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Using web-based technology to promote physical activity in Latinas: Results of the Muévete Alabama pilot study

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Abstract

Latinas in the U.S. report high levels of physical inactivity and are disproportionately burdened by related health conditions (ex., Type 2 Diabetes, obesity), highlighting the need for innovative strategies to reduce these disparities. A one-month single-arm pre-posttest design was utilized to assess the feasibility and acceptability of a culturally and linguistically adapted Internet-based physical activity intervention for Spanish-speaking Latinas. The intervention was based on the Social Cognitive Theory and the Transtheoretical Model. Changes in physical activity and related psychosocial variables were measured at baseline and the end of the one-month intervention. The sample included 24 Latina adults (mean age= 35.17±11.22). Most (83.3%) were born outside of the continental United States. Intent-to-treat analyses showed a significant increase ($p=.001$) in self-reported moderate-to-vigorous intensity physical activity from a median of 12.5 minutes per week at baseline to 67.5 minutes per week at the one-month assessment. Participants reported significant increases in self-efficacy as well as cognitive and behavioral processes of change. Nearly half (45.8%) of the participants reported advancing at least one stage of change during the course of the one-month intervention. Findings support the feasibility and acceptability of using interactive Internet-based technology to promote physical activity among Latinas in Alabama.

Keywords

Exercise; Health Disparities; Latina; Women; Internet

Introduction

Regular performance of physical activity can reduce the risk of premature death and various chronic diseases, including heart disease, stroke, Type 2 Diabetes, high blood pressure, colon and breast cancers, and can help to control weight, improve fitness and reduce depression.¹ Despite these benefits, most Americans do not meet the national guidelines of performing at least 150 minutes/week of moderate intensity aerobic physical activity (PA).² This represents a public health concern and calls for intervention.

Technology-based platforms have rapidly changed the landscape for delivering physical activity interventions in nursing research and practice in recent years. Internet-based interventions for promoting physical activity can help to overcome many of the barriers of face-to-face interventions, have the potential to reach a large segment of the population at a relatively low cost, and have been widely used for promoting physical activity in predominantly non-Hispanic White populations.³ However, few published interventions have harnessed technology-based approaches to promote PA in minority populations,³ despite the need and likely appeal.

Latinos are the largest ethnic minority in the United States,⁴ and suffer marked physical activity related health disparities. According to the U.S. Census Bureau, Latinos (53 million) made up 17% of the U.S. population growth between 2000 and 2010, accounting for more than half of the nation's population growth.⁵ Latinos report particularly low rates of physical activity and are disproportionately affected by related health conditions, especially Latinas who are even less physically active than Latino men.⁶ Only 38.2% of Latinas, or Hispanic females, in the United States meet the federal guidelines for performance of aerobic physical activity.⁷ Latinas are disproportionately affected by health conditions related to physical inactivity, such as diabetes and stroke⁶ and are more likely to be obese than non-Hispanic White women.⁸

Thus, while there is an obvious need for innovative approaches to promote physical activity in Latinas, the evidence of Internet based intervention in this community is mounting. There has been a rapid growth in Internet access among Latinos in recent years.^{9,10} Web-based interventions with Latinas have shown success in promoting healthy behaviors such as smoking cessation¹¹ and the treatment of depression;¹² yet, the use of such technologies to promote PA through culturally and linguistically appropriate interventions among Latinas remains scarce.

Interventions aimed at reducing health disparities in Latinas must address the unique social and cultural factors that influence performance of physical activity including low English language proficiency,^{13,14} family responsibilities, lack of social support,¹³⁻¹⁶ perception of weight and body image, and concerns for neighborhood safety lack of safe places to exercise.¹⁵ Previous efforts for increasing physical activity among Latinas adults have commonly involved face-to-face interventions.¹⁷ Although a number of these have shown success in promoting PA, they are still subject to barriers of face-to-face interventions commonly reported by Latinas such as lack of transportation, taking time away from family, and/or fear of immigration authorities.¹⁵ In fact, rapid increases in the Latino population

have been met with harsh immigration laws in some states, which can further impede their ability to participate in traditional face-to-face physical activity programs.

Over the past decade, some of the fastest growing Latino populations have been in the southeastern United States. For example, in the state of Alabama, the Hispanic population grew 158% (to 186,209) between 2000 and 2011, more than any other state.¹⁸ In 2011, Alabama passed one of the strictest state laws intended to decrease undocumented immigration, and these included permission of state and local police to ask for immigration papers during routine traffic stops, decreed most contracts with illegal immigrants unenforceable, and required schools to assess the immigration status of children at registration time.¹⁹ Given the political climate in this region at that time, new strategies, such as Internet-based approaches appeared necessary for reaching a greater number of Latinas and intervening to close the gap in PA-related health disparities in this population.

Thus, the goals of the current study were to examine the feasibility and acceptability of using interactive Internet technology to promote physical activity among Latinas in Alabama. A PA Internet intervention that was based on the Social Cognitive Theory (SCT)²⁰ and the Transtheoretical Model (TTM)²¹ was provided for one month. The Social Cognitive Theory explains human behavior as the result of the dynamic interaction between personal, behavioral and environmental influences²⁰ while Transtheoretical Model views behavioral change as a process in which individuals' progress through a series of stages in order to change a behavior. Specific aims of the current study included: 1) assessing changes in physical activity from baseline to one-month assessment; and 2) assessing changes in SCT and TTM constructs directly targeted by the intervention (i.e., social support,²² self-efficacy,²³ stages of change,²³ processes of change²⁴) from baseline to one-month assessment. PA was measured using the 7-Day Physical Activity Recall,²⁵ a structured interview in which participants were asked to recall the previous 7 days of physical activity. To corroborate self-report data, participants were asked to wear ActiGraph accelerometers (small, lightweight devices worn on hip to monitor the frequency, duration and intensity of PA) over the same time period.

Methods

Study Design

In this pilot study, Muévete Alabama, a single-arm pre-posttest design was utilized to assess the feasibility and acceptability of this Spanish language and individually tailored physical activity website for Latinas. Thus, all participants received the same one-month trial of the intervention. There was no control arm in this study given the early stage of research on Internet-based interventions to promote PA in Latinas. The intervention was adapted from the Pasos Hacia La Salud study, which is ongoing in San Diego, California (R01CA159954). Changes in physical activity (as measured by Seven Day Physical Activity Recall interviews) and related psychosocial variables were measured at baseline and one-month. Secondary aims of this pilot study included gaining familiarity and experience working with the target population in this region and eliciting participant feedback to help inform our future physical activity intervention efforts.

Participants

The study sample was comprised of 24 Latinas. Eligibility criteria for study enrollment included: a) aged 19–65 years, b) insufficiently active at baseline assessment (defined as 60 minutes of self-reported physical activity per week), c) self-identified as Spanish speaking and Hispanic or Latina, d) had access to the Internet either at home, work or through a friend/family member, and e) self-report of no history of any medical condition that would prevent participation in physical activity or could worsen with changes in physical activity. Exclusion criteria included: a) current pregnancy or planning to become pregnant within two months, b) Body Mass Index (BMI) over 40 kg/m², c) current participation in any other physical activity promotion or related program, d) history of heart disease, stroke or any other health condition that would make physical activity unsafe, and e) self-reported hospitalization for a psychiatric disorder within the previous three years.

Recruitment

Participants were recruited in a metropolitan area in Alabama beginning in fall of 2013 and continued through December 2013. A variety of recruitment strategies were used, including: distribution of study flyers, word-of-mouth, and face-to-face announcements by Spanish-speaking staff at local community organizations (i.e., non-profit organizations for Hispanic families and individuals, churches, and the public library). Upon distribution of flyers and announcements, interested participants called a research staff member to complete a telephone eligibility screening interview and receive an in-depth explanation about the study. The telephone screening interview included the Physical Activity Readiness Questionnaire, an exercise readiness tool that is recommended by the American College of Sports Medicine to assess risk from performance of physical activity.²⁶

Procedure

After eligibility was established, interested participants were scheduled to attend an orientation session to learn more about the study. The next appointment was the baseline assessment, in which participants completed the Seven Day Physical Activity Recall interview and related psychosocial questionnaires. At this visit participants also received a log on identification and password to access the study website, demonstration on website features, and instructions to visit the website and complete online questionnaires in order to receive tailored PA feedback and track their PA over the next month. At one-month, participants returned to the research center to complete the same assessments performed at baseline, along with a consumer satisfaction questionnaire. All study activities and materials/measures were provided in Spanish by a bilingual/bicultural research staff member. Training and quality control of research staff were conducted by staff in San Diego involved in this line of research and the follow up randomized controlled trial (RO1 CA159954). All study procedures were approved by the University's Institutional Review Board (IRB).

Description of Intervention

All participants received access to a culturally/linguistically adapted theory-driven physical activity promotion website for Latinas (Muévete Alabama, adapted from CA159954). Upon

logging in to the website, participants were prompted to complete psychosocial measures and received individually tailored physical activity counseling messages based upon their responses. A report was provided on: 1) current stage of motivational readiness for physical activity; 2) increasing self-efficacy for physical activity; 3) cognitive and behavioral strategies associated with physical activity (processes of change); and 4) how the participant compares to individuals who are physically active and with national guidelines for physical activity (normative feedback). This feedback was drawn from a bank of over 300 messages addressing different levels of these psychosocial and environmental factors affecting physical activity.^{27–29} Additional components of the study website included exercise videos of Latinas exercising to Latin music (salsa, merengue, etc.) and numerous website links for physical activity advice and information.

To encourage self-monitoring, participants were given pedometers and encouraged to track their activity daily on the website and set weekly physical activity goals on a calendar and produce graphs comparing their actual physical activity to their goals. Previous studies have shown that social support can be an important determinant of exercise behavior among Latinas;^{13,16} thus, the current intervention was adapted to further promote social support for exercise through the provision of a guest log on identification and password so a friend or family member could access the website, additional pedometers for family and/or friends, and a pamphlet on increasing social support for exercise. Participants were prompted by email to use the website twice during this period. The email included reminder information on how to use the website features and encouraged them to contact research staff for further website instruction.

The intervention was based on Social Cognitive Theory²⁰ and the Transtheoretical Model²¹ and has received empirical support from studies with mostly White, Non-Hispanic samples,^{27,30} as well as among Latinas when delivered in print-based format.^{29,31} Table 1 illustrates the application of these theoretical mediators and how key constructs were targeted by the intervention. Extensive formative research was conducted to ensure that this intervention was culturally and linguistically appropriate for Latinas,^{27,28} including translation/back translation of research materials and measures. A well-established process of translation, often used in multilingual research, involves forward translation (from English to Spanish) by one bilingual/bicultural translator, followed by back translation (from Spanish back to English) by another independent translator. Both English versions are then compared to ensure that the original version remains conceptually and culturally equivalent; this involves an iterative process in which any discrepancies between two independent translations are discussed by the research team until consensus is reached. Six focus groups were conducted to explore physical activity barriers for Latinas, and 25 cognitive interviews helped clarify the text and ensure key intervention messages were not lost in translation (see Pekmezi et al.²⁹ for further detail). When feedback indicated that delivery via technology-based channels might increase reach and appeal, another round of focus groups (n=19) specifically addressing Internet usage among Latinas was conducted to further inform our intervention refinement process.

Measures

At baseline, demographic information on participant's age, education, income, number of children living in the home, marital status, and country of origin was collected using a self-reported questionnaire. Acculturation was assessed using the Short Acculturation Scale for Hispanics,³² which is a 12-item scale developed to measure different dimensions of acculturation (such as language, media use, and social networks) in Hispanics. This measure has good internal consistency (Cronbach alpha = .92) and validity, demonstrating a correlation between acculturation score and participants' generation ($r = .65$) comparable to other measures of acculturation.³²

Physical activity was assessed at baseline and one-month time points using the Seven Day Physical Activity Recall.²⁵ The Seven Day Physical Activity Recall is a semi-structured interview that assesses the frequency, duration, and intensity of physical activity. It provides an estimate of minutes per week of physical activity performed in continuous bouts of ten minutes or greater. The Seven Day Physical Activity Recall has shown acceptable reliability and validity with Latino populations³³ and has been validated against objective measures of PA such as doubly labeled water³⁴ and Caltrac activity monitors.³³ To corroborate self-report physical activity findings, participants were instructed to wear an ActiGraph accelerometer (GT3X and GT3X+ models) during waking hours for seven days prior to their baseline and one-month assessments.

Psychosocial variables were assessed at baseline and one-month. Social support from family and friends for physical activity was assessed using the 10-item Social Support for Exercise Scale,²² which has previously shown acceptable test-retest reliability (.79 and .77 for the friends and family scales respectively, $p < .0001$) and internal consistency (Cronbach alpha coefficients = .84 and .91 for friends and family scales).²² Self-Efficacy was assessed using a five-item instrument ($\alpha = .82$) that measures confidence for exercising²³ and has been used often in PA studies. A 40-item questionnaire²⁴ that has been used in many PA studies, was used to measure the 10 cognitive and behavioral processes of change associated with progressing through the stages of behavioral change in the TTM.²¹ Internal consistency for the 10 processes of change subscales ranged from .62 to .96.²⁴ To categorize participants into stages of change (precontemplation, contemplation, preparation, action, maintenance), a four-item measure with previously established reliability and validity was used.²³ Feasibility and acceptability of the web-based intervention was assessed at the one-month post-intervention follow-up using a 21-item consumer satisfaction questionnaire, which has been used in numerous studies and was adapted for the current study.^{29,31}

Treatment Fidelity

Several strategies of treatment fidelity³⁵ were used to monitor the external reliability and validity of the intervention. The website and study handouts were reviewed in practice sessions by Spanish speaking females not enrolled in the study for clarity and ease of use prior to beginning participant recruitment. To assess whether participants used the behavioral skills provided in the intervention (treatment receipt and enactment), participants completed a consumer satisfaction questionnaire at the one-month assessment which included questions regarding the use skills received during the intervention. The consumer

satisfaction measure included questions such as “Did the staff explain the study in a way that was easy to understand?”, “How many of the exercise tip links did you read?”, “Who did you give the pedometer to [or guest website access to]?”

Statistical Analysis

Sample characteristics, stages of change, and consumer satisfaction questionnaire data were summarized. Paired t-tests were conducted to examine pre-post intervention changes in self-efficacy and processes of change. Self-reported PA and social support did not meet assumptions of normality, and thus were analyzed using Wilcoxon signed rank tests. Intent-to-treat analyses were conducted with baseline values carried forward for case of missing data at the one-month follow-up.

Results

Recruitment and Sample Characteristics

Forty-six Latinas expressed interest in the study and were screened for study eligibility. Of these, 33 were eligible to participate and 24 provided informed consent and enrolled in the study. Nine participants did not enroll in the study due to lack of time and loss to follow-up. At the completion of the one-month intervention, 21 participants provided follow-up data; indicating a retention rate of 88%. Reason for participant withdrawal from the study included medical issues (n=1), lack of time (n=1) and loss of contact (n=1).

Latinas enrolled in the study (n=24) were between the ages of 21–61 years (M=35.17, SD=11.22), BMI at baseline was 27.32 kg/m² (SD=4.76). Most of the women were born outside of the continental United States (83.3%) and reported low levels of acculturation (n=22, 91.7%). Ethnic background included Mexico (n= 15, 62.5%), Colombia (n=3), Guatemala (n=2), one each from Puerto Rico, Venezuela, Peru, and Argentina. Approximately half of the participants reported highest level of education as completion of high school or less (n=13, 54.2%) and reported a household income of less than \$30,000 annually (n=12, 57.1%). Most of the women were either married or living with a partner (n=16, 66.7%) and had at least one child 18 years of age or younger residing in the home. Table 2 illustrates complete demographic characteristics of participants.

Changes in Physical Activity

Participants reported a statistically significant increase (p= .001) in self-reported moderate-to-vigorous physical activity from baseline (median=12.5 minutes per week) to the one-month assessment (median= 67.5 minutes per week). There were no significant correlations between the Seven Day Physical Activity Recall and accelerometer measured moderate-to-vigorous PA performed in ten minute bouts or greater at baseline (rho = -.386, p=.114) or one-month assessment (rho = .347, p=.224). This may be due to issues related to the small sample size and adherence to the accelerometer wear protocol as only 11 participants wore accelerometers for at least 10 hours/day on 4 or more days during the week before their baseline and one-month assessments. Of the 18 participants who provided valid accelerometer data at baseline, only two participants engaged in continuous bouts of 10 minutes or longer of moderate-to-vigorous intensity physical activity, recording 23 and 26

total minutes/week of moderate-to-vigorous physical activity. At one month, 14 participants provided valid accelerometer data and four of these women engaged in at least one ten-minute bout of physical activity. The median minutes per week of physical activity for these four participants was 24.5 ($SD=14.5$, Range 12.5 to 45).

Changes in Psychosocial Variables

Nearly half (45.8%) of participants reported advancing at least one stage of change during the course of the one-month intervention. Participants reported significant increases in self-efficacy ($p=.006$) as well as cognitive ($p=.017$) and behavioral ($p=.002$) processes of change from baseline to one-month. While trends in the data indicate that social support from friends and family increased from baseline to one-month, these findings were not significant. Table 3 illustrates pre-post changes in PA and psychosocial variables.

Consumer Satisfaction

All participants who completed the consumer satisfaction questionnaire at the one-month assessment ($n=21$, 100%) reported gaining some knowledge about exercise from the program, felt “somewhat” to “very” motivated to start or continue exercising as a result of using the website, found the messages on the website to be “somewhat” to “very” enjoyable and would recommend the website to family or friends. Further, they (100%) reported being “somewhat” to “very” satisfied with the Muévete Alabama program.

The women all reported ($n=21$, 100%) reading at least some exercise tip links on the website during the intervention period and most ($n=18$, 85.7%) gave the additional pedometer and guest logon to a person in their social network. The women usually reported giving the pedometer to family members—particularly to their child ($n=7$, 29.2%) or partner/spouse ($n=3$, 12.5%), while others gave it to a friend ($n=5$, 20.8%) or other person ($n=3$, 12.5%). Similarly, 6 participants (28.6%) gave the website access to their child, 3 (14.3%) to a partner or spouse, 5 (23.8%) to a friend and 4 (19%) to another person.

Discussion

The purpose of our pilot study was to evaluate the feasibility and acceptability of using interactive web-based technology to promote physical activity in Spanish-speaking Latinas. The results indicate that the culturally and linguistically adapted, theory-driven (Social Cognitive Theory and the Transtheoretical Model) Internet-based physical activity intervention for Latina adults produced significant increases in self-reported moderate-to-vigorous intensity PA, processes of change, and self-efficacy for physical activity. Further, nearly half (45.8%) of the participants advanced at least one stage of change from baseline to post-intervention. Overall, findings from the consumer satisfaction measure, along with high participant retention (87.5%), indicate that the program was well-received.

Increases in self-reported moderate-to-vigorous intensity PA found in our study are consistent with findings from previous physical activity interventions with Latinas that have relied on the use of self-reported measurement of physical activity.²⁹ In both Pasos Adelante, which included both male and female Mexican American adults, and Las Mujeres Saludables, comprised solely of Latina adults, physical activity increased from 73.7 minutes

per week preprogram to 138.1 minutes per week of moderate intensity walking at the 12-week post-program assessment³⁶ and from 65.15 to 122.40 minutes per week physical activity from baseline to the 12-week follow-up,³⁷ respectively. In Seamos Activas, an intervention to promote PA in Latina adults, participants reported significant increases in moderate-to-vigorous intensity PA from 16.56 at baseline to 147.27 at 6-months.²⁹ In comparison, our findings from Muévet Alabama are modest; however, further investigation is merited given the short duration of the study and new approach of using Internet technology to promote PA in this population.

Other interventions have shown success in using web-based approaches to promote PA but included primarily non-Hispanic White populations. For example, Dunton and Robertson³⁸ used a randomized controlled trial to assess an intervention promoting PA in a sample of mostly White middle-aged women and found that participants in the intervention group increased their self-reported moderate-to-vigorous physical activity from baseline to three months by 32 minutes per week, whereas the control group decreased by 25 minutes per week.³⁸ Although literature indicates that Internet technology has been commonly used to promote PA in adults,³ the use of Internet-based PA interventions in minority populations remains scarce. In one of the few published studies using web-based technology to promote PA in minority populations,³⁹ a 3-month pre-posttest intervention consisting of a culturally relevant PA website and structured exercise classes was used in a sample of overweight/obese African American female college students. Changes in moderate-to-vigorous PA in this study were not significant from baseline to 3-months; however, participants reported favorable findings regarding the feasibility and acceptability of using an Internet-enhanced approach to promote PA.³⁹

Similar to the findings of a study conducted by Joseph et al,⁴⁰ accelerometer measured moderate-to-vigorous intensity PA performed in bouts of ten minutes or greater did not correlate with self-reported PA (performed in bouts of 10 minutes or more) in Muévet Alabama. Non-adherence to the accelerometer-wear protocol by study participants and the small sample size may contribute to the lack of correlation between self-reported and accelerometer-measured physical activity. Few intervention studies have used accelerometers in this target population, and although a higher adherence to accelerometer wear was reported,^{41–44} minimum wear time required to have valid data in these studies^{41,43,44} was different than in our study. For example, Ainsworth et al's⁴¹ study of sedentary postpartum Latinas reported that 86% of participants at baseline were adherent to accelerometer protocol of at least 10 hours a day on 3 or more days during the week. Another study that examined adherence to accelerometer wear and performance in Latino male and female adults found that 77.7% of participants were adherent to accelerometer wear on at least 3 out of 6 days during 10 hours or more per day.⁴⁴ Interestingly, both Marquez⁴³ and Evenson⁴⁴ reported that adherence to accelerometer wear protocol in their studies was higher in males than in females. Matthews et al⁴⁵ recommends accelerometers be worn 3–4 days in order to identify PA levels with at least 80 percent reliability; thus, the more rigorous protocol of 4 days of minimum accelerometer wear (at least 10 hours/day) was selected for Muévet Alabama. Despite our best efforts (power point presentation, handouts explaining accelerometer wear protocol, demonstration on how to wear and discussion of adherence to wear time protocol) only 11 participants (52.4% adherence) wore

the accelerometers correctly at both assessment periods in the current study, which limits the conclusions we can draw from the available objective data. Of the 11 participants who adhered to accelerometer wear protocol, two participants at baseline and four participants at one-month had 10-minute or greater bouts of accelerometer-measured PA, therefore, PA in this subset could not be correlated with PAR data. Future researchers attempting to use accelerometers should consider providing more frequent reminders to adhere to accelerometer wear protocol than the one-time reminders used in our study.

Another possible explanation for the discrepancy between the self-report and accelerometer data could be that the participants were not accurately self-reporting moderate-to-vigorous PA. Thus, future researchers should consider providing more hands-on demonstrations of different intensities of physical activity. In our study, physical activity intensities were verbally explained to participants but future studies should consider incorporating the use treadmills or hall way walks to demonstrate intensities of physical activity, as was used in the Seamos Saludables study.³¹

Previous physical activity interventions with Latinas have shown success for increasing social support through exercise or walking partners,^{46–48} using multiple approaches such as having the participant select an exercise partner from their own social network,⁴⁷ being assigned to or paired-up with another study participant,⁴⁶ or enrolling in a study as friend or family pairs.⁴⁸ In our study, the lack of significant pre-posttest increases in social support may be due to participants having to select their own social support partner to share the website with and give a pedometer to, as opposed to being assigned an exercise partner as part of the study. A potential limitation of this approach is that it relied on the use of existing social support networks, making it challenging for participants without social networks to select an exercise partner. However, the majority of participants (n=18, 85.7% of study completers) in our study reported giving the pedometer and/or the website log on to a person within their social network. Moreover, social support handouts and discussion occurred once during the one-month duration of the study; perhaps these intervention strategies were not comprehensive enough to produce a significant increase in social support over a short period of time. Future studies should examine whether the use of more intensive strategies, provided over longer term interventions, are more effective in increasing social support in Latina adults.

There were a number of limitations to our study. The study used a one group pre-posttest design. Given the early stage of research, this allowed us to beta test the program and collect some preliminary feedback from the community on its appeal in a cost-effective manner prior to advancing to a larger, more costly clinical trial. However, such a design leaves the study open to threats to internal validity such as history, or concurrent events that may be responsible for changes in outcome variables. Moreover, while self-report data indicates that the women logged on to the website, objective website usage data was not available for this study. Another limitation is the small sample size, which can reduce statistical power to find significant outcomes. Lastly, while comparable in length to other physical activity interventions with Latinos,⁴⁹ the short duration of the Internet-based intervention did not allow for assessment of longer-term sustainability of behavioral changes.

This study has a number of strengths. To our knowledge, this line of research represents the first foray into theory-based culturally and linguistically adapted Internet-delivered physical activity interventions targeting Latina adult populations, along with the ongoing randomized controlled trial, Pasos Hacia La Salud in San Diego RO1CA159954. The use of a web-based intervention provides an innovative approach to reach this at-risk population and reduce existing physical activity-related health disparities. This is particularly important as recent data indicate Latinas have Internet access similar to non-Hispanic Whites and are even more likely than non-Hispanic Whites to have accessed physical activity, diet and nutrition information online.⁵⁰ The web-based intervention used in this study provided health information that was culturally and linguistically adapted to meet the needs and cultural values of Latinas, and can help to overcome barriers common in face-to-face interventions such as lack of transportation, childcare and family responsibilities, and fear of immigration authorities.¹⁵

There are several considerations for both nursing research and nursing practice that emerge from this report. First, for both clinicians and investigators, the use of technology in delivering interventions and treatment appears to be a viable strategy across age groups among Latinas. The ease, convenience, motivation enhancement, and acceptability of such strategies was evident in this study. Second, several critical elements deployed in the Social Cognitive Theory and Transtheoretical Model Stages of Change processes appear to show utility for this cultural subgroup: self-efficacy as well as cognitive and behavioral processes of change such as self-rewards and self-reminders. These are strategies that nurses might use to enhance PA motivation among Latinas. Last, both clinicians and investigators need to be specific about differentiating self-report assessment of PA in contrast to objective measures. Clinicians require detail in assessing client PA activity in terms of dose, frequency, and type to help clients with development of individual strategies to increase PA. Similarly, nurse investigators have a battery of technologies to deploy both as motivational tools and precise outcomes of intervention effects, such as pedometers, wrist technology (i.e., “fitbit”), and accelerometry. Internet based studies, such as Muévete Alabama, have the potential to reach a great number of individuals in efforts to promote physical activity and reduce related health disparities. Once web-based interventions are developed they can be sustained at relatively low cost and with limited support from research staff, whereas face-to-face interventions are labor intensive and require greater personnel demand. Participants in our study received two email reminders from study staff to access the website; however, a website to promote physical activity could be sustained over longer periods of time with little, if any, contact with research staff. In fact, during the course of our study, a number of participants expressed interest in continuing to use the website beyond completion of the study.

Given the unique factors that influence physical activity in Latinas and the paucity of literature on Internet-based interventions in this population, further research involving longer-term studies with randomized controlled trial designs (such as Pasos Hacia La Salud) will be necessary to determine the efficacy of this approach for promoting physical activity with Latinas. Latinos are the largest ethnic minority in the United States ⁴ with marked disparities in physical activity and related medical conditions,^{6,8} yet culturally appropriate physical activity interventions that specifically target the unique needs of this population

remain scarce. Muévete Alabama contributes to the current gap in literature on innovative ways to reduce health disparities in Latinas.

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Table 1

Theoretical constructs addressed by intervention components.

Theoretical Construct ¹	Critical Inputs	Intervention Component
Self-regulation (SCT)	Goal Setting	Goal setting feature and activity monitoring calendar on website
	Self-monitoring behavior	Two pedometers given to each participant (one for herself and one for a friend/family member) Activity monitoring calendar on website allows participants to enter amount and type of PA performed each day
	Enlistment of social support	Brochure with information on social support for exercise Provided with additional pedometer for walking/ exercise partner Guest log on given to participant for a friend or family member to access the website
Outcome expectations (SCT)	Belief that the behavior will lead to desired outcomes	Website tip sheet and links provide information on benefits of PA
Self-efficacy (SCT, TTM)	Vicarious experience/observational learning	Exercise videos demonstrating Latinas exercising to Latin music
	Mastery experience Verbal persuasion Somatic/emotional states	Participants complete questionnaires (Self-Efficacy, Stages of Change, Processes of Change questionnaires) on the website and receive an individually tailored feedback report on increasing PA. Website content and individually tailored message provides information on improving self-efficacy for physical activity (e.g., explaining that they are already doing some activity-cleaning, walking; verbal encouragement and motivation to begin or continue exercising; addressing physical and emotional states associated with beginning or continuing exercise).
Stages of Change (TTM)	Precontemplation Contemplation Preparation Action Maintenance	Illustration and information on website regarding processes of change. Individually tailored messages provide information to help participants progress through stages of change.
Processes of Change (TTM)	Consciousness raising Dramatic relief/emotional arousal Environmental reevaluation Social liberation Counter conditioning Self-liberation Counter-conditioning Helping relationships Reinforcement management Stimulus control	Individually tailored messages and website links provide information on cognitive and behavioral processes of change (e.g., increasing knowledge of PA, comprehending benefits of increasing PA, rewarding yourself, finding social support).
Decisional Balance (TTM)	Weighing out the pros and cons of changing behavior	Tailored messages and website links provide information emphasizing the pros of participating in physical activity and helping problem solve potential cons

¹Theories from which theoretical constructs are taken are listed in parentheses. SCT=Social Cognitive Theory; TTM=Transtheoretical Model

Table 2

Demographic characteristics of participants at baseline (N=24).

	Mean	SD
Age	35.17	11.22
	N	Percentage
Characteristic		
Latino/Hispanic, female	24	100
Non-US born		
Yes	20	83.3
No	3	12.5
No Answer	1	4.2
Educational level		
Less than 12 years	10	41.7
High school graduate	3	12.5
Technical school or some college	6	25.0
College graduate or higher	5	20.9
Employment		
Unemployed	12	50.0
Part-time (< 35 hours week)	4	16.7
Full-time (≥ 35 hours week)	8	33.3
Yearly household income		
<\$10,000	4	16.7
\$10,000 but <\$20,000	5	20.8
\$20,000 but <\$30,000	3	12.5
\$30,000 but <\$40,000	5	20.8
\$40,000	4	16.7
Not reported	3	12.5
Marital status		
Never married nor living with partner	2	8.3
Living with partner	6	25.0
Married	10	41.7
Divorced	4	16.7
Separated	1	4.2
Widowed	1	4.2
Children aged 6–18 years living with you		
Yes	13	54.2
No	11	45.8
Children ages 5 and under living with you		
Yes	12	50
No	12	50

Table 3

Physical activity and psychosocial outcomes

Variable	Range	Baseline	One-Month	P
Self-reported PA (min/week); median, range		12.5 (0–120.0)	67.5 (0–510.0)	.001
Social support; median, range				
Family	1–5	1.5 (1.0–2.8)	1.65 (1.0–3.1)	.087
Friends	1–5	1.2 (1.0–3.5)	1.50 (1.0–3.8)	.221
Self-efficacy; mean, SD	1–5	2.15 (.86)	2.53 (.69)	.006
Processes of change				
Cognitive	1–5	2.65 (.76)	2.95 (.66)	.017
Behavioral	1–5	2.24 (.80)	2.70 (.68)	.002
Stages of Change; n, %				
Precontemplation		1 (4.2)	0	
Contemplation		22 (91.7)	9 (42.9)	
Preparation		0	5 (23.8)	
Action		0	5 (23.8)	
Maintenance		1 (4.2)	2 (9.5)	