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# Designing a Culturally Appropriate Visually Enhanced Low-Text Mobile Health App Promoting Physical Activity for Latinos: A Qualitative Study

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## Abstract

Rapid proliferation of smartphone ownership and use among Latinos offers a unique opportunity to employ innovative visually enhanced low-text (VELT) mobile health applications (mHealth app) to promote health behavior change for Latinos at risk for lifestyle-related diseases. Using focus groups and in-depth interviews with 16 promotores and 5 health care providers recruited from California clinics, this qualitative study explored perceptions of visuals for a VELT mHealth app promoting physical activity (PA) and limiting sedentary behavior (SB) for Latinos. In this Phase 1 study, participants endorsed visuals portraying PA guidelines and recommended visuals depicting family and socially oriented PA. Overall, participants supported a VELT mHealth app as an alternative to text-based education. Findings will inform the future Phase 2 study development of a culturally appropriate VELT mHealth app to promote PA for Latinos, improve health literacy, and provide an alternative to traditional clinic text-based health education materials.

## Keywords

mobile health applications, health literacy, Latinos, physical activity, promotores, health care providers, health education

## Introduction

Insufficient physical activity (PA) and increased sedentary behavior (SB) are major factors contributing to lifestyle-related diseases, such as obesity, diabetes, and cardiovascular disease (Tremblay, Colley, Saunders, Healy, & Owen, 2010). Healthy People 2020 objectives support increasing PA levels and limiting SB as preventive health strategies to improve health outcomes (U.S. Department of Health and Human Services, 2013). Although previous studies have demonstrated intervention effectiveness promoting PA, interventions promoting PA for populations at high-risk for chronic diseases with concurrent low literacy and low health literacy (LHL) are limited (Knowler et al., 2002; Saha, 2006).

### Low Health Literacy

More than half (about 90 million) of all U.S. adults have LHL skills, a condition affecting all racial and ethnic groups (Kutner, Greenberg, Jin, & Paulsen, 2006). Health literacy is “the degree to which individuals can obtain, process, and understand the basic healthcare information and services they need to make appropriate health decisions” (Institute of Medicine, 2011). This includes skills, such as the ability to

read and comprehend text in order to locate and interpret information in documents (i.e., print literacy); to use quantitative information (numeracy) for tasks involved in measurement (e.g., medication dosage and interpreting food labels); and to both speak and listen effectively (i.e., oral literacy). LHL has been linked to poor health knowledge, unhealthy behaviors, poor health outcomes, and increased health care costs, particularly among low-income racial/ethnic minorities (Institute of Medicine, 2011). Moreover, LHL is associated with limited ability to comprehend labels and messages, reduced medication compliance, decreased preventive care services, and increased hospitalizations and emergency services (Berkman et al., 2011).

Latinos represent the U.S. group with the largest proportion (65%) of LHL adults. Among those with LHL, Latinos (41%) have the lowest literacy level (“below basic”), in contrast to Blacks (24%) and Whites (9%) (Berkman et al.,

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2011). Latinos were also found to have lower levels of leisure-time PA compared with non-Latino Whites (Neighbors, Marquez, & Marcus, 2008), placing them at high risk for obesity and obesity-related diseases (Lopez-Quintero, Berry, & Neumark, 2009). Thus, effective strategies for Latinos are needed to improve health outcomes by promoting health literacy levels and healthy lifestyle behaviors (e.g., engaging in PA and limiting SB).

### *Strategies to Improve Health Literacy*

A key component to improve the delivery of health education, quality of care, and health behaviors in populations with LHL is effective communication strategies between health care providers (HCPs) and clients. Barriers to effective communication include misunderstandings due to language, culture, literacy levels, age, disabilities, or emotions (Osbourne, 2006). Another barrier is the limited time allotted per patient visit, which often thwarts HCPs' ability to effectively communicate important health information. Last, health education is often relegated to text-based handouts that are inappropriate for LHL clients (Tai-Seale, McGuire, & Zhang, 2007). These barriers need to be addressed to improve the quality of health services and reduce health disparities, especially for at-risk ethnic minorities with LHL.

Two strategies to improve health education communication with LHL racial/ethnic populations are cultural appropriateness and the use of visual aids. First, employing culturally appropriate health education materials is an effective communication strategy when dealing with diverse racial/ethnic populations. When designing culturally appropriate health education materials, input from community informants is essential. For instance, soliciting input from promotores who work directly with Latinos is important (Kreuter, Lukwago, Bucholtz, Clark, and Sanders-Thompson, 2003). Promotores are community lay health workers (male or female) who are trusted members of the community, familiar with the culture, and fluent in the language (Ayala et al., 2010). Their role often includes disseminating health-related information (e.g., benefits of PA) and facilitating health promotion programs. Health promotion intervention programs for Latino populations have been particularly effective when facilitated by promotores (Bender, Nader, Kennedy, & Gahagan, 2013).

Second, visuals are an effective means for explaining complex concepts, providing instruction and directions, and imparting education (e.g., the benefits of PA) without the use of text (Centers for Disease Control and Prevention, 2009; Choi, 2011). Visual aids, including pictures, icons, drawings, and videos, are recommended when providing health information and education and have been effective in conveying health information to individuals with LHL (Choi, 2011; Houts, Witmer, Egeth, Loscalzo, & Zabora, 2001). For example, videos were found to be more effective than text-based education materials for comprehension and recall

among parents for appropriate antibiotic use (Schnellinger et al., 2010). An integral step toward identifying culturally appropriate visuals for Latinos is soliciting input from community stakeholders (e.g., promotores, members, and leaders). Stakeholder focus groups and comprehensive interviews can be used to inform the design and development of culturally appropriate visuals of health education materials (Kreuter et al., 2003).

### *Leveraging Digital Technology for Health Education*

Recent advances in digital technology have led to the rapid penetration of mobile phone use among U.S. populations, particularly among Latinos. A majority (92%) of Latinos are now avid mobile phone users, where 61% own smartphones (Pew Research Center, 2014). More Latino smartphone users (38%) accessed health information by mobile phone than did non-Latino White (27%) and non-Hispanic Blacks (35%; Fox & Duggan, 2013). Moreover, Latinos (15%) are beginning to download health-related mobile apps.

Given the advances and proliferation of digital technology, an innovative strategy to promote health behaviors, particularly for Latinos, would be to employ mobile health applications (mHealth apps) using primarily visual images with limited text. MHealth apps can be downloaded onto smartphones, enabling clients to access health information at their leisure, wirelessly transmitted through mobile technology (Stephens & Allen, 2013). Interactive online health information can now be provided via mHealth apps on such diverse topics as the types, importance and benefits of PA, tailored individual coaching and PA guidelines, and links to related health information (Garber et al., 2011). Personal health and fitness tracking (e.g., weight and walking steps) is also available using mHealth apps.

Health educators and providers could also employ such apps to disseminate health education during clinic/office visits. Although a primarily visual low-text mHealth app may be effective in improving health literacy for healthy lifestyle behaviors and thereby improve health outcomes among diverse at-risk populations, there is little if any information on this subject. An essential first step is to solicit input from community informants to guide the design and development of culturally appropriate visually enhanced low-text (VELT) mHealth app.

Thus, the objective of this article is to describe promotores' and HCPs' (1) current practices and experiences disseminating health education and (2) perceptions regarding visuals promoting PA and limiting SB for a VELT mHealth app promoting PA for Latinos. Findings will be used to inform the design and development of a culturally appropriate, primarily visual low-text mobile health app to improve health literacy and encourage Latino engagement in PA.

This mHealth app, an innovative health education tool, will also support HCPs and promotores during clinic visits. The

VELT mHealth app could be a more efficacious alternative to standard text-based health promotion materials for use in clinic settings by HCPs. A culturally appropriate Velt mHealth app to promote healthy behaviors could be translated and disseminated among at-risk populations, with the potential to improve health outcomes and reduce health disparities.

## Method

### Design

A qualitative exploratory study using focus groups and in-depth interviews was conducted in California between November 2012 and February 2013. This study was Phase 1 of a larger multiyear three-phase study. The objective of this Phase 1 study was to explore perceptions of three groups: (1) Latino consumers, (2) promotores, and (3) HCPs regarding visual images for the Velt mHealth app described above. Findings from Phase 1 will be used to guide the Phase 2 design and development of a culturally appropriate Velt mHealth app for Latinos. In Phase 3, the Velt mHealth app will be tested for feasibility and potential efficacy in promoting PA and limiting SB among Latinos.

This Phase 1 article focuses solely on two health care service provider groups (promotores and HCPs) regarding their perceptions of visuals (e.g., icons, pictures, drawings, animations, and videos) promoting PA and limiting SB for Latinos. Two focus groups were conducted with 16 Spanish and English-speaking promotores, and individual in-depth interviews were conducted with five nurse practitioners. Details and findings on Latino consumer focus groups are reported elsewhere in another paper.

### Sample

Purposive sampling strategies were used to identify and recruit 16 bilingual (English and Spanish) promotores, 8 each from two federally funded community clinics (one in Northern California and one in Southern California) providing health education services to primarily low-income Latino communities. Five nurse practitioners providing primary health care services in San Francisco Bay Area clinics for low-income Latinos were identified and recruited from professional nurse practitioner websites in Northern California. A \$25 gift card was given in recognition of each participant's time. University-affiliated Institutional Review Board/Committee on Human Research approval was obtained prior to study implementation.

### Measures

Prior to the interviews, participants completed a questionnaire on demographic characteristics. An interview guide was developed consisting of open-ended semistructured questions for use in the focus groups and in-depth interviews.

The semistructured questions are provided in Table 1. During the focus groups and in-depth interviews, slides of visual images illustrating PA and SB were displayed on an overhead screen to stimulate discussions and explore promotores' and HCPs' perceptions regarding visuals intended to encourage PA and reduce SB among Latinos. Focus group and in-depth interviews took about one hour to complete. Two focus groups consisting of promotores were conducted at clinic worksites. The first focus group (promotores = 7 women and 1 male) was conducted in English in Southern California and a second focus group (promotores = 6 women and 2 men) was conducted in Spanish in Northern California. Individual in-depth, face-to-face interviews were conducted in English with five nurse practitioners at their clinic worksites.

All focus groups and in-depth interviews were digitally recorded and transcribed verbatim by independent bilingual transcribers. A certified Spanish translator translated the Spanish focus group interview from Spanish to English. To ensure accuracy, two bilingual research investigators (SM and MSB) reviewed all transcriptions. For consensus, all authors performed a final review of all focus group and individual in-depth interview transcriptions.

### Analytic Strategy

**Qualitative Data.** Interview transcripts were coded using Atlas.ti Version 7 ([www.atlasti.com](http://www.atlasti.com)). All authors independently read all transcribed focus group and in-depth interviews. Transcripts were independently coded for initial themes and then checked for inter-rater agreement by two research investigators (MSB and SM). Content analysis was conducted by marking and categorizing key words and phrases to identify emerging themes (Krippendorff, 1980; Neuendorf, 2002). Data were analyzed to identify links across themes. Themes were reviewed, discussed, and resolved through consensus. The research team met weekly to review and discuss transcript coding, achievement of data saturation, consensus regarding identification and definition of themes, and selection of illustrative excerpts from transcripts. Dependability of the data interpretation was supported by investigator triangulation, a process whereby more than one investigator analyzes the data (Miles & Huberman, 1994).

**Quantitative Data.** Descriptive statistics (frequency, percentage, mean, standard deviation) of participant demographics were computed using SPSS 18 ([www.ibm.com/software/analytics/spss/](http://www.ibm.com/software/analytics/spss/)).

## Results

### Sample Characteristics and Emerging Themes

Demographic characteristics of HCPs and promotores are presented in Table 2. Overall, mean ages of promotores ( $41 \pm 17.0$  years) and HCPs ( $42 \pm 13.3$  years) were similar. More

**Table 1.** Focus Group and In-Depth Face-to-Face Interview Guide.

Interviewer to ask the following questions of participants:

1. What type of health information regarding physical activity do you share with your clients?
2. What kind of responses do you typically receive from clients about this health information?
3. In your work setting, how do you evaluate the health literacy level of your client?
4. What experiences do you have with addressing the health literacy of your client?
5. Do you currently use mobile phone health apps?
  - If yes—What aspects of these mobile health apps were helpful
  - If yes—What would you change about these mobile health apps
  - If no—What mobile health apps have you heard of?
6. Interviewer displays individual PowerPoint slides containing the following visuals for participants. While each slide is displayed, interviewer asks participants to report on their first impressions of the individual visual images. The sequence of slides is listed below:
  - a. 3 icons: Silhouette of figure walking, lifting weights, and walking with companions
  - b. 3 icons: Silhouette of television, telephone, a bed
  - c. 3 drawings/illustrations: Person walking alone, people walking together in a group, and person riding a bike
  - d. 3 drawings: Person sitting reading, two people sitting on couch, person sleeping in bed
  - e. 3 black and white pictures: People walking alone or together
  - f. 3 colored pictures: People walking or dancing together
  - g. 3 colored pictures: Man reading with children, young man sitting at computer, and woman talking on the phone
  - h. 2 animate: Moving drawings of couple dancing and person doing brisk walking
  - i. Animate: Moving drawing of young girl yawning and sitting at a table
  - j. 3 black and white clock drawings: Analog clock face with numbers, hour hand, and minute hand; kitchen timer; and digital clock with numeric hour and minute display
  - k. Black and white picture of generic 30 day calendar
  - l. PowerPoint slides with following videos:
    - i. 2-minute video of male health care provider in lab coat discussing benefits of physical activity and the recommended guidelines for physical activity
    - ii. 2-minute video of human hand drawing a picture of a person walking and a clock face where the minute hand moves to indicating 30 minutes of elapsed time. During the video, a person is lecturing in the background about the benefits of physical activity and being physically active 30 minutes/day
    - iii. 2-minute video of a dance instructor conducting a Zumba class in Spanish for a large group of people of various ages and gender

than half the promotores (56.3%) emigrated from Mexico, while more than half the HCPs (60%) were U.S.-born. Mobile phone use was prolific among promotores (93.8%) and providers (100%).

Themes were categorized into (1) common themes shared between promotores and HCPs and (2) a unique HCP theme. Themes common to promotores and HCPs included (1) concerns about clients' literacy levels, (2) challenges for promoting PA, (3) suggestions for culturally appropriate visuals that promote PA, and (4) support of a VELT mHealth app. The unique HCP theme focused on barriers to providing quality health education. Table 3 lists the emerging themes with sample participant quotes.

### *Themes Common to Promotores and Health Care Providers*

**Concerns for Clients' Literacy Levels.** Most focus group participants and HCPs expressed concerns about their clients' literacy levels. Both promotores and HCPs reported client literacy levels were not formally assessed (i.e., using

validated instruments) during client encounters. However, most participants reported that informal ad hoc literacy assessments were done, typically during clinic program enrollment or during clinic visits. They observed their clients had difficulty reading clinic forms and needed assistance. Furthermore, many clients could not read or tell time and had difficulty reading text-based clinic handouts or directions on how to navigate the health care system. To address these issues, in place of text-based handouts, promotores and HCPs offered verbally delivered health information. Some promotores provided health education using visual aids (e.g., books with pictures). Observations regarding digital technology literacy (i.e., inability to use computers or mobile phones) were mixed. Promotores commented that some clients exhibited limited digital technology literacy, while some client groups, such as migrant farmers, exhibited proficiency using mobile phones.

**Challenges Promoting PA for Promotores and HCPs.** Providers reported most clients had limited perceptions or awareness of their health risks. “. . . many do not perceive themselves



**Table 2.** Demographics of Promotores and Health Care Providers.

Variable	Promotores (n = 16)	Health care providers (n = 5)
	% or M ± SD	
Age (years)	41.0 ± 17.0	42 ± 13.3
Gender		
Female	81.3	100
Marital status		
Single	18.8	—
Married/cohabitating	75.0	80.0
Divorced	6.3	20.0
Number of children	2.4 (±1.3)	1.6 (±1.1)
Birthplace		
USA	37.5	60.0
Mexico	56.3	—
South America	6.3	20.0
Other	—	20.0
Years in USA		
≤10	25.0	—
>10	37.5	40
Born in USA	37.5	60
Work type		
Service work	(25)	—
Technical	(31.3)	—
Professional	(43.8)	100
Annual income (×1000 \$)		
<20	12.2	—
20-39	62.5	—
40-59	6.3	20.0
≥60	12.5	80.0
N/A	6.3	—
Cell phone ownership	93.8	100

as overweight or obese.” This raised concerns whether clients appreciated the importance of PA for reducing health risks. Promotores and providers described their clients as too busy with work to engage in PA or prepare home cooked meals, “Both parents often work long hours and have little time to spend with family or to schedule PA.”

**Suggestions for Culturally Appropriate Visuals.** Participants commented on the importance of family cohesion (*familismo*) as an important cultural value. One of the promotores commented, “Clients need to imagine themselves doing culturally relevant PA.” All participants felt that visuals of family member walking together were particularly appealing and would be agreeable to Latinos. Both promotores and HCPs commented that visuals of parents walking with their children served to role model the importance of PA for health.

Both promotores and HCPs suggested visuals incorporate friends and peers for social support to encourage PA engagement. Promotores reported that Latino males preferred visuals depicting social and team sports, such as soccer. Other

promotores suggested visuals include examples of fun in-home PA and colorful group activities (e.g., dancing, stretching, walking).

Promotores commented that it was important for clients to personally identify and relate to the visual images by imagining oneself doing a particular PA. Suggestions for “relatable” visual images included (1) depictions of people in a variety of shapes, sizes, ages, family roles, and races; and (2) familiar and easily achievable PA (e.g., dancing or walking). Visuals of brisk walking and dancing were praised by HCPs (see Figure 1: Brisk walking with friends). Several HCPs commented that these images demonstrated well the required intensity for “moderate-to-vigorous” PA. The narrated video of someone drawing a clock face with moving hands was also praised by HCPs to demonstrate the concept of “30-minutes per day PA guideline” for adults. All participants stated that these visuals were creative, informative, and appropriate for those with low literacy and numeracy, particularly Latinos.

**Support for a VELT mHealth App.** Overall, promotores and HCPs indicated that a VELT mHealth app could be a useful health education tool and deemed it superior to text-based handouts and would likely use such an mHealth tool with their clients, provided it was culturally tailored for Latinos and simple to use. They agreed it could motivate PA engagement for Latinos.

**HCP Barriers for Providing Quality Health Education.** This emerging theme was only reported by HCPs, not by promotores. HCPs expressed two sources of frustration. First, limited time for health education during clinic visits was a common concern. Second, most health education materials were available only as text-based handouts that were often left unread or discarded by clients with LHL. In place of text-based handouts for low literate clients, most of the nurse practitioners opted to offer brief, verbally delivered health education information.

## Discussion

All focus group interviews provided perceptions of visual images promoting PA and limiting SB through icons, pictures, and videos for a VELT mHealth app for Latinos. Three overlapping themes emerged from the focus groups and HCP interview discussions along with one unique HCP theme. Suggestions were offered for designing culturally appropriate visuals encouraging PA. Findings from this study will inform the design and development of a culturally appropriate VELT mHealth app promoting PA for Latinos.

### Evaluation of Literacy Levels

Overall, promotores and HCPs reports were similar to previous studies suggesting that clinicians do not routinely confirm patient literacy levels or their understanding of health education materials (Farrell, Kuruville, Eskra, Christopher,

**Table 3.** Emerging Themes Sample Quotes of Promotores and Health Care Providers.

Themes	Promotores	Health care providers
Concerns for clients' literacy levels and informal literacy assessments	<p>"Often times you can tell by talking to the client, if they did not understand what that direction from the provider was or the instructions"</p> <p>"I'll ask them straight out, as delicate as possible," "do you have any challenges in reading or writing?"</p> <p>"The materials that we give out tend to be picture based, and if they tell me they can't read or write"</p>	<p>"I'm probably not doing a very good service to people, . . . by not having a better way to assess that. I don't think that I have been doing that many active things to assess health literacy"</p> <p>". . . some of these adults don't have more than a primary education"</p>
Challenges for promoting physical activity	<p>"Well, what I hear from people is precisely that, "I don't have time, I can't go to a gym, I don't have a park near me, I can't go out"</p> <p>"When us Latinos come to this country, we capitalize us, because most of us come here to work, with the idea on our heads of "I am going to work" neglecting our family a little, and also our health"</p>	<p>"One problem is motivation. I know that they know that they're over weight, but I don't think that they perceive as well the health ramification that may lead to being obese. The second is that their lives are full of so much stuff. They feel like the exercise is to go to a gym, and doing whatever has to be done. They don't know that it's just to increase activity"</p>
Suggestions for culturally appropriate physical activity visuals	<p>"What would probably catch my attention, is if you had men playing soccer. That's huge in our community"</p> <p>"Soccer, or sports, sports related, you know, not so much dancing"</p> <p>"This is more attractive, because of the colors and all that, and in that app, it could give us the option of organizing our day, at what time you're going to do exercise, at what time you're going to get up, at what time you're going to work, all that, because I think it's very important to organize"</p>	<p>"Walking together is good and like here, they have a couple dancing, which is wonderful, but I would put the women, . . . with dark hair"</p> <p>". . . if you have groups of friends and people that are in it (app image) that can help build community . . . (and) would . . . really enhance the intervention"</p>
Support for a VELT (visually enhanced low-text) mHealth app for Latinos	<p>"Yes, because they're giving them the principal benefits of doing exercise, like preventing heart diseases, or diabetes. I think that they would really like that"</p> <p>"Something visual would stick to them better, more movement strikes stronger than letters"</p>	<p>"I think it would be good"</p> <p>"I know this is geared towards adults, but I would love to see something for the whole family, including the kids, because they going to take their moms phone and say, "let me show you how to do it"</p>
Barriers to providing health education	<p>Promotores did not discuss barriers to providing health education</p>	<p>"We are very limited on time, so we run over very quickly the things that they can do to reduce their risk factors, but I don't see a whole lot of time spent on teaching and education"</p> <p>"We give them some education, pamphlets, but they are very general. It should be more individualized"</p>

& Brienza, 2009; Rhodes et al., 2004). Promotores and HCPs in this study did not formally evaluate patient/client literacy levels. However, they reported that informal ad hoc literacy assessments were made during clinic visits when clients needed help with text-based forms.

Understanding clients' literacy levels provides guidance on appropriate delivery of health information. Health care guidelines recommend HCPs assess patient/client health education and comprehension (Centers for Disease Control

and Prevention, 2009). For clinicians where clinic visit time is limited, one option is to use a simple three-question validated tool to assess patient/client literacy levels (Sarkar, Schillinger, Lopez, & Sudore, 2011). Identifying the literacy level of clients will not only guide health educators and HCPs to provide appropriate health information, but may also improve the quality of health services for diverse racial/ethnic groups and reduce health disparities, particularly for those with LHL.



**Figure 1.** Drawing of brisk walking with friends.

Note. U.S. Department of Health and Human Services, NIDDK, NIH. gov. Drawing of two women walking, October 2012. Available at <http://diabetes.niddk.nih.gov/dm/pubs/type1and2/prevent.aspx>

Concerns about clients' low literacy levels were discussed. HCPs expressed frustrations that only clinic text-based health education materials were available for Latino clients with low-literacy. In lieu of inappropriate text-based educational materials, promotores and HCPs offered verbal health education. However, verbal information or instructions have limitations and may not be adequate for clients who are tired, sick, distracted, overwhelmed, or hearing impaired (Choi, 2011; Osbourne, 2006). Incorporating visual information (e.g., videos, cartoons, and minimal/simplified text) has produced superior comprehension and retention scores compared with text-based handouts (Houts et al., 2001; Schnellinger et al., 2010). Furthermore, interventions incorporating visual aids, such as video, drawings, and simplified text have shown to be effective in improving clients' health literacy. Thus, adopting a VELT mHealth app may be an effective health education option to offer LHL clients.

### *Culturally Appropriate and Tailored Health Education Materials*

Culturally appropriate and tailored interventions (using health education materials) have been shown to be effective in improving health behaviors, especially among ethnic minorities (Bender & Clark, 2011; Kreuter et al., 2003;

World Health Organization, 2009). In this study, suggestions were offered by promotores and HCPs for culturally appropriate visuals promoting PA for use with a VELT mHealth app for Latinos. A foremost consideration for designing visuals as a key PA motivator for Latinos is family and community—a cultural value promoting cohesion and identity (Cardona et al., 2009). To ensure cultural relevance, suggestions included visuals with family-oriented activities, such as walking and dancing together—often preferred PA among Latinos (Ickes & Sharma, 2012). Social support from friends and family has also been shown to increase the likelihood of participation in PA (Martyn-Nemeth, Vitale, & Cowger, 2010). Visuals depicting social sports such as soccer and team athletics could also address cultural relevancy for men.

Culturally appropriate messages on how to address common barriers to PA encountered by Latinos are also important. Common barriers reported by Latinos consist of time constraints related to responsibilities at home and work and environmental barriers, such as access to safe neighborhood walking routes and parks (Ickes & Sharma, 2012). Participants in this study reported similar barriers encountered by their clients who had little time for social and family activities, including PA. Innovative solutions to common PA barriers are needed for Latinos and other at-risk populations.

### *Enhancing Ideal Imagery for Physical Activity*

Participants offered several examples of relatable visuals depicting people of different ages, gender, shapes, and sizes engaging in PA. Furthermore, visuals demonstrating how to accomplish PA behaviors are important for promoting PA (Ickes & Sharma, 2012). For example, to demonstrate the recommended U.S. guidelines for daily adult PA, the HCPs highly endorsed the proposed visuals of brisk walking (i.e., moderate-to-vigorous activity) and rotating clock hands illustrating 30-minutes/day of PA.

The intention is to encourage a personal connection with these visuals, thereby motivating PA engagement. For example, dancing or walking in groups represents familiar and fun activities that Latinos can easily relate to and imagine themselves engaged in.

### *Support for a VELT mHealth App*

Overall, promotores and HCPs were supportive of a VELT mHealth app for Latinos with LHL as a health promotion tool that could also be used with clients in a clinic setting, provided it was simple and easy to use. Using visuals with simple text is shown to improve health literacy scores and increase retention (Houts et al., 2001). Given the limited health education materials for LHL clients, a VELT mHealth app would offer the promotores and HCPs a viable option for promoting healthy lifestyles behaviors for clients at risk for obesity-related diseases.



## Limitations

Focus groups and in-depth interview data reflect perceptions of a convenience sample of promotores and female HCPs from select geographical locations. Although the findings from this study cannot be generalized, this was not the intent of the study. Findings provide important insights and recommendations for designing and developing a primarily visual low-text culturally appropriate mHealth app promoting PA and limiting SB for Latinos in an effort to improve health literacy.

## Implications for Nursing Practice

A key element in nursing practice is providing patient health education that is appropriate for the patient's literacy level and culture (Douglas et al., 2014). To achieve this goal, nurses must first assess the literacy level of their clients to determine how to optimally deliver education or information to improve health literacy (Osbourne, 2006). For clients with low-literacy skills, using visuals (e.g., pictures, icons, videos) along with simple text and verbal instructions would be an effective alternative to text-based educational materials. Another alternative would be employing VELT mHealth apps that promotes healthy lifestyle behaviors for patient/clients, particularly those with limited English proficiency.

## Conclusions and Implications for Future Research

This study explores an innovative strategy of using emerging digital technologies to provide visually enhanced health education. The proposed VELT mHealth app focuses on combining evidence-based strategies using visual aids and mobile technology to promote PA with Latino populations known to have a high prevalence of physical inactivity and obesity. Findings from this study will inform the development of a culturally adapted and tailored VELT mHealth app promoting PA and limiting SB for Latinos. This approach has the potential to provide a model that may (1) improve health literacy and promote healthy lifestyle behavior change and thus improve health outcomes for at-risk populations, (2) improve the quality of health education for diverse cultures, particularly racial/ethnic groups with low literacy skills, and thereby reduce health disparities, and (3) promote an innovative health education option for health educators, nurses, and HCPs to use with patients/clients. Future research is needed to evaluate the feasibility and potential efficacy of a culturally appropriate Latino VELT mHealth app promoting PA.

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