

Mujeres en Accion: Design and Baseline Data

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Abstract The majority of programs designed to promote physical activity in older Hispanic women includes few innovative theory-based interventions that address cultural relevant strategies. The purpose of this report is to describe the design and baseline data for *Mujeres en Accion*, a physical activity intervention to increase regular physical activity, and cardiovascular health outcomes among older Hispanic women. *Mujeres en Accion* [Women in Action for Health], a 12 month randomized controlled trial to evaluate the effectiveness of a social support physical activity intervention in midlife and older Hispanic women. This study tests an innovative intervention, *Mujeres en Accion*, and includes the use of a theory-driven approach to intervention, explores social support as a theoretical mediating variable, use of a *Promotora* model and a Community Advisory group to incorporate cultural and social approaches and resources, and use of objective measures of physical activity in Hispanic women.

Keywords Physical activity · Hispanic women · Health promotion · Older women

Introduction

Factors that contribute to high rates of coronary heart disease (CHD) in older Hispanic women include the prevalence of overweight and obesity (48.9%) [1] and a corresponding lack of physical activity (74%) [2]. The older Hispanic woman is at particular risk, for after 60 years of age, there are further declines in leisure-time physical activity [2]. The few community-based interventions designed to promote physical activity among Hispanic women have shown varying levels of effectiveness [3]. Intervention approaches targeting physical activity in Hispanic women have most often focused on individual-level variables, with limited acknowledgement of the association between health behaviors and culturally relevant social support resources [4]. As a result, little is known about the influence that health promoting interventions may have on perceptions of social support resources in Hispanic women, and in turn, behavioral and health outcomes [5].

Social support has been shown to be especially relevant, and perhaps a more potent factor in health promotion among Hispanic women when compared with women of other ethnic groups. Further, greater social support is associated with higher levels of PA [6–9]. Thus, Hispanic women may be more responsive to interventions that provide needed support and role models for physical activity. The mobilization of naturally-occurring social networks as an intervention strategy is important because such networks are indigenous to the community, and offer culturally relevant and effective social support. The challenge

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involves identifying ways to mobilize these naturally-occurring support systems. Attention to culturally relevant antecedents of physical activity among Hispanic women, such as social support, may further the development of theoretical models which acknowledge the importance of social contextual resources. Given the evidence for the relationship between social support and health outcomes, more attention is needed to implement interventions at the level of the social network, and acknowledge and build upon the strength of Hispanic women's interpersonal networks [10, 11]. Understanding and addressing social resources associated with increased physical activity among Hispanic women is necessary to support translational research, particularly within community settings.

Purpose

This paper describes *Mujeres en Accion*, a culturally relevant, theory-based social support intervention designed to impact theoretical mediating variables of perceived social support and environmental resources, the behavioral outcome of physical activity, and reduce CHD risk in older Hispanic women. *Mujeres en Accion* incorporates an innovative approach that acknowledges and builds on social support resources among Hispanic women. Here we report the theoretical perspective and baseline data for *Mujeres en Accion*.

Theoretical Perspective

Intervention development began with seeking to identify and understand, from the perspective of Hispanic women, the social, contextual, and cultural factors related to participation in regular physical activity [12]. Our work included partnerships with community-dwelling Hispanic women through the creation of a Community Advisory Board, designed to explore the concerns and needs of Hispanic women related to physical activity. The Advisory Board has been active since 2006, and is comprised of older Hispanic women who live in the community and surrounding neighborhoods. Board members have provided empirical support for employing a social support model to guide the intervention. Group meetings have included focused discussions of strengths, resources, and barriers to physical activity, acceptable types of physical activity, and format for a physical activity intervention program. Advisory Board members have identified and corroborated with the *Mujeres* study team on culturally and contextually relevant strategies which have been incorporated into the intervention design. The Advisory Board remains active to provide consistency in the “voice” of community members.

We mapped the results of our formative research to intervention leverage points designed to help Hispanic women to initiate and sustain physical activity, consistent with relevant beliefs, values, and expectations. We chose a social support framework to inform the *Mujeres* intervention and evaluation, as this allowed a focus on the interactions between individuals as well as between women and their environment. Further, a social support framework addressed the development of supportive resources that can enhance physical activity outcomes and awareness of environmental resources for activity. Our intervention model emphasizes social support through acknowledging family values and motivations for health, promoting physical activity as a way to enhance women's roles as caregiver, creating networks of family and friends to promote physical activity, identifying safe, supportive, and acceptable places to engage in physical activity, and identifying and building on community partnerships to promote physical activity. The intervention design integrated the unique cultural and contextual perspectives, characteristics, and resources of Hispanic women, as well as theoretically relevant determinants of physical activity that could be transformed into culturally relevant support and behavior change strategies. *Mujeres en Accion* is unique in its attention to: (a) a theory-based intervention derived from formative research; (b) a focus on, and measures of individual social support resources and environmental resources; (c) a group of women at high risk for inactivity and associated cardiovascular risk factors; and (d) a focus on both the initiation and maintenance of physical activity.

The *Mujeres en Accion* theoretical framework illustrates the mechanisms through which social support may positively influence theoretical mediators of social support and environmental resource, regular physical activity, and resulting cardiovascular health outcomes (Fig. 1). Social support is defined as aid and assistance exchanged through social relationships and interpersonal transactions, and includes four types of support: (a) emotional support, including expressions of empathy, trust, caring, (b) instrumental support, including tangible aid or service, (c) appraisal support, including information that is used for self evaluation, and (d) informational support, including advice, suggestions, and information [13]. Social support has been widely documented as a mediator of both behavioral and cardiovascular health outcomes [14–16]. For many women, lifestyle changes such as physical activity occur in a context of friends, family members, and social contextual settings that contribute to the behavior change process [7]. Integration in a social network has been shown to provide a sense of purpose, recognition of self-worth, ability to meet expectations, motivation for self-care, and identification and use of resources [7, 17]. Social

support systems are consistent with both cultural factors and social norms linked to health behavior change [18]. Further, Eyler et al. [19] found that a lack of social networks was a primary barrier to physical activity among minority women, including Hispanic women.

Intervention Components

Mujeres en Accion intervention components were designed to promote social support and environmental resources for moderate intensity physical activity in community-dwelling Hispanic women. The intervention was conducted in a group format led by trained *Promotoras*, and included: (a) emotional support provided by *Promotoras* including sharing ideas and experiences, as ways to initiate and sustain walking, offer encouragement, and develop opportunities to create enhanced relationships, (b) instrumental support including the use of pedometers in monitoring regular walking, maps showing safe walking areas around the clinic and group member’s neighborhood, the formation of community walking groups by participants themselves, and the identification and development of social-contextual resources to promote walking in the community, (c) appraisal support including feedback consistent with the use of self-monitoring activities included women recorded their progress (pedometer step counts, number and duration of activity bouts) on weekly Physical Activity Records that were shared with *Promotoras*, and (d) informational support including education materials developed with and for the target audience to promote moderate-intensity walking, negotiate neighborhood safety,

and avoid musculoskeletal injury. Table 1 describes the intervention components and sessions.

Specific Aims

There were three primary aims for *Mujeres en Accion*. The first was to examine the feasibility of *Mujeres en Accion* by determining participant attrition, attendance, and acceptability of the intervention. The second aim was to explore the impact of *Mujeres en Accion* on the theoretical mediating variables of perceived social support and environmental resources, the behavioral outcome variable of physical activity, and the cardiovascular health outcome variables of body mass index (BMI), body composition, and body fat distribution. The third aim was to determine the effect size of changes in *Mujeres en Accion* participants at 6 and 12 months in behavioral outcomes and cardiovascular health outcomes. Specifically, we hypothesize that community-dwelling Hispanic women who receive the *Mujeres en Accion* intervention will have significantly higher levels of perceived social support and environmental resources, higher levels of regular physical activity measured by self-report and objective pedometer, and improved levels of cardiovascular health outcomes, including BMI, body composition measured through BIA, and body fat distribution, measured through anthropometric measures recorded at 3, 6 and 12 months, compared with an Attention-Control group receiving a monthly newsletter over the same period of time.

Fig. 1 *Mujeres en Accion* intervention model

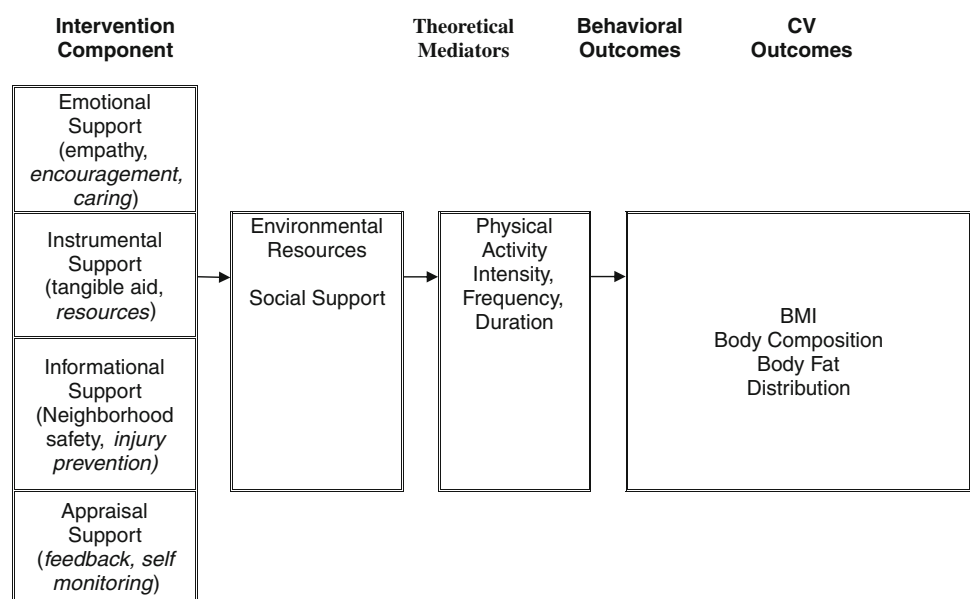


Table 1 Social support intervention sessions

Session 1	Discussion of informational support, specific to the benefits of walking, instruction about how to walk safely, information on proper shoes and clothing, examples of warm-up and stretching exercises, and use of the pedometer
Sessions 2–3	Identifying and generating instrumental and appraisal support for walking, setting and reviewing goals for progress in walking, evaluation and assessment of support resources to promote walking
Sessions 4–5	Identifying and developing sources for emotional support, including those who would be supportive of walking goals, ways to ask for needed support, and mutual goal setting.
Session 6	Current or expected barriers to walking and the identification of instrumental support to overcome barriers and integrate moderate intensity walking into daily life.
Session 7	Reinforcement of group, family, and friend support, as a way to enhance emotional and appraisal support
Session 8	Discussion of community support resources for regular walking, including informational support and the creation of supportive resources consistent with informational and instrumental support.
Sessions 9–10	Reinforced progress in moderate intensity walking and incorporated ways to seek emotional, instrumental, appraisal, and informational support in moving from adoption of walking to maintenance.
Session 11	Focused on appraisal support, including the use self-monitoring techniques to promote walking behavior.
Session 12	Summary of prior sessions and allowed participants to synthesize content, personal supports for walking, including the development and evaluation of personal and environmental resources

Method

Eligibility and Recruitment, Sample and Setting

Among the outcomes for this study, reduction in body fat is the most widely reported in the literature, and was used as a guide to estimate a reasonable treatment effect size. Using preliminary data, effect sizes in percent body fat from baseline to a later point ranged from .5 to 1.7. We estimated the potential treatment effect of a .75 standard deviation difference in % body fat between participants receiving the *Mujeres* intervention and participants in the Attention Control group [20]. Assuming a treatment effect of .5 standard deviation and a two-tailed alpha of .05, a sample of 88 subjects or 44 per group was required to test for intervention effects with a power of .80 [21].

Two hundred seventy one Hispanic women were recruited to participate in the evaluation of the feasibility, acceptability and effects of *Mujeres en Accion*; 103 did not meet the criteria for inclusion of: (a) ability to participate in moderate-intensity physical activity but currently sedentary, (b) free of significant musculoskeletal problems or comorbidity that would prevent participation in at least moderate-intensity physical activity, and (c) low risk for participation in moderate-intensity physical activity, following American College of Sports Medicine guidelines. Participants were screened for risk by the Physical Activity Readiness Questionnaire (PAR-Q) [22] using criteria for participation in exercise programs that are low-to-moderate intensity. Physician approval and clearance to participate in physical activity was obtained from participants who answered “yes” to one or more of the 7 screening questions or who were over age 69 at baseline [23]. An additional 48 declined participation at enrollment. Random assignment to the Attention Control group or *Mujeres en Accion* group

was accomplished using SPSS software to generate a list of subject sequence numbers and to assign corresponding treatment codes via a random number function.

Fifty-nine Hispanic women were randomized to the intervention group and 48 to the Attention Control group. Program recruitment was conducted through Community Health Centers, Wal-Mart, Kmart, Home Depot, and Hispanic serving marketplaces (market places that include foodstuffs that cater to Hispanic shoppers), thrift stores, and community centers, Social Service Centers, local churches, schools, and Community Health Fairs and Events that target Hispanic populations, such as a Tamale Festival and the Hispanic Women’s Conference. The study was featured in local television and on a Spanish radio program. Project personnel invited women’s participation in the study, explaining its background, purpose, and procedures in both English and Spanish. Formal, written consent was obtained from participants. The recruitment flow chart is displayed in Fig. 2.

Setting

A total of 12 community sites were used as the setting for group walks in areas close to participant neighborhoods. Sites included 2 parks in the East Valley, 3 schools in Central, East and West Phoenix, 2 churches in Central City South and West Phoenix, 1 community clinic and 1 community center, 2 senior centers and 1 family center. These community sites were developed through partnerships established by the Community Advisory Board and were reported as safe and acceptable places for physical activity and walking among participants. Participants shared that physical activity and walking in groups was important; they felt “safe in numbers” especially in parks. School sites were considered convenient because group sessions

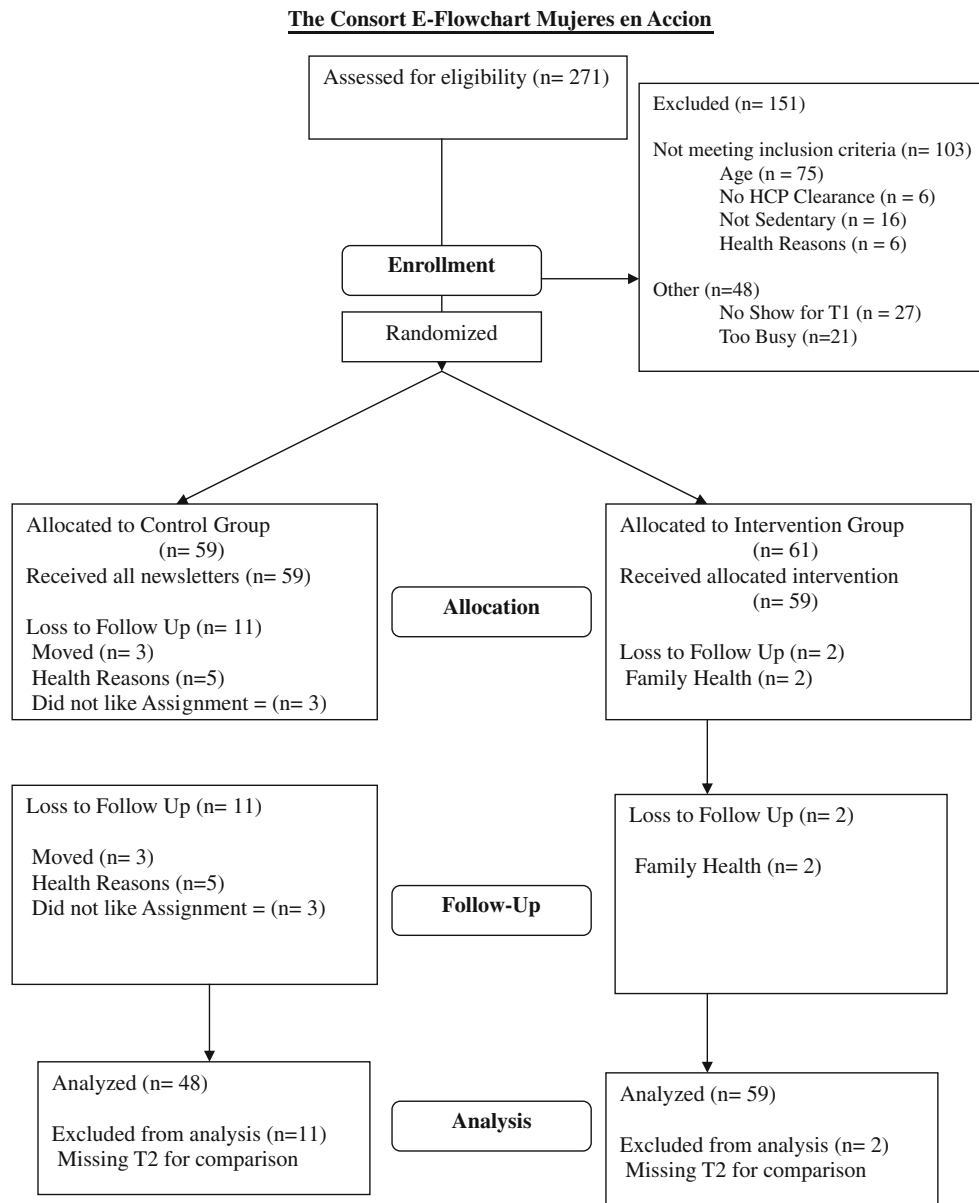


Fig. 2 The Consort E-Flowchart Mujeres en Accion

were conducted after children and grandchildren were dropped off for class. Churches, centers, and clinic offered protection from extreme weather conditions. For example, participants walked around a family clinic corridor and the Stardust House in South Phoenix allowed for evening walks for participants that worked during the day. At every session, participants wore their *Mujeres en Accion* T-shirts and many brought grandchildren, friends and other family members.

Design

Mujeres en Accion is a randomized controlled trial in which 107 older Hispanic women were assigned to one of

two treatment groups. *Mujeres* received a theory-based, culturally relevant social support intervention over a 12 week period, with 3 booster sessions over the 12 months of the trial. The intervention dose and measurement time points were selected to reflect those most consistent with feasible and effective PA interventions [6]. The Attention Control group received monthly newsletters with information about sunscreen, breast self examinations and other adult health and safety issues on the same schedule. Data collection points in *Mujeres en Accion* included baseline (1 week before implementing the intervention), 3, 6 and 12 months. In addition to monthly newsletters, the study staff contacted participants in the Attention Control group at each data collection point; these did not

include the theoretically “active ingredients” of *Mujeres en Accion*.

Intervention Structure

Promotora Role

Consistent with best practices in this area, we recruited 2 Hispanic women from the communities of interest to serve as *Promotoras* [24]. For leadership development each *Promotora* received approximately 4 h of training in a group format, delivered in their language of choice, Spanish. Training included an overview of the study protocol, their role in promoting support for moderate-intensity physical activity through social support, strategies to address barriers to physical activity, clarification of emergency procedures, and instructions about keeping attendance records and monitoring physical activity/steps per day goals and progress among participants. *Promotoras* were also provided telephone call scripts for weekly reminder calls and as follow up to contact any participants that missed a session. Both were part of our formative research and served as founding members of the Community Advisory Board.

Intervention sessions were held in groups of approximately 5–10 participants, led by the *Promotoras*. The participants were asked to use a PA Record to document their goal, the frequency and duration of walking, number of steps per day, and whether they plan to maintain, decrease, or increase their walking for the next week.

Weekly intervention meetings included a group walk designed to model moderate-intensity walking (3–6 METs) in a supportive group setting. At the first group meeting, participants were given pedometers (Yamax Digiwalker, model SW-200, Yamax, Tokyo, Japan) and were instructed in the use and methods for self-monitoring and documentation of steps per day in a PA Record. Pedometers were used for three purposes in the intervention: (1) for informational support to participants on baseline and increasing levels of walking, (2) as a supportive instrumental cue to increase walking, and (3) as appraisal support on progress toward goals. During each week of the intervention, participants set individual “steps per day” goals and self-monitor their progress using a pedometer to record, in their PA Record, daily accumulated steps taken. At weekly meetings, the participants, assisted by the *Promotoras*, examined their progress and applied what they learned during the week to support new goals. Participants were encouraged to increase their physical activity and walking at their own rate.

Variables and Measurement

Demographic variables

Demographic variables included: (a) age in calendar years; (b) number of years of schooling completed; (c) socioeconomic status, measured as annual household income and number of individuals living in the household.

Theoretical Mediating Variables

Social support

Exercise social support was measured using the Social Support and Exercise Survey [25]. This survey evaluates levels of support and the participation and involvement of others. Internal consistency estimates have ranged from .84 to .91. Social support for exercise factors has been related to reported current exercise habits ($r = .35-.46$). The scale has been used across cultures and in Hispanic women [26].

Environmental Resources

Environmental resources were assessed through the neighborhood environment for walking using the NEWS (Neighborhood Environment Walkability Scale). This 68 item instrument examines the local environment thought to be related to physical activity and includes assessment of residential density, proximity to non-residential land use such as parks, access to such non residential places, walking facilities, neighborhood aesthetics, and traffic and crime safety [27]. The NEWS is correlated with perceived walkability of positive neighborhood characteristics ($F_{1,105} = 9.07, P = .003$) and high occurrence of walking ($F_{1,105} = 6.02, P = .016$) [27].

Behavioral Endpoints

Physical Activity

The behavioral outcome of physical activity was measured using objective (pedometers) and self-report approaches. Two weeks prior to each scheduled data collection (T1–T4) participants were mailed a data collection kit that included: (a) a pedometer; (b) an instruction sheet for using and wearing the pedometer, presented in both English and Spanish; and (c) a Physical Activity Record for recording 7 consecutive days of pedometer use. We asked participants to use a Physical Activity Record to record both the time that the pedometer was put on for the day and the time it was removed for the day. Participants were asked to return the data collection materials and pedometer in a padded

mailing envelope consistent with data collection time points. Self-report measurement was based on the 7-day Physical Activity Recall (PAR), a reliable and valid indicator of individual patterns of physical activity [28], which has been validated across populations. During each data collection period participants were asked to describe daily, for 7 days, frequency and duration of intentional physical activity performed for greater than 10 min per session.

The type of physical activity included the specific mode of activity defined as moderate (4 METs), hard (6 METs), and very hard (10 METs) activity. The frequency was documented as the number of activity sessions undertaken per day. The duration of each activity session was reported in minutes or hours. Sleep (1 MET) is recorded in hours. Time spent in light intensity activity (1.5 METs) is computed by summing the hours spent in sleep, moderate, hard, and very hard activity and subtracting that sum from 24 (h/day). The intensity of activity is assigned the MET levels noted above. An Activity Summary Score in *kcal/week* was calculated for each participant using the equation: (frequency in times per week an activity was performed \times duration in hours of each activity session \times intensity in METs assigned for the type of the activity) \times wt kg.

Physical Endpoints

CV Health Outcomes

Body mass index (BMI) was computed as weight in kilograms divided by the square of height in meters. Height was measured to the nearest 0.5 cm with a stadiometer taken with the individual shoeless and standing erect. Weight was measured to the nearest 0.1 kg using a digital scale. Body composition was measured using the Tanita foot-to-foot bioelectrical impedance scale (Tanita Corporation of America, Inc, Arlington Heights, IL). The scale has been shown to provide a valid assessment of percent body fat in older adults and is convenient and practical [29]. Body fat distribution was determined by measuring waist to hip ratio. Three measurements of waist and hip were obtained using a non-stretch tape measure to determine mean waist and hip circumference, and mean waist-to-hip ratio. Waist circumference was measured at the narrowest spot between the ribs and hips, or when a narrow point was not evident, at the midpoint between the lowest rib and the iliac crest. Hip circumference was measured at the widest circumference.

Confounding Variable

Dietary Intake: Dietary intake was obtained by a 24-h (24R) diet history at T1, T2, T3, and T4. With the 24R, the respondent is asked to remember and report all the foods and beverages consumed in the preceding 24 h. The 24-h

recall is useful across a wide range of populations [30]. The validity of the 24-h dietary recall has been studied by comparing respondents' reports of intake with intakes unobtrusively recorded or weighed by trained observers. In general, group mean estimates from 24-h recalls were similar to observed intakes [30].

This means of obtaining dietary information is appropriate for this population because it does not require literacy or computation skills as does a food frequency questionnaire. In addition, it allows for clarification of portion sizes, composition of combination foods such as casseroles, and what was actually eaten versus what was provided. Howat et al. [31] report significant positive correlations between a food frequency questionnaire and 24-h dietary recalls for kilocalories and 22 nutrients. In a comparison of food record and a 24-h recall, Montgomery et al. [32] note that more food was documented with the 24-h recall.

Implementation

Evaluation of Intervention Fidelity

To maintain fidelity, a program manual was developed for training *Promotoras* and monitoring program delivery. Program sessions, including booster sessions and telephone contacts with intervention participants were randomly audiotaped, with the PI evaluating program presentation and content. An index of procedural consistency was used to monitor the degree of program implementation and the frequency and duration of specified activities. To assess whether participants in both study groups attended to the information they received, each group answered manipulation check questions following the intervention.

The relative “dosage” of treatment was maintained through evaluation of the amount of intervention received by participants, using a protocol stipulating the conditions under which intervention components were to be delivered. To ensure that each participant received the intervention “dose” intended, all participant contacts were tracked, including the number of intervention sessions attended and contact with *Promotoras* during weeks 12–24 of the intervention. Level of program intensity was evaluated as minutes of contact, including supervised walking time and participation in related intervention activities.

Feasibility

Intervention feasibility was conceptualized as the rate of attendance at the planned intervention sessions, attrition, and participant acceptability of *Mujeres en Accion*. Rate of attendance and attrition, as well as reasons for attrition,

were reported through logs kept by the Promotoras and monitored by the study Project Director.

Acceptability

An Intervention Acceptability Measure was used to evaluate acceptability of intervention components, targeting two major aspects of the intervention and its domains: (a) intervention components: utility, effectiveness, credibility, and satisfaction; and (b) mode of delivery including format and strength. The measure was administered one time in the post-intervention period to the intervention group.

Data Management and Analysis

Data collectors were blinded to treatment condition. Coded data collection forms, completed at each measurement time (i.e., T1–T4) were reviewed for missing information, and included notes about the interview to identify potential outliers. Any questions were clarified with the RA, with missing data collected in an expeditious manner. The data was entered using SPSS windows, twice, with the two versions of the database compared using procedures available in SPSS, with inconsistencies checked against the raw data forms.

Baseline Data

Sample

Of the 61 women assigned to the *Mujeres en Accion* group, 59 received the intervention, with two lost to follow up; 11 participants were lost to follow up among the 59 randomized to the Attention Control group. Baseline data are reported on 107 Hispanic women, 48 in Attention Control group, 59 in the intervention group. Paired *t*-tests showed no significant differences between groups on baseline measures.

The mean age for the women in the *Mujeres en Accion* group was 55.41 (SD 7.80), and Attention Control group 55.48 (SD 6.81). Fifty-six percent of the women in the study were married, 18% divorced. While almost one-third of the women reported a household monthly income of >\$2,000 (32%); 48% had monthly incomes between \$500–1,999. Both groups had an average of 10 years of schooling and reported over three persons living in their households. Forty percent were born in Mexico, and most (58%) had lived in their neighborhoods for more than 10 years. The women were evenly divided in their preference of language, with 46% *Mujeres* and 49% Attention

Control preferring Spanish language for reading and speaking.

Social support, assessed with the Social Support for Exercise Scale, showed that both the *Mujeres* intervention women and the Attention Control women had high social support at baseline, with mean scores of 2.48 and 2.70 respectively. Environmental resources for women's walking was assessed with NEWS, recording participant perception of access to such non residential places, walking facilities, neighborhood aesthetics, and traffic and crime safety. The participants assessed the individual neighborhood items as moderate in their impact on physical activity (for example sidewalk presence, crime safety), with scores ranging from 2.36 (traffic safety) to 2.84 (places for walking). However, women in *Mujeres* and the Attention Control indicated overall dissatisfaction with their neighborhoods.

Baseline PAR indicated weekly average time spent in physical activity was 37.51 min (SD 24.58), with an accompanying MET scores of 3.44 (SD 1.288). Objective pedometer data recorded mean steps per day, taken enrollment week were 5,441.865 (SD 3,394.53). The range of steps was rather broad from 188 steps/day to 13,847 steps per day, as was the weekly PAR ranging from 10 min per week to 125 min per week of moderate physical activity showed total caloric intake, proteins, fats and carbohydrates as low; for example, total kcal intake for *Mujeres en Accion* women was 1,406, and Attention Control women 1,351.

Cardiovascular health outcomes on the women included a BMI of 33.61 (SD 7.64, with a wide range of 21.46–64.43). Bioelectric Impedance measure of percent body fat included a mean of 41.52 (SD 6.53), with a range of 24.35–58.17, and waist-to-hip ratio of .878 (SD .071, range .72–1.15). Table 2 describes the M, SD for scale item scores and diet composition.

Discussion

Hispanic women have lower levels of physical activity and higher levels of CHD risk compared to their non-Hispanic counterparts, and few interventions specifically address the social support needs of Hispanic women related to the adoption and maintenance of physical activity. *Mujeres en Accion* was developed based on formative research, partnership with community members, and is consistent with recommendations for research on physical activity, which include identifying relevant and practical interventions that can be integrated in community settings [5].

Baseline data for these older Hispanic women indicate that their assessment of their neighborhoods, safety and environmental resources was largely satisfactory.

Table 2 Outcome scores, baseline

Item	Baseline intervention M (SD)	Baseline attention-control M (SD)
Ex Soc support	2.48 (.94)	2.70 (.97)
Neighborhood satisfaction total	4.23 (1.43)	3.89 (1.54)
Access to services	2.51 (.725)	2.69 (.663)
Streets in neighborhood	2.69 (.650)	2.55 (.756)
Places for walking	2.84 (.790)	2.81 (.761)
Neighborhood surround	2.72 (.824)	2.80 (.817)
Safety from traffic	2.36 (.729)	2.41 (.610)
Safety from crime	2.40 (.840)	2.41 (.802)
Energy intake kcal	1,406.35 (568.11)	1,351 (576.13)
Total fat (Gm)	55.74 (30.61)	50.44 (32.13)
Total Carb (Gm)	171.87 (81.736)	167.19 (83.72)
Total Prot (Gm)	58.12 (22.91)	60.07 (27.91)
Kcal fat	501.69 (275.52)	454.00 (289.12)
Kcal Carb	687.48 (326.94)	668.78 (334.89)
Kcal Protein	232.48 (91.65)	240.30 (111.65)
% fat	34.64 (12.36)	32.11 (11.97)
% Carb	49.72 (14.76)	50.31 (15.45)
% Protein	17.02 (4.35)	18.35 (6.12)

Environmental factors such as built environments conducive to physical activity and neighborhoods with safety and user friendly ambiance (e.g. dogs on leashes, traffic control lights) are neighborhoods that support healthy lifestyles. Research has shown that poor neighborhoods where crime rates are higher than in more affluent neighborhoods may contribute to declines in physical activity. Neighborhood crime has been found to be negatively associated with physical activity among women, perhaps because these neighborhoods are perceived to be unsafe for walking [33]. The women participating in *Mujeres en Accion*, while reporting an overall dissatisfaction with their neighborhood resources for physical activity, also reported modest satisfaction with particular neighborhood elements, such as crime and safety. The *Mujeres en Accion* intervention targets the development of Hispanic women's resources to enhance safety and determine alternative physical activity locales and resources for improved levels of physical activity.

The Hispanic women in this study indicated low to moderate on social support for physical activity, validating the relevance of a social support intervention, *Mujeres en Accion*. Our theoretical rationale and approach to the study design was based on the notion that social support influences physical health outcomes, including the pathways of: (a) behavioral processes, health behaviors, and adherence to behavioral interventions that facilitate engaging in physical activity and (b) psychological processes that are linked to appraisals or emotions that can facilitate or

impinge on physical activity engagement [34]. In this sample, the reported social support for exercise was 2.48 (intervention) and 2.7 (Attention-Control), reflecting a modest perception that friends and family provide support for, accompaniment with, and help women find and implement time for physical activity and walking.

Our formative work has shown that social support, social networks and life partners are influential in Hispanic women's physical activity, and strategies that include families, partners and enduring supports are desirable when designing physical activity interventions [3, 20]. We specify other factors that increase social support and consider strategies that enhance social resources in response to Hispanic women's aging, such as anticipatory adjustment to social role changes that accompany aging. Our *Mujeres en Accion* intervention, developed with older Hispanic women from the community from which this population is drawn, employs social support intervention leverage points and strategies for recruitment and retention directly related to the cultural values in older Hispanic women, promising enhanced change in the mechanism of change, social support.

Baseline data from the women in this study included a mean BMI in the "obese" range, with a wide range of 21.46–64.43, and a mean percent body fat of nearly 50%. These baseline data are somewhat higher than data reported for national trends in adults and in Mexican–American adults. The rather wide range of overweight and obesity in these women was accompanied by a wide range of self-reported physical activity and pedometer steps. Baseline PAR showed the weekly average time spent in physical activity was 37.51 min, and moderate met scores of 3.44. Objective pedometer data recorded mean steps per day, taken enrollment week, were 5,441.865. The range of steps was rather broad from 188 steps/day to 13,847 steps per day, as was the weekly PAR ranging from 10 min per week to 125 min per week of moderate physical activity. In 2004, Tudor-Locke and Bassett [35] established preliminary pedometer-determined physical activity cut points for healthy adults: (1) <5,000 steps/day (sedentary); (2) 5,000–7,499 steps/day (low active); (3) 7,500–9,999 (somewhat active); (4) 10,000–12,499 (active); and (5) ≥12,500 steps/day (highly active). These categories were reinforced in 2008 [36]. Our baseline data indicates that the older Hispanic women recruited for *Mujeres* began this intervention with more obesity and sedentary behaviors, categorized as sedentary to low active, than reported survey data, and set the stage for optimal improvement following the *Mujeres* social support intervention.

The covariate of dietary intake reported at baseline in this sample of older Hispanic women was lower than expected for both total calories and macro intake. While caloric intake varies with gender, age and physical activity,

in general adults consume about 1,500 kcal/day. In this study, the women consumed less. Additionally, the women reported a high percentage of fat intake. These findings are reflected in other reports [37] where Mexican–American women who underreported energy intake tended to be older and overweight.

Assessment of dietary intake is limited in population subgroups that have culture-bound food purchase, preparation, and eating patterns [38]. In the United States, most work on dietary intake fails to separate the unique nutrient intakes of ethnic groups and does not account for the contextual issues surrounding eating behaviors among ethnic women [39]. Other research shows underreported energy intake on 24 h recall by 16–20% [40]. Our earlier research showed a similar pattern among older Hispanic women in terms of under-reporting or under-expected energy intake [41]. Older Hispanic women reported an average caloric intake of 1,031 calories (recommended was 1,900–2,200), protein average intake was 41.25 g (recommended 50 g) and total fat average intake was 40.3 g (recommended is 63.33 g). The women all consumed less than 50% of recommended macronutrients, except for saturated fats; all participants consumed 63% of the recommended saturated fats of 31% of total calories consumed. Consistent under-reporting of energy intake might be partially explained by the notion that, for some women, energy intake is influenced by the context of where food is consumed, with whom, eating patterns developed in times of food scarcity, and of patterns in dietary intake in the context of gender, culture and ethnicity [41].

Summary

The significance and innovation of *Mujeres en Accion* includes use of a theory-driven approach to intervention, exploring social support as a theoretical mediating variable, use of a Promotora model and a Community Advisory Board to incorporate cultural and social approaches and resources, use of objective measures of physical activity in Hispanic women, and the examination of clinical cardiovascular disease outcomes consistent with health disparities in Hispanic women. The study fills the gap in the research on moderate intensity walking in older Hispanic women by testing theoretical constructs such as social support that are salient and build on cultural strengths of women and neighborhood relationships and settings.

As a social network strategy, interventions including *Promotoras* are guided by the assumption that an individual's behavior is influenced by the social groups to which they belong, and from which they derive their "social identity" [42]. The *Promotora's* that lead *Mujeres en Accion* addressed issues relevant to aging Hispanic

women, such as bladder control while engaging in physical activity, specific cultural notions of physical activity in enhancing health. For example, one *Promotora* described social support as the "weapon" in fighting obesity in older Hispanic women. Because both *Promotoras* served as role models for women who were sedentary then successful in initiating and maintaining physical activity; they could share personal resources in initiating and maintaining physical activity efforts. They shared personal resources in organizing their time to make physical activity part of their daily routine, while still caring for family and home and offered suggestions for enjoyable and safe places to walk with friends and other women in the walking groups.

Hispanics are the fastest growing minority group in the U.S., predicted to comprise least 30% of the population by the year 2010 [43]. Hispanic women have higher rates of many CHD risk factors, including hypertension, obesity, diabetes mellitus, and physical inactivity compared to non-Hispanic white women of comparable socioeconomic status (SES) [44]. Research that evaluates physical activity in this population subgroup indicates that older Hispanic women are classified as among the least physically active groups in the country [45, 46]. While Hispanic women have been shown to be concerned about physical activity, and to view physical activity as an important factor in maintaining their overall health and well-being, the majority of intervention programs designed to promote physical activity have reached primarily non-minority, middle-income women and men [3, 47]. Our research helps fill the gaps of a paucity of evidence showing the development and testing of the effectiveness of culturally sensitive efforts in intervention implementation.

The most compelling aspect of *Mujeres en Accion* is the intervention delivery of social support by study *Promotoras*, with intervention strategies for women to develop supportive resources from friends, family and the environment to enhance physical activity. In a recent review of lay health advisor interventions targeting cardiovascular risk reduction, Fleury et al. [24] note that few studies reported in the literature focus on the role of advisors in identifying resources or appropriate use of community resources. Further, the authors note that few reports focus on advisor role effectiveness in improving participant knowledge and motivational outcomes. The *Mujeres en Accion* intervention formulates specific role delineation for *Promotoras* in training, intervention delivery, and intervention fidelity. Recruiting, training and retaining community *Promotoras* through the *Mujeres en Accion* intervention addresses the gap in current research knowledge about the efficacy of the *Promotora* role in enhancing social support and environmental resources among older Hispanic women in community settings and includes an

assessment of their role in the maintenance of physical activity and sustained use of available and new resources.

Mujeres en Accion is focused on filling important gaps in our knowledge about physical activity in older Hispanic women. The study provides a number of important characteristics that are unique. First, a critical element of this study is the extensive and culturally relevant recruitment, intervention, and retention efforts we are implementing. Deep and enduring partnerships with neighborhood communities, churches and schools, as well as partnerships with local *Promotoras* have been essential and instrumental to our efforts. Our strategy of involving a Latina Community Advisory Board in the development and refinement include an emphasis on developmental learning, and enduring factors from generational transmission of values and behavior that influence physical activity [48]. Our recruitment settings include neighborhood schools, community centers, churches and clinics that emphasize comprehensive care to address the needs of these hard-to-reach Latinas. Second, *Mujeres en Accion* operationalizes social support to tailor each contributing factor (e.g. instrumental, emotional, operational and appraisal) support in a developmentally and culturally relevant fashion. Third, *Mujeres en Accion* employs reliable and valid measures of mediation, not often reported in physical activity research, targeting the elements of social support and environmental resources that are enhanced through the *Mujeres en Accion* intervention [49]. Outcomes measures of increased physical activity employ multiple methods, both objective and subjective, intending to capture the increase in physical activity that might be increase with intentional activity.

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