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Systematic Review of Physical Activity Interventions in Hispanic Adults

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Abstract

Introduction: Physical activity (PA) has demonstrated substantial physical and psychological benefits. However, Hispanics engage in less leisure-time PA when compared with other groups, putting them at higher risk for diseases associated with obesity, such as diabetes mellitus type 2. This literature review was conducted to identify best practices with regard to interventions designed to increase PA among Hispanic adults.

Methods: Extensive searching located 21 randomized controlled studies conducted in the United States.

Results: Common conceptual frameworks were the transtheoretical model and social cognitive theory. Most interventions used educational sessions with a variety of topics and many used *promotoras* to increase PA. Outcomes were predominantly examined using self-report PA measures. Walking was the most commonly reported PA behavior. Studies with significant results were those that measured moderate-to-vigorous PA and used theory to guide interventions. Male and older participants were underrepresented.

Conclusions: Effective culturally appropriate PA interventions for Hispanics adults are needed. Particular attention to intervention tailoring based on country of origin could enhance intervention effectiveness.

Keywords

systematic review; physical activity; Latino/a; adults; Hispanic

Introduction

The link between physical inactivity and overweight/obesity has been well documented (Kwon, Wang, & Hawkins, 2016). Overweight/obesity is associated with the development of chronic conditions such as diabetes mellitus type 2, coronary heart disease, and hypertension (HTN; Centers for Disease Control and Prevention, 2018). Approximately 69% of adults are overweight/obese (National Institute of Diabetes and Digestive and Kidney Diseases, 2017), and only 1 in 5 adults meets the recommendations of at least 150 minutes of physical activity (PA) every week (Centers for Disease Control and Prevention, 2014). Hispanics, the

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fastest growing group in the United States, engage in less leisure-time PA than other subsets of the U.S. population and are more likely to be diagnosed with diabetes mellitus type 2 (Brown, 2014; Marquez, Neighbors, & Bustamante, 2010).

Due to the burden that chronic health conditions place on Hispanic adults, it is critical to promote PA in this population. Previous published reviews focusing on factors that promote PA have been limited to healthy adults (Conn, Phillips, Ruppert, & Chase, 2012), females (Keller & Fleury, 2006; Perez, Fleury, & Keller, 2010; Sharma, 2008), non-Hispanic samples, or acculturation without a PA emphasis (Ickes & Sharma, 2012; Martinez, Ainsworth, & Elder, 2008; Mier, Ory, & Medina, 2010). This literature review aimed to identify intervention strategies to increase PAs that are culturally appropriate, and effective, for U.S. Hispanic adults. Such strategies could be used in clinical practice to enhance the health of this population.

Methods

Inclusion criteria for the literature search were randomized controlled PA intervention studies that included at least 75% U.S. Hispanic adults (i.e., age 18 or older) as participants. PubMed, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and PsycINFO were searched from start date to June 2018. Only randomized controlled trials (RCTs), due to the stronger level of evidence, were included. Studies that did not include a measurable PA outcome measures were excluded as were family-centered interventions that focused on PA behaviors of children.

Search Strategy

Searches were conducted following PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009) and in the same manner for each database using the terms *physical activity, intervention, Hispanic, Latino(a), and adults*. For PubMed, the initial search yielded 882 results using the terms [physical activity AND intervention AND adult AND “Hispanic or Latino or Latina”]. After reading the titles and abstracts, 838 were excluded and 44 were read in full text. For CINAHL, 3,877 results were obtained; 4 were duplicates, 3,853 were excluded based on the title and abstract, and 20 were read in full text. For PsycINFO, there were 496 results; 6 duplicates, 481 were excluded based on the title/abstract, and 9 studies read in full text (Figure 1). An additional 15 articles were excluded because there was no intervention, 20 were not RCTs, 5 did not measure a PA outcome, and 12 focused on children. In the end, 21 studies were included in the review.

Data Extraction

One author independently extracted data and synthesized the results. Demographic data (i.e., sample size, age, gender, ethnicity, country of origin, and health status), theoretical approach, intervention description, and research design were extracted for each study. In addition, the type of PA behavior, how it was measured, and the pertinent results of each study were extracted.

Results

The 21 studies (Table 1) ranged in dates of publication from January 2001 to June 2018. All studies were RCTs; however, there was variation with regard to the intervention strategies and outcome measures used.

Participant Characteristics

Almost half (48%) of the studies reported participant country of origin (Coleman et al., 2012; Hovell et al., 2008; Khare, Cursio, Locklin, Bates, & Loo, 2014; King, Bickmore, Campero, Pruitt, & Yin, 2013; Koniak-Griffin et al., 2015; Marcus et al., 2013; Marcus et al., 2016; Marshall et al., 2013; Pekmezi et al., 2009; Rosal et al., 2011) or self-identified ancestry, and 16 studies referred to participants as Hispanic/Latino (Arre-dondo et al., 2017; Babamoto et al., 2009; Coleman et al., 2012; Duggan et al., 2014; Hawkins et al., 2015; Hovell et al., 2008; Khare et al., 2014; Koniak-Griffin et al., 2015; Marshall et al., 2013; Mitchell, Andrews, & Schenker, 2015; Pekmezi et al., 2009; Poston et al., 2001; Rosal et al., 2005; Rosal et al., 2011; Rothschild et al., 2014; Vincent, 2009). Almost half (48%) of the studies had at least some participants who self-identified as Mexican or Mexican American (Arre-dondo et al., 2017; Coleman et al., 2012; Hovell et al., 2008; Koniak-Griffin et al., 2015; Marcus et al., 2016; Marshall et al., 2013; McEwen, Pasvogel, Murdaugh, & Hepworth, 2017; Poston et al., 2001; Rothschild et al., 2014; Vincent, 2009). Other countries of origin represented in the study samples were Mexico, Puerto Rico, Dominican Republic, Guatemala, and Colombia (Koniak-Griffin et al., 2015; Marcus et al., 2013; Marcus et al., 2016; Pekmezi et al., 2009; Rosal et al., 2011). All but two studies (Eakin et al., 2007; King et al., 2013) had study samples that were 100% Hispanic.

All studies had a majority of female participants, with 11 studies reporting 100% female participants (Arredondo et al., 2017; Coleman et al., 2012; Hawkins et al., 2015; Hovell et al., 2008; Khare et al., 2014; Koniak-Griffin et al., 2015; Marcus et al., 2013; Marcus et al., 2016; Marshall et al., 2013; Pekmezi et al., 2009; Poston et al., 2001). Sample sizes varied from 20 to 1,093 participants, and only two studies had participants that were older than 64 years of age (King et al., 2013; McEwen et al., 2017). Most participants were between the ages of 18 and 64, and study samples were relatively homogenous. Men and older adults were underrepresented, with only half (48%) of the studies enrolling male participants (Babamoto et al., 2009; Duggan et al., 2014; Eakin et al., 2007; King et al., 2013; McEwen et al., 2017; Mitchell et al., 2015; Rosal et al., 2005; Rosal et al., 2011; Rothschild et al., 2014; Vincent, 2009). No study had greater than 36% male participants.

Most of the studies (19 of 21) reported the health status of participants through measures such as diagnosed medical conditions or risk factors (e.g., elevated body mass index [BMI] or HTN). Two studies did not provide health status information (Khare et al., 2014; Marcus et al., 2016). Health indicators reported were BMI (Hovell et al., 2008; Marcus et al., 2013; Marshall et al., 2013; McEwen et al., 2017; Mitchell et al., 2015; Pekmezi et al., 2009), diabetes mellitus (Arredondo et al., 2017; Duggan et al., 2014; Koniak-Griffin et al., 2015; Rosal et al., 2005; Rosal et al., 2011; Rothschild et al., 2014; Vincent, 2009), multiple health conditions (Arredondo et al., 2017; Eakin et al., 2007; King et al., 2013), gestational

diabetes (Hawkins et al., 2015), and hyperlipidemia (Babamoto et al., 2009; Coleman et al., 2012).

Duration of Studies

The follow-up period ranged from 3 to 24 months; however, most (62%) studies had follow-up periods between 3 and 6 months (Babamoto et al., 2009; Coleman et al., 2012; Duggan et al., 2014; Eakin et al., 2007; King et al., 2013; Marcus et al., 2013; Marcus et al., 2016; Marshall et al., 2013; McEwen et al., 2017; Mitchell et al., 2015; Pekmezi et al., 2009; Rosal et al., 2005; Vincent, 2009). One study followed participants for 6 weeks postpartum (Hawkins et al., 2015). One study had a follow-up period of 9 months (Koniak-Griffin et al., 2015). Five studies had follow-up periods of 12 months (Arredondo et al., 2017; Hovell et al., 2008; Khare et al., 2014; Poston et al., 2001; Rosal et al., 2011). Only one study (Rothschild et al., 2014) followed participants for 12 months or longer.

Measures

Studies in this review used a wide variety of PA measures (Table 2). Some studies measured only the amount of activity (e.g., minutes, hours, days of PA), while others measured the amount and type of activity (e.g., mild, moderate, or vigorous). There were studies that measured kilocalories or metabolic equivalent minutes, while others did not measure these variables.

Interventions

Theoretical Frameworks.—Sixteen studies (Arredondo et al., 2017; Coleman et al., 2012; Eakin et al., 2007; Hawkins et al., 2015; Hovell et al., 2008; Khare et al., 2014; King et al., 2013; Marcus et al., 2013; Marcus et al., 2016; Marshall et al., 2013; Pekmezi et al., 2009; Poston et al., 2001; Rosal et al., 2005; Rosal et al., 2011; Rothschild et al., 2014; Vincent, 2009) reported a guiding framework and six interventions were based in transtheoretical model of change (TTM) and social cognitive theory (SCT; Hawkins et al., 2015; Khare et al., 2014; King et al., 2013; Marcus et al., 2013; Marcus et al., 2016; Pekmezi et al., 2009). Guiding theories included SCT (Poston et al., 2001; Rosal et al., 2005; Rosal et al., 2011; Vincent, 2009), the socioecological model (Arredondo et al., 2017; Eakin et al., 2007; Marshall et al., 2013), behavior change theory (Coleman et al., 2012), operant learning theory and applied behavior analysis (Hovell et al., 2008), and self-management theory (Rothschild et al., 2014). Nine studies that mentioned a theoretical framework had statistically significant results (Arredondo et al., 2017; Coleman et al., 2012; Hawkins et al., 2015; Hovell et al., 2008; King et al., 2013; Marcus et al., 2013; Marcus et al., 2016; Poston et al., 2001; Vincent, 2009). Of those with significant results, six used either SCT or a combination of SCT and the TTM (Hawkins et al., 2015; King et al., 2013; Marcus et al., 2013; Marcus et al., 2016; Poston et al., 2001; Vincent, 2009). Other studies with statistically significant results used behavior change theory (Coleman et al., 2012), ecological framework (Arredondo et al., 2017), and operant learning theory (Hovell et al., 2008).

Delivery of Interventions.—There were different modalities of intervention delivery described in the studies. Nine studies used community health workers (CHWs) or

promotoras (i.e., lay health advisors; Martinez, Arredondo, & Roesch, 2013) to engage participants in the interventions (Arredondo et al., 2017; Babamoto et al., 2009; Coleman et al., 2012; Duggan et al., 2014; Koniak-Griffin et al., 2015; Marshall et al., 2013; McEwen et al., 2017; Mitchell et al., 2015; Vincent, 2009). *Promotoras* not only facilitated intervention sessions but also typically participated by engaging in PA behaviors themselves. Studies that used *promotoras* (Arredondo et al., 2017; Babamoto et al., 2009; Koniak-Griffin et al., 2015; Marshall et al., 2013; McEwen et al., 2017; Mitchell et al., 2015; Vincent, 2009) delivered face-to-face educational sessions at a predetermined location or at the participant's home. The rest of the studies used research staff (i.e., professionals) to deliver interventions (Coleman et al., 2012; Duggan et al., 2014; Eakin et al., 2007; Hawkins et al., 2015; Hovell et al., 2008; Khare et al., 2014; King et al., 2013; Marcus et al., 2013; Marcus et al., 2016; Pekmezi et al., 2009; Poston et al., 2001; Rosal et al., 2005; Rosal et al., 2011; Rothschild et al., 2014). Most studies used face-to-face educational sessions (Arredondo et al., 2017; Babamoto et al., 2009; Coleman et al., 2012; Duggan et al., 2014; Eakin et al., 2007; Hawkins et al., 2015; Hovell et al., 2008; Khare et al., 2014; Koniak-Griffin et al., 2015; Marshall et al., 2013; McEwen et al., 2017; Mitchell et al., 2015; Poston et al., 2001; Rosal et al., 2005; Rosal et al., 2011; Rothschild et al., 2014; Vincent, 2009), and nine of these had significant results (Arredondo et al., 2017; Babamoto et al., 2009; Coleman et al., 2012; Hawkins et al., 2015; Hovell et al., 2008; Koniak-Griffin et al., 2015; Mitchell et al., 2015; Poston et al., 2001; Vincent, 2009). Three studies provided print materials via mail to engage participants in PA behaviors (Arredondo et al., 2017; Marcus et al., 2013; Pekmezi et al., 2009), one study used a computer to deliver the PA intervention (King et al., 2013), and one study emailed materials to participants (Marcus et al., 2016). Of five studies that used non-face-to-face contact, four had significant results (Arredondo et al., 2017; King et al., 2013; Marcus et al., 2013; Marcus et al., 2016).

Intervention Content and Dose.—Interventions varied with regard to the use of strategies to enhance, and measure, PA. Eight studies provided pedometers to the participants as well as activity logs to track PA (Hawkins et al., 2015; King et al., 2013; Koniak-Griffin et al., 2015; Marcus et al., 2013; Marshall et al., 2013; Pekmezi et al., 2009; Rosal et al., 2011; Vincent, 2009); five had significant results (Hawkins et al., 2015; King et al., 2013; Koniak-Griffin et al., 2015; Marcus et al., 2013; Vincent, 2009). Three studies provided accelerometers and had significant results (Arredondo et al., 2017; Koniak-Griffin et al., 2015; Marcus et al., 2016). Studies that provided pedometers to participants also provided logs to record PA. Hence, participants were aware of the measurement of PA by pedometer and also of the timeframe of data collection.

One study used a virtual advisor with an embodied conversational agent on a computer at a community senior center (King et al., 2013). One study designed an aerobic intervention with a Latina aerobics instructor, which included dance sessions accompanied by *salsa/merengue* music (Hovell et al., 2008). Two studies used print materials that were personalized to the participant's current state of motivational readiness for PA and tip sheets on selected topics such as stretching or measuring heart rate (Marcus et al., 2013), and mailings of PA manuals matched to the participants' current level of motivational readiness (Pekmezi et al., 2009).

Twelve (57%) studies reported significant improvement in PA from pre- to postintervention. Eight of 10 studies that listed walking as the primary intervention for PA had significant results (Arredondo et al., 2017; Coleman et al., 2012; Hovell et al., 2008; King et al., 2013; Marcus et al., 2013; Marcus et al., 2016; Marshall et al., 2013; Vincent, 2009). Also, one study featured a combination of dancing and walking (Vincent, 2009) and one study dancing alone (Hovell et al., 2008) as the primary modes of PA. The study that had dancing alone as the PA behavior also had statistically significant results with more participants engaging in the PA behavior postintervention (Hovell et al., 2008). The study that had a combination of dancing and walking also had statistically significant results (Vincent, 2009).

The educational sessions covered PA topics such as walking, leisure-time activity, and self-management of diabetes (Arredondo et al., 2017; Babamoto et al., 2009; Coleman et al., 2012; Duggan et al., 2014; Hawkins et al., 2015; Hovell et al., 2008; Koniak-Griffin et al., 2015; McEwen et al., 2017; Rosal et al., 2005; Rosal et al., 2011; Vincent, 2009).

Intervention sessions ranged in duration from 50 minutes (Coleman et al., 2012) to 2 hours (Koniak-Griffin et al., 2015). One study had only three intervention sessions delivered at 1 month, 2 months, and 6 months, with significant results (Coleman et al., 2012). Finally, one study provided biweekly or monthly educational materials (Pekmezi et al., 2009), but did not have significant findings.

Cultural Relevance of Interventions.—Many (81%) of the studies mentioned cultural appropriateness as part of intervention development. Furthermore, 67% of the studies described cultural appropriateness explicitly (Babamoto et al., 2009; Hawkins et al., 2015; Hovell et al., 2008; King et al., 2013; Koniak-Griffin et al., 2015; Marcus et al., 2013; Marshall et al., 2013; McEwen et al., 2017; Mitchell et al., 2015; Pekmezi et al., 2009; Poston et al., 2001; Rosal et al., 2005; Rosal et al., 2011; Vincent, 2009). Nine (43%) studies provided detail on how interventions were adapted to be culturally appropriate (Hawkins et al., 2015; Hovell et al., 2008; Marshall et al., 2013; McEwen et al., 2017; Pekmezi et al., 2009; Poston et al., 2001; Rosal et al., 2005; Rosal et al., 2011; Vincent, 2009). Four (19%) studies mentioned interventions as being culturally appropriate but did not provide specific cultural components (Babamoto et al., 2009; Eakin et al., 2007; Marcus et al., 2016; Rothschild et al., 2014). Four studies (19%) provided succinct explanations regarding culturally appropriate interventions (King et al., 2013; Koniak-Griffin et al., 2015; Marcus et al., 2013; Mitchell et al., 2015). Finally, four (19%) studies did not mention culturally appropriate component (Arredondo et al., 2017; Coleman et al., 2012; Duggan et al., 2014; Khare et al., 2014).

Discussion

Engaging in leisure-time PA at least 1 hour per day decreases the probability of obesity (Sarma, Devlin, Gilliland, Campbell, & Zaric, 2015) and reduces the risk for chronic health conditions, such as diabetes mellitus (Bell et al., 2014). This literature review identified effective strategies to increase PA among Hispanic adults. However, the studies in this review had mixed samples of Hispanics.

It is important to note that there may be differences between Hispanic adults related to country of origin. Evidence suggests that nearly 7 in 10 Hispanic adults do not believe that there is a shared culture among Hispanic populations in the United States (Taylor, Lopez, Martinez, & Velasco, 2012). Therefore, preferences of Hispanic participants may differ with regard to tailoring of PA interventions. For example, this review found that studies that incorporated dancing and music had significant findings. However, musical styles vary among Hispanic cultures; the music preferences of Mexicans may differ from those of Central Americans, for example (Turino, 2003). Hence, selecting culturally appropriate music that caters to the musical taste of the participants' country of origin or ancestry may be an important factor in efforts to increase participation PA behaviors among Hispanics.

There is evidence to suggest that Hispanic populations experience disparities in the incidence of type 2 diabetes mellitus, when compared with other U.S. populations (Bullard et al., 2018). Effective PA interventions can address health disparities and reduce the incidence of obesity and diseases linked to inactivity, such as diabetes and cardiovascular disease.

The studies in this review had mixed samples of Hispanics. Mexican or Mexican American ancestry was self-reported by participants in 10 studies; however, the other 11 studies reported various countries of origin.

There were five studies (Hawkins et al., 2015; King et al., 2013; Pekmezi et al., 2009; Rosal et al., 2005; Vincent, 2009) with sample sizes of less than 100 participants, which may have limited the ability to detect intervention impact and differences between groups. Recruitment challenges or limited fiscal resources may have contributed to frequent small samples. Restricted age range may limit the generalizability of findings of this review. Most study participants were between 30 and 50 years of age, hence there was a lack of information about the impact of PA interventions among younger and older Hispanic adults.

The majority of the studies examined interventions based on walking. There was great variety in the way that PA was measured, with some studies focusing solely on the amount (e.g., number of minutes) of PA, while other studies focused on the amount and type of PA (e.g., mild vs. vigorous). Two studies suggested that individuals of Mexican American ancestry prefer walking to engage in PA (Mier, Medina, & Ory, 2007; Wood, 2002). While walking appeared to be a convenient and inexpensive PA strategy, future research should explore other forms of more vigorous PA, such as dancing, which also appeared to be of interest to this subgroup.

Promotoras or lay health advisors were often used to promote the interventions among Hispanic populations. The use of *promotoras* may have had a dual purpose: to increase trust with and to enhance cultural appropriateness of the interventions. Additionally, these lay health advisors were often bilingual members of the community who could readily communicate with Spanish-speaking participants. The ability to communicate in the participants' preferred language may facilitate PA behavior change. Findings suggests that the use of *promotoras* may influence the acceptance of interventions by Hispanic adults. However, more rigorous investigation comparing *promotoras* with other interventionists has

been recommended to provide empirical evidence of *promotora* effectiveness (Ayala, Vaz, Earp, Elder, & Cherrington, 2010; Rhodes, Foley, Zometa, & Bloom, 2007).

Theoretically driven studies showed significant increases in PA, ranging from two- to tenfold increase per week. The predominant theoretical frameworks used, SCT and TTM, focus on the capability of individuals to enact desired PA behaviors. Hence, these theories may be an appropriate foundation to develop PA interventions for Hispanic populations in the future.

The use of pedometers to measure outcomes may have enhanced PA in and of itself. Evidence for use of pedometers to promote walking has had mixed results in the literature (Ogilvie et al., 2007). However, the use of a pedometer seemed to provide immediate visual feedback about the quantity of steps (Gabrys, Sperzel, Bernhoerster, Banzer, & Vogt, 2017), which may have motivated some individuals to engage in and sustain PA behaviors. Moreover, the relative cost of pedometers is low (Kolt et al., 2012; Sangster, Church, Haas, Furber, & Bauman, 2015), which facilitates access to this tool.

There were limitations to this literature review. Some studies that are relevant to this review may have been missed due to inadequate indexing in available databases. Additionally, ancestry searches conducted by hand did not yield any studies; furthermore, no dissertations were included in this review nor were articles published in Spanish. Some studies included in this review had small sample sizes, and many of the studies relied on self-report of PA by participants. While there is evidence to suggest that self-reported PA is reliable (Craig et al., 2003), there is also evidence confirming that individuals tend to underreport sedentary behavior and overestimate both intensity of PA and duration of moderate-to-vigorous PA (Cerin et al., 2016). Despite the heterogeneity among the U.S. Hispanic adult population, several studies did not describe country of origin or ancestry. Additionally, all studies had primarily female participants.

Conclusion

This literature review described randomized controlled studies that tested PA interventions in Hispanic samples in the United States. A number of effective strategies to enhance PA among Hispanic adults were identified. The use of *promotoras* or CHWs, a theoretical framework, and face-to-face delivery formats appeared to enhance intervention effectiveness. The use of pedometers produced significant results in some studies, as did studies that measured moderate-to-vigorous PA. Innovative strategies, including a virtual advisor and tailored mailings, were also effective and served to enhance engagement in PA behaviors. However, there was wide variety with regard to the type of intervention implemented and the manner in which PA was measured.

Recommendations for future research include increased efforts to recruit male, younger, and older participants. The use of more objective PA measures, rather than self-report, should be considered in future research. More consistency in the measures used to examine PA could enhance the ability to compare and contrast intervention effectiveness between studies. In addition, developing culturally appropriate interventions that target subsets of the Hispanic population appears to be missing from the literature. Interventions that are specifically

tailored based on the participants' country of origin or ancestry may enhance the effectiveness of PA interventions. Tailoring may also help sustain PA within the target populations.

Hispanics are the largest minority population in the United States. This population experiences increased rates of chronic health conditions, such as diabetes mellitus type 2 and cardiovascular disease, which have been correlated to sedentary lifestyle behaviors and overweight/obesity (Caballero, 2005). Therefore, more research is warranted to develop effective intervention strategies that can increase PA in the growing population of U.S. Hispanic adults. Furthermore, such interventions must be tailored and amenable to implementation among America's diverse Hispanic communities.

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Figure 1.
PRISMA diagram of search results. Adapted from Moher et al. (2009).

Randomized Controlled PA Intervention Studies With Hispanic Adults ($N=21$)

Author, Sample	Theoretical framework	Intervention	Design, Follow-up length	PA measure	Results
Arredondo et al. (2017); <i>N</i> = 380; females, mean age (<i>SD</i>) = 44.4 (44.4) (100% Latina); various participants with T2DM, arthritis, heart disease, cancer	Ecological framework <i>Promotora</i> model	Weekly <i>promotora</i> -led free PA classes Start group with prayer, end class with review of monthly mailed health handouts with topics including setting goals and overcoming barriers to PA and short discussion on how to apply lesson or skill Culturally appropriate component: not specified	Cluster randomized controlled trial (2 walking groups, 2 cardio dance classes, and 2 strength training classes) 12 months	PA accelerometer weekly averages of MVPA; self-report PA World Health Organization Global Physical Activity Questionnaire: minutes per week of leisure time MVPA	<i>Accelerometer-based MVPA</i> : Measured in logged units; PA adjusted mean (<i>SE</i>) <i>IG</i> = 4.93 (0.05) <i>CG</i> = 4.78 (0.03) Difference in adjusted means 0.15, <i>p</i> = .03 <i>Self-report leisure time PA</i> : Measured in logged units; PA adjusted mean (<i>SE</i>) <i>IG</i> = 4.86 (0.05) <i>CG</i> = 4.47 (0.10) Difference in adjusted means 0.39, <i>p</i> = .003 IG participants had significant results
Babamoto et al. (2009); <i>N</i> = 189; female 64%, male 36%, mean age (<i>SD</i>) = 50.0 (11.9); self-identified as Hispanic/Latino; various participants with hyperlipidemia	No theory specified	Participants assigned to 1 of 3 study arms: CHW, CM, or SPC CHW: 3 bilingual CHWs delivered 10 weekly education individual sessions. Follow-up telephone calls. CM: 2 registered nurses worked with patients individually for diabetes education and monitoring. Monthly visits and monthly phone calls as needed SPC: Usual care Culturally appropriate component: Incorporating patient cultural and spiritual beliefs for CHW group; using culturally appropriate educational materials based on stages of change for CM group	3-group RCT with 2 treatment and 1 control groups 6 months	Exercise at least 3 times per week Self-reported PA	CHW (<i>n</i> = 75): Baseline <i>n</i> = 21 (28%), 6-month <i>n</i> = 47 (63%), <i>p</i> < .05 within groups at 6-month follow-up CM (<i>n</i> = 60): Baseline <i>n</i> = 15 (25%), 6-month <i>n</i> = 23 (38%), <i>p</i> < .05 between groups at 6-month follow-up SPC (<i>n</i> = 54): Baseline <i>n</i> = 9 (17%), 6-month <i>n</i> = 19 (35%), <i>p</i> < .05 within groups at 6-month follow-up PA improved in CHW and SPC
Coleman et al. (2012); <i>N</i> = 868; females, mean age = 52 (65% Mexican and 35% Central/South American) at-risk for developing CVD, HTN, or hyperlipidemia	Behavior change theory	Bilingual CHWs delivered intervention of three 50-minute, individually tailored 1:1 counseling sessions at 1 month, 2 months, and 6 months Culturally appropriate component: Not specified	2-group RCT 6 months	Self-reported PA; Physical Activity Assessment Survey	Moderate PA CG: Baseline 328 (75%), follow-up 335 (77%), OR (95% CI) = 1.10 [0.80, 1.50], <i>p</i> = .57 IG: Baseline 309 (71%), follow-up 365 (84%), OR (95% CI) = 2.19 [1.57, 3.07], <i>p</i> < .001 Vigorous PA CG: Baseline 69 (16%), Follow-up 75 (17%), OR (95% CI) = III [0.77, 1.59], <i>p</i> = .58 IG: Baseline 57 (13%), follow-up 143 (33%), OR (95% CI) = 3.37 [2.38, 4.77], <i>p</i> < .001 IG group had significant results
Duggan et al. (2014); <i>N</i> = 320; female 70.6%, male 29.4%, mean age =	No theory specified	Educational curriculum provided by CHWs at participants' homes 5 weekly guided sessions on diabetes education Culturally appropriate component: Not specified	2-group RCT 6 months	Self-reported PA IPAQ	<i>Leisure time PA mean (SE)</i> IG 3 months: Vigorous = 0.96 (0.2), <i>p</i> = .09; moderate = 2.13 (0.2), <i>p</i> = .13; mild = 3.59 (0.2), <i>p</i> = .72

Author, Sample	Theoretical framework	Intervention	Design, Follow-up length	PA measure	Results
50.6 years (100% Hispanic/Latino), 67% TD2M					CG 3 months: Vigorous = 0.72 (0.1); moderate = 1.76 (0.2); mild = 3.67 (0.2) No significant results
Eakin et al. (2007); N = 135, 6 weeks; N = 162, 6 months; female 78.5%, male 21.5%, mean age (SD) = 30.5, intervention group = 50 (13), control group = 49 (13); Hispanic (75%) with 1 or more chronic health conditions (HTN, heart disease, T2DM)	Socioecological model and behavioral-ecological approach for intervention development	Health educator conducted two 12f self-management support and community linkage sessions, 60-90 minutes, 3 months apart. Phone calls at 2, 6, and 14 weeks 3 tailored newsletters reinforcing behavior change goals Culturally appropriate component: Intervention culturally adapted and translated into Spanish	2-group RCT 6 months	Two PA outcome variables: Total minutes of walking/week Yes/No dichotomous measure whether meeting guidelines of 30 minutes/day of moderate PA at the rate of least 5 days/week or 20 minutes/day of vigorous PA at least 3 days/week	<i>Change in minutes of walking/week:</i> IG: Baseline 60 (0-840) total minutes walking/week [median and range] 6 weeks: 11 ± 20 6 months: 16 ± 20 Wald $F(2) = 2.04, p = .132$ CG: Baseline 70 (0-840) total minutes walking/week [median and range] 6 weeks: 47 ± 23 6 months: — 11 ± 23 No significant results
Hawkins et al. (2015); N = 68; females, no mean age provided (100% Hispanic), gestational diabetes	TTM and SCT	6 monthly 12f counseling sessions and 5 telephone booster sessions Contacts provided by bicultural and bilingual health educators encouraging PA 30 minutes of moderate-intensity activity on most days of the week Pedometer provided to participants Culturally appropriate component: Intervention based on individually tailored strategies to promote diet and PA change among Hispanic populations. All materials available in English and Spanish	2-group pilot RCT 6 weeks postpartum	MET hours/week measured by Pregnancy Physical Activity Questionnaire	Smaller reduction of moderate-intensity PA from baseline to mid-pregnancy compared with CG (mean ± SE = -23.4 ± 16.6 MET hours/week vs. -27.0 ± 16.2 MET hours/week, $p = .88$) IG: Vigorous-intensity PA increase 1.6 ± 0.8 MET hours/week CG: -0.8 ± MET hours/week in CG, $p = .004$ Small baseline to postpartum increase 0.5 ± 0.5 MET hours/week vs. -0.9 ± 0.5 MET hours/week, $p = .046$ Vigorous PA increased in IG
Hovell et al. (2008); N = 137; females, mean age (SD) = 31.36 (6.21); 100% Hispanic, country of origin Mexico 96.7%, other 3.3%, 70% of participants obese	Operant learning theory and applied behavior analysis	Three weekly 90-minute aerobic exercise group sessions for 6 months held in a community setting. Bilingual Latina aerobics instructor-led vigorous, low-impact aerobic dance sessions 30 minutes of exercise/diet education with "hands-on" learning activities Culturally appropriate component: Bilingual health educators and guest speakers provided culturally tailored, low-literacy education on home safety and selected disease prevention topics unrelated to exercise, diet, or CVD to CG. Education component following exercise segment included exercise and diet education	2-group RCT 12 months	Self-reported PA via question Direct PA observation	<i>Minutes (min) of activity per 2 weeks as percentiles of PA measures</i> IG <i>Vigorous exercise:</i> Baseline: 9 min 70th, 61 min 80th, 191 min 90th Posttest 90 min 30th, 180 min 40th, 270 min 50th, 360 min 60th, 360 min 70th, 392 min 80th, 486 min 90th, $p < .001$ Follow-up: 38 min 60th, 138 min 70th, 300 min 80th, 399 min 90th <i>Walking:</i> Baseline: 40 min 90th Posttest 35 min 50th, 60 min 60th, 90 min 70th, 180 min 80th, 271 min 90th, $p < .001$

Author, Sample	Theoretical framework	Intervention	Design, Follow-up length	PA measure	Results
		with “hands-on” learning activities culturally appropriate for low-literacy Latinas for IG			<p>Follow-up: 30 min 70th, 60 min 80th, 159 min 90th</p> <p>Moderate exercise: Baseline: 6 min 60th, 53 min 70th, 120 min 80th, 333 min 90th Posttest 60 min 60th, 102 min 70th, 156 min 80th, 280 min 90th, $p = .310$</p> <p>Follow-up: 6 min 60th, 60 min 70th, 92 min 80th, 240 min 90th CG;</p> <p><i>vigorous exercise:</i> Baseline: 30 min 90th Posttest 82 min 80th, 180 min 90th, $p < .001$</p> <p>Follow-up: 99 min 90th <i>Walking:</i> Baseline: 85 min 90th Posttest 50 min 70th, 90 min 80th, 149 min 90th Follow-up: 36 min 80th, 198 min 90th</p> <p><i>Moderate exercise:</i> Baseline: 40 min 60th, 80 min 70th, 144 min 80th, 289 min 90th Posttest 12 min 60th, 40 min 70th, 108 min 80th, 198 min 90th Follow-up: 22 min 60th, 60 min 70th, 120 min 80th, 152 min 90th IG had significant results</p> <p>Increases in all PA and moderate-intensity PA within groups: All PA: IG: Baseline: all PA 8.45 ± 5.36 Postintervention: 13.53 ± 6.59, $F = 20.94$, $p < .01$ 1 year 8.48 ± 5.73, $F < 0.01$, $p = .99$ CG: Baseline: all PA 8.81 ± 5.18 Postintervention: 11.11 ± 7.74, $F = 3.89$, $p = .05$ 1 year 10.00 ± 5.61, $F = 0.72$, $p = .40$ Moderate Intensity PA: CG: Baseline: all PA 2.57 ± 2.89 Postintervention: 5.06 ± 3.73, $F = 15.95$, $p < .01$ 1 year 3.26 ± 3.17, $F = 0.79$, $p = .38$ CG: Baseline: all PA 2.99 ± 3.33 Postintervention: 4.41 ± 4.92, $F = 3.59$, $p = .06$ 1 year 3.81 ± 3.87, $F = 0.57$, $p = .45$ No significant results</p> <p>4-month changes in mm/walking/week CG: M change 26.8 (67.0) Virtual advisor IG: AI change 253.5 (248.7) Between-group difference: 226.8, 95% CI = [107.0, 346.4], $F(1,38) = 13.6$, $p = .0008$ IG had significantly more steps</p>
Khare et al. (2014); $N = 155$; females, mean age (SD) = 50.87 (6.88); Mexican or Central American	SCT and TTM	CVD risk factor screening, related educational handout, PRN physician care referral, follow-up assessment at 1 and 2 years from baseline, postcards and newsletter for both groups IG received 12-weekly lifestyle change f2f intervention sessions and extra orientation session for family members Culturally appropriate component: Not specified	2-group RCT 12 months	CHAMPS summary scores Hours/week in all PA	
King et al. (2013); $N = 39$; female 65%, male 35%; mean age (SD) = 72.1 (8.2); 92.5% Hispanic, country of origin	TTM and SCT	4-month ECA PA intervention delivered through a computer in a local community senior center Participants encouraged to complete virtual advisor sessions regularly Pedometer provided to participants Culturally appropriate component: 12 months of	2-group RCT 4 months	CHAMPS Questionnaire Walking changes at baseline, 2 months, and 4 months	

Author, Sample	Theoretical framework	Intervention	Design, Follow-up length	PA measure	Results
40% Mexico, 40% U.S., 20% other; with previous health conditions		participatory formative research and evaluation to enhance ECA cultural and linguistic congruity for Latino and, to some extent, Filipino older adults			
Koniak-Griffin et al. (2015); $N = 223$; females, mean age (SD) = 44.6 (7.9); 84% Mexican, 14% Dominican, Central or South American, 2% born in the United States but raised in Mexico, with T2DM and HTN	No theory specified	<i>Mujeres Sonos y Precavidas</i> 6-month lifestyle intervention consisting of group education plus individual teaching and coaching Eight 2-hour weekly classes for first 2 months Individual teaching and coaching had 8 contacts delivered over 4 months (4 home visits plus 4 telephone calls). Personal goals established by participants for lifestyle changes. Messages included increasing PA to 10,000 steps per day; PA diaries provided Accelerometer provided to participants Culturally appropriate component: Classes based on culturally relevant, <i>promotora</i> -led educational program developed for Latino communities by National Heart, Lung, and Blood Institute	2-group RCT 9 months	Daily steps via accelerometer	IG: Baseline: 8,579 $\pm$ 3,268 6 months: 8,769 $\pm$ 2,747 9 months: 8,577 $\pm$ 2,872 Contrast $t = 2.07$, $df = 201$, $p = .04$ CG: Baseline: 8,571 $\pm$ 3,130 6 months 8,480 $\pm$ 3,506 9 months 7,241 $\pm$ 2,764 IG had more steps
Marcus et al. (2016); $N = 218$; females, mean age (SD) = 39.2 (10.47); 87.3% Hispanic, 84.4% Mexican American, 3.4% Colombian, 1.0% Guatemalan, 1.0% Puerto Rican, 0.5% Dominican Republic, 12.7% other	SCT and TTM	Participants provided with study website access, including self-monitoring of minutes of activity and steps Components included goal setting, message board for support, "ask the expert," maps for walking routes, and exercise videos Monthly questionnaires generated tailored PA reports, including information on current stage of motivational readiness for PA, comparison of participants with other individuals who are physically active, comparison of participant responses with previous responses, and useful PA facts Weekly email prompts to access intervention website in Month 1, biweekly in Months 2 and 3, and monthly during Months 4-6 Culturally appropriate component: nonspecific culturally and linguistically adapted, individually tailored, Internet-based PA intervention	2-group RCT 6 months	Accelerometer PA total min/week 7-day PAR Questionnaire	IG: Baseline: 8.0 ($SD = 15.0$) min/week MVPA 6 months: 112.8 ($SD = 97.1$) min/week MVPA CG: Baseline: 10.44 ($SD = 23.98$) min/week MVPA 6 months: 63.5 ($SD = 88.7$) min/week MVPA Adjusted model: IG had 50.0 more min/week of MVPA at 6 months compared with CG (adjusting for baseline), $SE = 9.5$, $p = .01$ IG had more steps
Marcus et al. (2013); $N = 266$; females, mean age (SD) = 41.61	TTM and SCT	Print interventions to increase PA, 4 mailings in Month 1, 2 mailings in Months 2 and 3, and 1 mailing in Months 4-6 Pedometer provided to participants	2-group RCT 6 months	3 psychosocial measures at baseline, 3 months via mail, and 6 months	Mean (SD) min/week of MVPA IG: 6 months: 73.36 (89.73), $M = 41.36$ ($SE = 7.93$), $p < .01$ CG: 6 months: 32.98 (82.82)

Author, Sample	Theoretical framework	Intervention	Design, Follow-up length	PA measure	Results
(10.07); 34.1% Dominican, Colombian 30.3%, 10.6% Puerto Rican, 6.8% Guatemalan, 5.3% Mexican, American or Chicana, other 12.9%, with increased BMI		Culturally appropriate component: Formative research conducted to culturally and linguistically adapt intervention for Latinas, and adapted intervention tested in a pilot study		f2f to develop intervention 7-day PAR Questionnaire	IG had significant results
Marshall et al. (2013); $N = 180$; females, mean age (SD) Intervention 1 36.94 (8.86), Intervention 2 35.27 (8.76), Intervention 3 35.42 (8.41); 100% Latina, country of origin Intervention 1 Mexico 98.2%, U.S. 1.8%, Intervention 2 Mexico 94%, U.S. 2%, other 4%, Intervention 3 Mexico 94.6%, U.S. 3.4%, with increased BMI	Behavioral and socioecological models for Latino health promotion and Communication Persuasion Model	12-week Spanish language PA program (<i>Pasos Adelante</i>). Weekly 1-hour group meetings led by a <i>promotora</i> Intervention 1 self-selected step goal, 2 10,000 steps/day, Intervention 3 3,000 steps in 30 minutes Culturally appropriate component: Culturally targeted and tailored flyers, letters, friend referral, presentations at community gatherings and parent-teacher meetings, and incentives to follow recommendations for recruiting minorities and underserved populations	3-group RCT with 2 treatment and 1 control groups 3 months Pedometers provided to participants	Accelerometer-based PA measured at baseline and after 12 weeks	<i>Median minutes of moderate-to-vigorous-intensity physical activity (fAVPA)</i> Intervention 1: Baseline 17, postintervention 22 Intervention 2: Baseline 13, postintervention 15 Intervention 3: Baseline 13, postintervention 29 Least square mean difference test Estimate (SE) Intervention 1 vs. 2: 0.1967 (0.1910), $p = .3029$ Intervention 1 vs. 3: 0.3581 (0.1905), $p = .0601$ Intervention 2 vs. 3: 0.1613 (0.1498), $p = .2815$ No significant results
McEwen et al. (2017); $N_{T1} = 157$, $N_{T2} = 105$, $N_{T3} = 87$; Participant: female 65%, male 35%, mean age (SD) = 53.53 (9.0); Mexican American 100%, with T2DM, increased BMI Family: female 72.6%, male 27.4%, mean age (SD) = 47.27 (16.1); Mexican American 100%, with increased BMI	No theory specified	12-week intervention program with six weekly 2-hour education (led by a certified diabetes educator registered nurse) and social support (led by promotoras) sessions focused on managing diabetes Three weekly 2-hour home visits and three 20-minute phone calls completed by promotoras Goals established in group sessions and evaluated/ refined as needed in home visits. Phone calls completed to check participants' progress or barriers in meeting goals Wait-list: 2-hour education sessions weekly for 3 weeks Culturally appropriate component: Mexican American participants with T2DM and family members participated in focus groups to inform intervention using community-based participatory research principles	2-group experimental repeated measures with dyad cohorts and wait list control 6 months	IPAQ: MET minutes per week	<i>IPAQ Vigorous activity:</i> MET minutes/week, mean (SD) $T_{1Control} = 1706.05$ (3222.0) $T_{1Intervention} = 1939.53$ (4444.2) $T_{2control} = 1887.44$ (4090.0) $T_{2Intervention} = 2003.72$ (3381.4) $T_{3control} = 2081.86$ (5343.2) $T_{3Intervention} = 2138.16$ (4425.8) $F(df), P$ Group $\times$ Time: 0.01 (1.9, 155.7), .984 Contrast T_1 vs. T_2 0.01 (1, 84), .906 Contrast T_2 vs. T_3 0.002 (1, 84), .963 <i>IPAQ Moderate activity:</i> MET minutes/week, mean (SD) $T_{1Control} = 1600.00$ (3195.0) $T_{1Intervention} = 639.50$ (1336.0) $T_{2control} = 1135.79$ (2217.0) $T_{2Intervention} = 1165.50$ (1873.2) $T_{3control} = 1271.58$ (2077.0) $T_{3Intervention} = 1057.50$ (2306.8)

Author, Sample	Theoretical framework	Intervention	Design, Follow-up length	PA measure	Results
Mitchell et al. (2015); $N = 254$; female 72%, male 28%, mean age 33.2 (7.8) female, 30.2 (7.0) male (Latino 100%), with increased BMI	No theory specified	Ten weekly 90-minute sessions with PA for 15–20 minutes, with participants sharing a healthy snack and promising to improve lifestyle Culturally appropriate component: Use of a Mexican specialist to create intervention program and development of culturally and linguistically appropriate low-literacy materials	RCT 12–14 weeks	PA changes in days/week performing at least 30 minutes of PA, days/week of at least 10 minutes of PA producing moderate heart and respiratory rate increases, and days/week of at least 10 minutes of PA producing large increases in heart and respiratory rate PA Confidence Scales and Behavioral	<p>$F(df), P$</p> <p>Group $\times$ Time 1.26 (1.8, 136.1), .285</p> <p>Contrast T_1 vs. T_2 2.86 (1, 76), .095</p> <p>Contrast T_2 vs. T_3 0.17 (1, 76), .686</p> <p><i>IPAQ Walking:</i></p> <p>MET minutes/week, mean (SD)</p> <p>$T_{1Control} = 805.93$ (1860.6)</p> <p>$T_{1Intervention} = 762.67$ (1400.2)</p> <p>$T_{2Control} = 1790.25$ (2820.5)</p> <p>$T_{2Intervention} = 1669.71$ (3108.4)</p> <p>$T_{3Control} = 1829.33$ (3022.0)</p> <p>$T_{3Intervention} = 1390.13$ (2200.0)</p> <p>$F(df), P$</p> <p>Group $\times$ Time 0.09 (2, 144), .915</p> <p>Contrast T_1 vs. T_2 0.08 (1, 72), .778</p> <p>Contrast T_2 vs. T_3 0.15 (1, 72), .697</p> <p><i>IPAQ Total activity:</i></p> <p>MET minutes/week, mean (SD)</p> <p>$T_{1Control} = 3877.17$ (5284.2)</p> <p>$T_{1Intervention} = 4278.16$ (7291.3)</p> <p>$T_{2Control} = 4406.01$ (7090.4)</p> <p>$T_{2Intervention} = 4874.10$ (6803.7)</p> <p>$T_{3Control} = 5027.09$ (8791.5)</p> <p>$T_{3Intervention} = 4322.76$ (7294.5)</p> <p>$F(df), P$</p> <p>Group $\times$ Time 0.25 (2, 190), .783</p> <p>Contrast T_1 vs. T_2 0.001 (1, 95), .970</p> <p>Contrast T_2 vs. T_3 0.38 (1, 95), .538</p> <p>No significant results</p> <p>Nonwork PA in days/week:</p> <p>At least 30 minutes: CG: 2.1 (1.6–2.6)</p> <p>IG: 3–7 sessions 2.5 (1.7–3.3)</p> <p>IG: 8–10 sessions 3.2 (2.8–3.7)</p> <p>$p = .004$</p> <p>Moderate PA: CG: 2.8 (2.2–3.4)</p> <p>IG: 3–7 sessions 3.7 (2.8–4.7)</p> <p>IG: 8–10 sessions 3.8 (3.3–4.3)</p> <p>$p = .022$</p> <p>Vigorous PA: CG: 1.4 (1.0–1.9)</p> <p>IG: 3–7 sessions 1.3 (0.5–2.1)</p> <p>IG: 8–10 sessions 1.7 (1.3–2.1)</p> <p>$p = 0.60$</p> <p>Total PA increased with attendance, except for vigorous PA</p>

Author, Sample	Theoretical framework	Intervention	Design, Follow-up length	PA measure	Results
Pekmezci et al. (2009); $N=93$; females, mean age (SD) = 41.37 (1.18); Dominican 35%, Colombian 31%, Puerto Rican 11%, Guatemalan 10%, other 13%, with increased BMI	TTM and SCT	IG: Six monthly PA manual mailings matched to participants' current level of motivational readiness and individually tailored computer expert-system feedback reports CG: Six monthly mailings of health information on topics other than PA Culturally appropriate component: Cultural and linguistic adaptation of an existing empirically supported, computer-tailored PA intervention. Formative research on individually tailored PA print intervention conducted by bilingual/bicultural staff.	2-group RCT 6 months	Risk Factor Surveillance System 2009 questionnaire 7-day PAR	Mean min/week of at least moderate-intensity PA mean (SD) IG: Baseline: 16.56 (25.76), 6 months: 147.27 (241.55) $R(1, 91) = 1.37, p = .25$ CG: Baseline 11.88 (21.99), 6 months 96.79 (118.49) No significant results
Poston et al. (2001); $N=379$; females, mean age (SD) = 39.2 (10.6), CG 40.0 (6.4); Mexican American 100%, with increased BMI	SCT	Weekly 90-minute meetings for 6 months led by bilingual Mexican American health professionals Content used individually oriented behavioral techniques with culturally compatible strategies Culturally appropriate content: Use of bilingual materials and instructors/peer leaders, modification of native diets, culturally tailored rationales for diet and activity modification, and use of established social support networks	2-group RCT 12 months	7-day PAR	Mean (SD) for PA (kcal/kg/day) Baseline: IG 35.0 (3.8), CG 36.3 (4.2) 6 months: IG 36.2 (6.2), CG 37.6 (6.5) 12 months: IG 36.1 (5.0), CG 37.1 (4.8), $p < .05$ Activity in hours of moderate or greater activity per week Baseline: IG 8.1 (8.3), CG 11.3 (11.4) 6 months: IG 11.7 (11.2), CG 14.0 (16.4) 12 months: IG 10.5 (8.8), CG 12.9 (12.0), $p < .05$ IG group had more hours of moderate or greater PA and PA in kcal/kg/day
Rosal et al. (2011); $N=252$; female 77%, male 23%, age 18–44 16.3%, 45–54 29.8%, 55–64 32.9%, 65 21.0% (Puerto Rican 87.7%), with T2DM	SCT	12 weekly sessions and follow-up phase of 8 monthly sessions. Week 1 60-minute session at participant's home. Subsequent weekly 150-minute sessions in groups at community settings, with first 60 minutes of personalized counseling and cooking, and last 90 minutes of group protocol and meal Sessions delivered by nutritionist, health educator, or trained lay person Pedometer provided to participants Culturally appropriate component: Cultural tailoring included use of an educational soap opera to introduce self-management information and model attitudinal change and desired behaviors in the context of culturally relevant situations, use of bingo games to reinforce information taught, emphasis on making traditional foods healthier via healthy preparation methods, and addressing family preferences	2-group RCT 12 months	PA Survey question MET or total time of walking, sitting, or PA	Self-report walking for exercise IG: Baseline: 61.3% 4 months: 88.4%, $p = .057$ 12 months: 70.9%, $p = .435$ CG: Baseline: 52.3% 4 months: 70.9%, $p = .057$ 12 months: 66.4%, $p = .435$ No significant results reported for PA

Author, Sample	Theoretical framework	Intervention	Design, Follow-up length	PA measure	Results
Rosal et al. (2005); $N = 25$; female 80%, male 20%, mean age (SD) = 62.6 (8.6); Puerto Rican 100%, with T2DM	SCT	Individual initial 60-minute session and two 15-minute individual sessions preceding group sessions Ten weekly 150–180-minute group sessions targeting diabetes knowledge, attitudes, and self-management skills. Delivered by diabetes nurse, nutritionist, and assistant Booklet describing importance of lifestyle factors and recommendations for diet, PA, and self-monitoring blood glucose Drama (soap opera) developed to convey messages discussed at each session Culturally appropriate component: Intervention tailored to low-literacy needs and imparted through culturally familiar experiences in English and Spanish.	2-group pilot RCT 6 months	CHAMPS Questionnaire (modified version)	Kilocalories/week mean (SD) IG: Baseline 660 (705) 3 months: 439 (935) 6 months: 272 (929) $p = .11$ CG: Baseline 976 (1,154) 3 months 180 (1,262) 6 months 512 (967) $p = .11$ No significant results
Rothschild et al. (2014); $N = 144$; female 67.4%, male 32.6%, mean age (SD) = 53.7 (12.2); Mexican American 100%, with T2DM	Self-Management Theory	Baseline evaluations in 2 separate encounters approximately 30 days apart 36 home visits over 2 years, average visit duration 99 minutes. CHWs delivered behavioral self-management training. Sessions focused on knowledge and skills in diabetes self-management with goal-setting Culturally appropriate content: CHWs taught in the participants' preferred language and used culturally appropriate examples or metaphors	2-group RCT 24 months	PA Subscales of Diabetes Self-Care Activities and Empowerment Scale Mean days/week of PA	IG: Baseline 1.63 days/week 2 years: 2.64 days/week No significant results provided
Vincent (2009); $N = 17$; female 71%, male 29%, mean age 56 (Mexican American 100%), with T2DM	Chronic Disease Self-Management Model based on SCT	Eight weekly 120-minute sessions Sessions consisted of didactic content related to diabetes and taught by bilingual certified diabetes educator. Also, <i>promotoras</i> led cooking demonstrations, and group sessions as well as calling participants weekly. Pedometers provided to participants Culturally appropriate component: Content included low-fat modifications of traditional foods, discussing use of traditional home remedies, and emphasizing culturally appropriate exercise strategies such as walking and dancing for Mexican Americans. Participants were also encouraged to bring a family member as a support person. Participants received low-literacy materials in Spanish to share with family members.	2-group RCT PA measure: step count with pedometer, daily record on log 3-month follow-up		Steps per day IG: Baseline: 4,175 8 weeks: 7,238 $t = -2.51, p = .03$ CG: No data provided IG had more steps per day

Note. 7-day PAR = 7-Day Physical Activity Recall; BMI = body mass index; CHAMPS = Community Healthy Activities Model Program for Seniors; CHW = community health worker; CM = case management; CVD = cardiovascular disease; ECA = embodied conversational agent; HTN = hypertension; IPAQ = International Physical Activity Questionnaire; f2f = face-to-face; MET = metabolic

Table 2.**Outcome Measures Used in Studies.**

PA Measure	Study
Days per week of PA	Rothschild et al. (2014)
Exercise at least 3 times per week	Babamoto et al. (2009)
MET minutes of leisure-time and weekly PA	Hawkins et al. (2015), McEwen et al. (2017)
Number of days participants completed 30 minutes of PA	Mitchell et al. (2015)
Percentage of participants reporting MVPA	Coleman et al. (2012)
Difference in leisure-time mild, moderate, and vigorous PA	Duggan et al. (2014)
Percentiles of participants engaging in walking, moderate exercise, and vigorous exercise	Coleman et al. (2012), Duggan et al. (2014), Hovell et al. (2008)
Minutes of walking per week	Eakin et al. (2007), Rosal et al. (2011) (2011)
Minutes of walking per day	Koniak-Griffin et al. (2015)
Minutes of MVPA	Marshall et al. (2013)
MET hours per day and total PA duration in hours per day	Rosal et al. (2011)
Change in weekly MVPA in minutes	Arredondo et al. (2017), Marcus et al. (2013), Marcus et al. (2016) (2016)
Percentage of participants engaged in aerobic activity	Hovell et al. (2008)
PA in hours of moderate or greater activity per week	Khare et al. (2014), Pekmezi et al. (2009), Poston et al. (2001)
Change in kilocalories as a measure of PA	Poston et al. (2001), Rosal et al. (2005)
Mean number of participant steps	King et al. (2013), Koniak-Griffin et al. (2015), Vincent (2009)

Note. PA = physical activity; MET = metabolic equivalent; MVPA = moderate- to-vigorous physical activity.