improve glycemic control in older adults with type 2 diabetes. Diabetes Care, 25(12), 2335–2341. 10.2337/diacare.25.12.2335 [PubMed: 12453982]

Chrisman M, Daniel CR, Chow WH, Wu X, & Zhao H (2015). Acculturation, sociodemographic and lifestyle factors associated with compliance with physical activity recommendations in the Mexican-American Mano A Mano cohort. BMJ Open, 5(11), Article e008302. 10.1136/bmjopen-2015-008302

Church TS, Blair SN, Cocreham S, Johannsen N, Johnson W, Kramer K, Mikus CR, Myers V, Nauta M, Rodate RQ, Sparks L, Thompson A, & Earnest CP (2010). Effects of aerobic and resistance training on hemoglobin A1c levels in patients with type 2 diabetes: A randomized controlled trial. JAMA Journal of the American Medical Association, 304(20), 2253–2262. 10.1001/jama.2010.1710 [PubMed: 21098771]

Cornelissen VA, Fagard RH, Coeckelberghs E, & Vanhees L (2011). Impact of resistance training on blood pressure and other cardiovascular risk factors: A meta-analysis of randomized, controlled trials. Hypertension, 58(5), 950–958. 10.1161/hypertensionaha.111.177071 [PubMed: 21896934]

D'Alonzo KT (2012). The influence of marianismo beliefs on physical activity of immigrant Latinas. Journal of Transcultural Nursing, 23(2), 124–133. 10.1177/1043659611433872 [PubMed: 22294337]

Echeverria SE, Pentakota SR, Abraido-Lanza AF, Janevic T, Gundersen DA, Ramirez SM, & Delnevo CD (2013). Clashing paradigms: An empirical examination of cultural proxies and socioeconomic condition shaping Latino health. Annals of Epidemiology, 23(10), 608–613. 10.1016/j.annepidem.2013.07.023 [PubMed: 23972617]

Evenson KR, Sarmiento OL, Tawney KW, Macon ML, & Ammerman AS (2003). Personal, social, and environmental correlates of physical activity in North Carolina Latina immigrants. American Journal of Preventive Medicine, 25(3), 77–85. 10.1016/S0749-3797(03)00168-5 [PubMed: 14499813]

Herrmann SD, Heumann KJ, Der Ananian CA, & Ainsworth BE (2013). Validity and reliability of the global physical activity questionnaire (GPAQ). Measurement in Physical Education and Exercise Science, 17(3), 221–235. 10.1080/1091367X.2013.805139

Larsen B, Dunsiger SI, Pekmezi D, Linke S, Hartman SJ, & Marcus BH (2021). Psychosocial mediators of physical activity change in a web-based intervention for Latinas. Health Psychology, 40(1), 21–29. 10.1037/hea0001041 [PubMed: 33370154]

Lincoln AK, Shepherd A, Johnson PL, & Castaneda-Sceppa C (2011). The impact of resistance exercise training on the mental health of older Puerto Rican adults with type 2 diabetes. Journal of Gerontology: Series B: Psychological Sciences and Social Sciences, 66(5), 567–570. 10.1093/geronb/gbr034

Marin G, & Gamba RJ (1996). A new measurement of acculturation for Hispanics: The Bidimensional Acculturation Scale for Hispanics (BAS). Hispanic Journal of Behavioral Sciences, 18(3), 297–316. 10.1177/07399863960183002

Marquez B, Dunsiger SI, Pekmezi D, Larsen BA, & Marcus BH (2016). Social support and physical activity change in Latinas: Results from the Seamos Saludables trial. Health Psychology, 35(12), 1392–1401. 10.1037/hea0000421 [PubMed: 27669178]

Marquez B, Elder JP, Arredondo EM, Madanat H, Ji M, & Ayala GX (2014). Social network characteristics associated with health promoting behaviors among Latinos. Health Psychology, 33(6), 544–553. 10.1037/hea0000092 [PubMed: 24884908]

Martinez SM, Arredondo EM, Perez G, & Baquero B (2009). Individual, social, and environmental barriers to and facilitators of physical activity among Latinas living in San Diego County: Focus group results. Family & Community Health, 32(1), 22–33. 10.1097/01.FCH.0000342814.42025.6d [PubMed: 19092432]

Olson TP, Dengel DR, Leon AS, & Schmitz KH (2007). Changes in inflammatory biomarkers following one-year of moderate resistance training in overweight women. International Journal of Obesity, 31(6), 996–1003. 10.1038/sj.ijo.0803534 [PubMed: 17299382]

Pekmezi DW, Neighbors CJ, Lee CS, Gans KM, Bock BC, Morrow KM, Marquez B, Dunsiger S, & Marcus BH (2009). A culturally adapted physical activity intervention for Latinas: A randomized controlled trial. American Journal of Preventive Medicine, 37(6), 495–500. 10.1016/j.amepre.2009.08.023 [PubMed: 19944914]

Ramirez AG, Chalela P, Gallion K, & Velez LF (2007). Energy balance feasibility study for Latinas in Texas: A qualitative assessment. Preventing Chronic Disease, 4(4), A98. [PubMed: 17875273]

Rhodes RE, Lubans DR, Karunamuni N, Kennedy S, & Plotnikoff R (2017). Factors associated with participation in resistance training: A systematic review. British Journal of Sports Medicine, 51(20), 1466–1472. 10.1136/bjsports-2016-096950 [PubMed: 28404558]

Saelens BE, Gehrman CA, Sallis JF, Calfas KJ, Sarkin JA, & Caparosa S (2000). Use of self-management strategies in a 2-year cognitive-behavioral intervention to promote physical activity. Behavior Therapy, 31(2), 365–379. 10.1016/S0005-7894(00)80020-9

Sallis JF, Hovell MF, Hofstetter CR, Faucher P, Elder JP, Blanchard J, Caspersen CJ, Powell KE, & Christenson GM (1989). A multivariate study of determinants of vigorous exercise in a community sample. Preventive Medicine, 18(1), 20–34. 10.1016/0091-7435(89)90051-0 [PubMed: 2710760]

Sallis JF, Owen N, & Fisher E (2015). Ecological models of health behavior. In Glanz K, Rimer BK, & Viswanath KV (Eds.), Health behavior: Theory, research, and practice (pp. 43–64). Jossey-Bass.

Skowron MA, Stodolska M, & Shinew KJ (2008). Determinants of leisure time physical activity participation among Latina women. Leisure Sciences, 30(5), 429–447. 10.1080/01490400802353174

Spector D, Battaglini C, & Groff D (2013). Perceived exercise barriers and facilitators among ethnically diverse breast cancer survivors. Oncology Nursing Forum, 40(5), 472–480. 10.1188/13.ONF.472-480 [PubMed: 23989021]

Stamatakis E, Lee IM, Bennie J, Freeston J, Hamer M, O'Donovan G, Ding D, Bauman A, & Mavros Y (2017). Does strength promoting exercise confer unique health benefits? A pooled analysis of eleven population cohorts with all-cause, cancer, and cardiovascular mortality endpoints. American Journal of Epidemiology, 187(5), 1102–1112. 10.1093/aje/kwx345

Stodolska M, & Shinew KJ (2010). Environmental constraints on leisure time physical activity among Latino urban residents. Qualitative Research in Sport and Exercise, 2(3), 313–335. 10.1080/19398441.2010.517038

Troiano RP, Berrigan D, Dodd KW, Mâsse LC, Tilert T, & McDowell M (2008). Physical activity in the United States measured by accelerometer. Medicine and Science in Sports and Exercise, 40(1), 181–188. 10.1249/mss.0b013e31815a51b3 [PubMed: 18091006]

U.S. Department of Health and Human Services. (2018). Physical activity guidelines for Americans (2nd ed.). https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf

Vezina JW, Der Ananian CA, Greenberg E, & Kurka J (2014). Sociodemographic correlates of meeting US Department of Health and Human Services muscle strengthening recommendations in middle-aged and older adults. Preventing Chronic Disease, 11, E162. 10.5888/pcd11.140007 [PubMed: 25232749]

Table 1.

Characteristics of *Fe en Acción* Participants at Baseline (n = 436).

Sociodemographics	***M* (*SD*)**
Age (years)	44.41 (9.59)
Body mass index (kg/m^2; n = 434)	30.33 (6.23)
Years in the United States (n = 436)	20.96 (10.29)
	n (%)
Ethnicity (n = 436)	
Mexican	346 (79.4)
Mexican American	33 (7.6)
Hispanic, Latina, or Chicana	57 (13)
Education (n = 434)	238 (54.8)
Less than high school	196 (45.2)
Completed high school or higher Acculturation	
Adheres to non-Hispanic domain (n = 419)	135 (32.2)
Adheres to Hispanic domain (n = 428)	424 (99.1)
Marital status (n = 432)	
Married/living as married	334 (77.3)
Single or nonpartnered	98 (22.7)
Employment status (n = 433)	
Full-time, part-time, self-employed, or seasonal	285 (65.8)
Not employed	148 (34.2)
Number of children (<18 years) living in household (n = 426)	
None	103 (24.2)
1–3	297 (69.7)
≥4	26 (6.1)
Monthly household income (n = 405)	
<$2,000	236 (58.3)
≥$2,000	169 (41.7)
Physical activity	

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Sociodemographics	*M (SD)*
Number of days doing muscle-strengthening activities ($n = 432$)	
None	335 (77.5)
1 day/week	14 (3.2)
2 days/week	25 (5.8)
3 days/week	31 (7.2)
≥4 days/week	27 (6.3)
	M (SD)
ActiGraph accelerometer minutes/week PA ($n = 426$)	
Moderate intensity PA	102.15 (62.9)
Vigorous Intensity PA	1.05 (5.0)

Note. Individual *n* values may vary due to missing data. PA = physical activity.

Table 2.

Baseline Associations Between Sociodemographic Variables and Muscle-Strengthening PA (Meeting vs. Not Meeting the National Guidelines).

Variable	Not meeting guidelines, *M* (*SD*)	Meeting guidelines, *M* (*SD*)	*t*	*p*	*r*
Age	44.26 (9.43) (*n* = 349)	44.18 (10.18) (*n* = 83)	−0.79	.43	.038
Number of children <18 years in household	1.56 (1.56) (*n* = 349)	1.63 (1.40) (*n* = 80)	−0.39	.70	.019
Self-efficacy for group PA	3.39 (0.95) (*n* = 323)	1.63 (1.40) (*n* = 78)	−1.33	.18	.067
Social support for PA (no. of people providing support)	1.23 (1.07) (*n* = 348)	1.65 (1.23) (*n* = 83)	−3.14	.001	.150**
Behavioral strategies for PA	2.86 (2.32) (*n* = 330)	4.80 (2.60) (*n* = 76)	−6.44	.001	.305**
Barriers to PA (sum total barriers)	25.35 (11.13) (*n* = 189)	21.51 (10.62) (*n* = 51)	2.21	.03	−.142*

Note. Meeting national guidelines for muscle-strengthening PA is defined as engaging in ≥2 days per week of muscle-strengthening activities. PA = physical activity.

* $p < .05$.

** $p < .01$.

Table 3.

Bivariate Correlations Among Psychosocial and Sociodemographic Variables.

Variable	Perceived efficacy for exercise	Behavioral strategies	Barriers to physical activity	Social support (total number of persons)
Psychosocial variables				
Perceived efficacy for exercise	—			
Behavioral strategies	.242**	—		
Barriers to physical activity	−.091	−.203**	—	
Social support (total number of persons)	.147*	.255**	−.076	—
Sociodemographic variables				
Age	−.036	−.081	−.021	.021
Education (≥high school vs. less)	.200**	.187**	−.063	.059
Acculturation	.142*	.269**	−.022	.127
Married versus not	.011	.089	.061	.028
Employed versus not	−.137	.075	−.034	.007
Children versus not	−.080	−.038	−.033	.018
Monthly income ≥$2,000 versus less	.012	−.073	−.004	−.069

* $p < .05$.

** $p < .01$.

Table 4.

Hierarchical Logistical Regression of Associations Between Sociodemographic and Psychosocial Factors With Meeting Guidelines for Muscle-Strengthening PA Among Latina Participants in *Fe en Acción* (*n* = 193).

		***OR* [95% CI]**		
Variable	**R^2 change**	**Block 1**	**Block 2**	**Block 3**
Sociodemographics, R^2 = .05				
Age		1.04 [0.99, 1.08]	1.05 [1.00, 1.10]	1.05 [1.00, 1.10]
Education (≥high school vs <high school)		0.55 [0.25, 1.23]	0.84 [0.35, 2.05]	0.84 [0.34, 2.07]
Acculturation		0.97 [0.43, 2.21]	1.01 [0.41, 2.50]	1.08 [0.43, 2.71]
Married		0.87 [0.32, 2.32]	0.73 [0.25, 2.16]	0.72 [0.24, 2.15]
Employed		1.66 [0.77, 3.58]	1.54 [0.66, 3.59]	1.54 [0.65, 3.63]
Children in home		0.51 [0.17, 1.49]	0.32 [0.09, 1.10]	0.34 [0.10, 1.18]
Monthly income (≥$2,000 vs. <$2,000)		0.72 [0.34, 1.51]	0.92 [0.40, 2.12]	0.94 [0.41, 2.18]
Individual psychosocial factors, R^2 = .260	.21			
Perceived efficacy for group exercise			1.40 [0.85, 2.30]	1.34 [0.81, 2.21]
Behavioral strategies			1.43 [1.21, 1.69]	1.39 [1.18, 1.65]
Physical activity barriers to exercise			0.98 [0.95, 1.02]	0.98 [0.95, 1.02]
Interpersonal (Social support for PA), R^2 = .275	.02			
Number of persons				1.30 [0.93, 1.81]

Note. PA = physical activity.