

Recruitment of African American Women to a Walking Program: Eligibility, Ineligibility, and Attrition During Screening

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Abstract: The purposes of this study were to identify strategies successful in the recruitment of African American (AA) women to a home-based walking program and to examine factors that contribute to attrition, eligibility, and ineligibility during the recruitment screening protocol. Of the 696 women who contacted the researchers, 281 (40.4%) women enrolled in the study, 227 (32.6%) were lost to attrition, and 188 (27%) were ineligible. Those not enrolled due to attrition during screening or ineligibility reported more family risk for cardiovascular disease (CVD) and lived in neighborhoods with higher poverty. Although our recruitment strategies may have been successful in attracting low-income AA women, we were not as successful in preventing their attrition during the screening protocol, particularly for those living in poorer neighborhoods. © 2006 Wiley Periodicals, Inc. Res Nurs Health 29:176–189, 2006

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The overriding goal of *Healthy People 2010* (U.S. Department of Health and Human Services, 2000) is the elimination of health disparities associated with ethnicity, gender, education, or income. Disparities in health status for African Americans (AAs) have long been documented, and they persist despite overall decreases in mortality and advances in health care (Smedley, Stith, & Nelson, 2002). Over the past decade, interest in recruiting minority groups and women into research to reduce health disparities has been stimulated by the federal funding mandate to include diverse populations (Harden & McFarland, 2000). Although progress has been made, the lack of minority participation in clinical trials persists. For example, a 2001 review by Krummel et al. (2001) identified 19 primary prevention, population-based, behavioral research studies that focused on interventions directed at changing physical inactivity in women. Only three of those studies targeted ethnic minorities (Cardinal & Sachs, 1996; Chen et al., 1998; Lasco et al., 1989). A major conclusion was that what is known about physical activity in women is based predominantly on samples of White middle-class women.

Banks-Wallace and Conn (2002) identified 14 published physical activity intervention studies that included adult AA women and provided pre and post measures. However, most of the studies ($n = 11$) had small sample sizes ($n < 50$), with only one study (Kumanyika & Charleston, 1992) having a sample size of more than 100 ($n = 187$). In two recent studies AA women were purposely recruited into physical activity interventions. The researchers achieved respective enrollments of 94 and 64 (Nies, Chruscial, & Hepworth, 2003; Wilbur, Michaels Miller, Chandler, & McDevitt, 2003). Overall, exercise intervention studies to date have had relatively small samples of AA women.

Key among barriers to recruitment and enrollment of AAs into clinical trials are power differences and barriers raised by the study design. Power differences are related to an unequal balance of authority and influence between the researcher and research participant (Cardinal & Sachs, 1996; Dancy, Wilbur, Talashek, Bonner, & Barnes-Boyd, 2004). Nowhere has this been more clearly demonstrated than in the Tuskegee Syphilis Trials, the government-approved study that placed in jeopardy the lives of poor AA subjects with syphilis from 1932 to 1972 by not providing treatment that became available in the course of the study (Jones, 1993). This study as well as others (Escarce, Epstein, Colby, & Schwartz,

1993; Savitt, 1982; Schulman et al., 1999) has contributed to AAs ongoing mistrust of research studies and their reluctance to participate (Freimuth, et al., 2001).

Barriers to participation of minorities due to the study design often present after the interest and attention of potential participants is captured. Participation rates among AAs can be low because they have greater health risks that make them ineligible. For example, in an earlier physical activity intervention, more AA women than Caucasian women were excluded from the study due to elevated blood pressure (Wilbur, Miller, & Chandler, 2001). When the exclusion criteria are overly restrictive, the people who would benefit the most may be excluded. Lack of participation could reflect the individual's inability to meet the eligibility criteria rather than unwillingness to participate (Unson, et al., 2004).

Another design barrier to participation is heavy respondent burden related to the time and effort involved in the screening process (Swanson & Ward, 1995). The burden of participation in research has been identified to be higher in low-income minorities than in middle-class Whites (Mattson, Curb, & McArdle, 1985). This can be particularly problematic with physical activity interventions, where extensive screening is often necessary to assure safety. This burden can be further compounded by introduction of a run-in period during recruitment before volunteers complete all of the baseline screening (Morss et al., 2004). Volunteers can be excluded from further screening due to poor attendance prior to enrollment. If the protocol for attendance at screening sessions is stringent and lacks flexibility, those women who are least advantaged (as they are less likely to comply) will be denied access even after they have expressed interest.

Compensatory strategies for overcoming barriers to recruitment related to power differentials and study design are varied. Strategies advocated for decreasing the power differential, building trust, and increasing recruitment into clinical trials include involving members of the target population in planning. This usually takes the form of networking with existing community organizations, establishing advisory boards, and holding focus groups in the target community (Areal, Alvidrez, Nery, Estes, & Linkins, 2003; Bonner & Miles, 1997; Dancy et al., 2004). Community members' assistance in incorporating their own traditions, beliefs, and lifestyles into promotional materials helps to promote community ownership and enthusiasm for the project (Swanson & Ward,

1995). Further, locating the data collection sites in a familiar environment within the community rather than in a large medical center and involving AA personnel in all phases of the research have been found to promote a sense of trust in potential participants (Escobar-Chaves, Tortolero, Masses, Watson, & Fulton, 2002; Herring, Montgomery, Yancy, Williams, & Fraser, 2004; Swanson & Ward).

Inclusion of multiple recruitment strategies is effective in recruiting minority samples. In a subset of women screened for the Women on the Move study, the primary sources of referral of minority women were radio (41%) or family, friend, or coworker (38%); secondary sources were community presentations (12%) and brochures or newsprint (4%; Escobar-Chaves et al., 2002). For the Women's Health Initiative, mass mailings were the largest source of participants overall, however, for recruitment of minorities, community outreach, personal referrals, and culturally appropriate recruitment materials were more effective (Fouad et al., 2004). In the Midlife Women's Health Study, face-to-face interactions, such as at street fairs and church coffee hours were the most effective recruitment strategy (Gilliss et al., 2001).

To reduce study design barriers, it is important to determine whether a run-in period is appropriate for the aims of the study and if strategies to increase internal validity are compromising external validity. Strategies found successful in increasing attendance of low-income AA women at screening sessions have included the provision of babysitting, transportation to the data collection site, flexible scheduling, and use of incentives (Banks-Wallace, Enyart, & Johnson, 2004; Brown, Long, Gould, Weitz, & Milliken, 2000; Herring et al., 2004).

While recently researchers have analyzed differences between eligible and ineligible participants (Dunbar-Jacob et al., 2004; Fouad et al., 2004; Wilbur et al., 2001), few who have used the recommended strategies to recruit minority populations have examined differences systematically in those lost to attrition during screening before final eligibility could be determined. Identifying differences between those lost to attrition during screening and those who remain until eligibility is determined may provide important information for improving recruitment. One difficulty in identifying these differences lies in the limited information available on persons lost to attrition during screening, due perhaps to brief preliminary screening protocols as well as reluctance on the part of women inquiring to provide further

information, particularly if they decide they are not interested.

One study of recruitment of AAs that examined these differences was the Women on the Move study. Researchers found no differences in age, level of self-reported physical activity, or income between AA women enrolled in the study and those screened by telephone and not enrolled (Escobar-Chaves et al., 2002). Another group of researchers compared a group of AAs interested in participating in and eligible for a smoking cessation program who returned for randomization with a group that did not return for randomization (Ahluwalia et al., 2002). Factors associated with not returning for randomization were younger age, less readiness to quit, lack of regular source of health care, less church attendance, and lower literacy. An additional finding was that persons who were contacted *reactively* (potential volunteers were informed about the study and had to contact the researchers to participate) had less attrition prior to randomization than those recruited *proactively* (contacted directly by researchers to recruit them). Neither of these research groups compared those lost to attrition during screening with both ineligible and eligible enrolled subjects.

There is a need to identify what strategies are successful in the recruitment of AA women to clinical trials and to learn more about factors that contribute to attrition, ineligibility, and eligibility during the recruitment screening process. In this article, we describe the recruitment strategies used and screening process for a 24-week moderate intensity home-based walking program for mid-life AA women. The aims of this study were to: (a) describe passive and active attrition, ineligibility, and eligibility during a three-phase recruitment screening protocol; (b) compare recruitment strategies and characteristics of AA women lost to attrition after initial telephone screening, women who were eligible, and women found to be ineligible; and (c) explore the predictors of not enrolling after initial telephone screening due to screening attrition and ineligibility during a three-phase recruitment screening protocol.

METHODS

The parent Women's Walking Program study (WWP) was a quasi-experimental design with two treatment groups. Both treatment groups included home-based moderate-intensity walking (3–4 days per week for 30 minutes), with one

group receiving behavioral enhancement strategies designed to increase adherence over a 24-week active phase (weeks 1–24) and a 24-week maintenance phase (weeks 25–48). Women were to walk at a time and location of their choosing.

Recruitment Location

To reduce power differences and increase trust, locations for screening and data collection were established at two federally qualified community health centers serving poor and working class urban populations, one of which was located in a community area with encroaching upscale urban development. Examination of the immediately adjacent community served by that center and the community where the other center was located revealed that they were quite similar: they were predominantly AA (98.9% and 86.3%); and a quarter or more of the residents had incomes below poverty level (40.8% and 25.7%; Kouvelis, Harper, & Thomas, 2003). Recruitment was focused within a 3-mile radius of the data collection sites.

Recruitment Criteria

The WWP had an enrollment target of 240 sedentary AA women, ages 40–65 years, and at risk for cardiovascular disease (CVD). Being sedentary was defined as reporting no participation in regular moderate (e.g., walking) or vigorous (e.g., jogging) exercise for 30 minutes three or more times a week in the preceding 6 months and without any disabilities preventing activity. According to the Black Women's Health Study, the mean age for menopause in AA women is 49.6 years (Palmer, Rosenberg, Wise, Horton, & Adams-Campbell, 2003). Therefore, we recruited women aged 40–65 to obtain a sample that would include women with lower, changing, and increased cardiovascular risk related to the loss of naturally cardioprotective ovarian hormones at menopause.

The exclusion criteria were set to assure walking without the occurrence of adverse events, but were broad enough to recruit women with CVD risk factors, such as overweight, type 2 diabetes, and stage 1 hypertension. The exclusion criteria were: (a) major signs or symptoms suggestive of pulmonary or CVD (U.S. Department of Health and Human Services, 2004); (b) history of a myocardial infarction, stroke, or type 1 diabetes mellitus; (c) blood pressure \geq 160/100 mm Hg

(U.S. Department of Health and Human Services, 2004); or (d) use of beta-blockers, diltiazem, or verapamil, which directly affect the exercise response (American College of Sports Medicine, 2000). Women with type 2 diabetes had to have HbA1c of less than 9. This indicates average daily blood glucose levels of $<$ 300 mg/dL, which are recommended when exercising (American Diabetes Association, 2004).

Recruitment Materials

To further decrease the power differential and increase trust, a small focus group was held with five community women identified by the community outreach worker at one of the data collection sites. They gave input, critiqued the selection of colors and logo, and made recommendations on the use of photographs demonstrating expectations and on wording (including testimonials) on all recruitment print materials. Brochures featured photographs of AA women demonstrating what could be expected during the screening process, and the program and included testimonials from AA women participating in an earlier walking program. Recruitment print materials included a brief description of the program, race, age, and physical activity level criteria, location of the screening and data collection site, and a toll-free telephone number corresponding to each data collection site to call for further information.

Recruitment Dissemination

Reactive recruitment approaches were the primary mode used to make women aware of the walking program. That is, women were informed about the walking program, and those interested initiated contact with the researchers to participate (Lee et al., 1997; Velicer et al., 2005). Through the Center for Reducing Risks in Vulnerable Populations, the University of Illinois at Chicago College of Nursing has established a community advisory board whose mission is to address health disparities through collaboration and partnership with AA communities (Dancy et al., 2004). This 22-member board consisting of key community leaders and residents provided input on distributing print materials in local gathering places and newspapers. Two research staff members served on other advisory boards within the targeted communities, where they received notification of health fairs and forums for community educational presentations. In addition, recruit-

ment research staff were all AA and female, and three either lived in the community or had family ties to the community. These staff members further contributed to establishing locations to disseminate print materials in the target areas and were responsible for distribution. The print materials/brochures were distributed at more than 70 local schools, churches, grocery stores, libraries, clinics, and community agencies; at seven community health fairs; and at 10 presentations in community agencies, clinics, and churches. In addition, an email announcement was distributed at a local medical center workplace and an announcement was placed in the community newspaper. Interested women called the toll-free telephone number included in the print material or signed up on an enrollment sheet at fairs and presentations to be contacted later by telephone.

Efforts were not directed toward participant social networking through family, friends, and coworkers by spreading the word about the walking program; however, the participants were not discouraged from doing so. As a result, the study began receiving telephone inquiries from interested women residing beyond the original recruitment area who learned of the program from study participants.

Screening Protocol, Measures, and Means of Addressing Barriers During Screening

The screening protocol consisted of three phases: telephone screening, health assessment screening, and aerobic fitness assessment screening. We defined *attrition* as the loss of participants prior to establishing eligibility at any time from point of first contact to the final-phase of screening.

Phase 1: Telephone screening. Allowing for weekends and holidays, staff responded to inquiry telephone phone calls within 24 hours. When we were unable to contact a woman and she did not return our calls after as many as 10 attempts, she was then classified as having *passive attrition*.

When potential subjects were reached, they received a 20-minute introductory overview of the study, including the screening and study protocol, benefits, risks, and expectations. To facilitate access to Phase 2 and 3 screening, women were informed of the availability of babysitting for children and grandchildren and of early evening appointments for Phase 2. Women who said they were not interested were thanked for their time and

classified as having *active attrition*. Interested women were asked to consent and then were administered a 10-minute screening questionnaire for age and race eligibility, stage of readiness to change exercise behavior, and risk factors associated with engaging in moderate intensity walking.

The Stage of Readiness to Change Exercise Behavior Scale provided a measure for determining eligibility as well as an indicator of motivation to begin an exercise program (Marcus, Rakowski, & Rossi, 1992). The scale includes stages describing exercise level modified to include moderate as well as high-intensity exercise. Exercise was defined as 20–30 minutes per session, three times a week. The stages were *precontemplation* (not exercising and not intending to start in the next 6 months); *contemplation* (not exercising but intending to start in the next 6 months); *preparation* (exercising but not regularly or not at the prescribed level); *action* (exercising regularly but only begun in the past 6 months); and *maintenance* (exercising regularly and had done so for longer than 6 months).

Cardiovascular and musculoskeletal risk factors were assessed with the seven-item Physical Activity Readiness Questionnaire, which includes history of heart condition, use of medication for blood pressure or a heart condition, chest pain with physical activity, problems with balance or dizziness, musculoskeletal problems, and known reasons for not doing physical activity (American College of Sports Medicine, 2000). Additional questions related to cardiovascular risk included a family history of CVD, current smoker, history of elevated cholesterol and blood pressure, and diabetes (American College of Sports Medicine). All women who were eligible at the initial screening questionnaire were given an appointment for Phase 2 health assessment screening at their respective data collection site. Their addresses and the name and phone number of a contact were obtained, and they were mailed information to prepare for the assessment. A voice response system was programmed with the subjects' screening identification number and time and date for a reminder call for appointments the day before the appointment. In addition, subjects received a personal telephone call or message 2 days before the appointment and on the day of the appointment.

Phase 2: Health assessment screening. At the time of the health assessment, a detailed 30-minute informed consent was read to the participant by a research staff member as the participant read along. Participants were also given the

opportunity to sign an Authorization for Disclosure of Research Record Information authorizing the research staff to release abnormal health findings identified either at the health assessment or fitness assessment to the participant's designated health care provider, the health center data collection site, or university cardiology clinic.

An advanced practice nurse who worked at the clinic site or one of the advanced practice nurse investigators conducted the health assessment appointment. It lasted on average 75 minutes and included a health history and physical, routine blood chemistry, lipoproteins, complete blood count, and urinalysis. All women with type 2 diabetes had blood drawn for HbA1c.

Blood pressure was measured by a validated device with appropriate cuff size using guidelines recommended by the National High Blood Pressure Education Program (U.S. Department of Health and Human Services, 2004). Both systolic and diastolic pressures were recorded for each arm after the participant had been sitting quietly for 5 minutes. The two readings were then averaged. Standing height (inches) was measured using a stadiometer and reported to the 1/16 inch. Weight (pounds) was measured using a balance beam (Health O Meter) that was calibrated with standard weights and reported to the quarter pound. The body mass index (BMI) was calculated by dividing weight (converted to kilograms) by height (converted to meters) squared (wt/ht^2).

Women who met the blood pressure criteria and had no additional findings considered to place them at risk for walking were given a return appointment for a fitness evaluation. Once again, the voice response system was programmed, and reminder calls were made.

Phase 3: Aerobic fitness assessment screening. An exercise physiologist and registered nurse research assistant, both of whom were certified in advanced life support, conducted the fitness evaluation. All appointments were during the day due to need for medical backup. This evaluation lasted on average 60 minutes and included a resting 12-lead electrocardiogram (EKG) and a symptom-limited, incremental exercise test using a treadmill and the modified Bruce test protocol designed for use with subjects of low fitness (American Heart Association, 1972).

If the fitness evaluation revealed no abnormalities, the participant was given her exercise prescription and immediately enrolled and oriented to the walking program. When abnormal findings indicating ineligibility were identified at the Phase 2 or 3 assessments, a report was sent to

the participant's designated health care provider. Women who did not sign the Authorization for Disclosure of Research Record Information were given a copy of their findings to take directly to a provider. These women were told that, based on additional follow-up, they could become eligible later. Women who completed the screening protocol received a monetary incentive of \$35.

Women who canceled or failed to make their appointment at Phase 2 or 3 were called and offered the opportunity to reschedule up to two additional times, at which point they were offered the opportunity to call our offices during the remaining recruitment time to schedule an appointment at a time convenient for them. The number of staff-initiated scheduled appointments was set at 3 to prevent a backlog due to missed appointments and long lapses between the screening phases. Women who provided a reason for not participating in Phase 2 or 3 were classified as having *active attrition*; while those who missed their appointments and provided no reason were classified as having *passive attrition*.

Study Trial Tracking Database and Scheduling

A study database was established using Visual Basic and Access to assist in tracking the outcome of each contact with the participant from the first message left on the program voicemail through ineligibility, attrition during screening, or eligibility and orientation. Weekly reports were compiled on the number of potential volunteers contacting us for information and the number of Phase 1, 2, and 3 screenings scheduled and completed. This allowed for systematic implementation of the recruitment protocol. Appointments were overbooked to allow for no-shows and last-minute cancellations, with backup staff available if needed.

Analyses

Using geographic information system (GIS) technology (ArcGIS 9.1), each woman's home address was geocoded to StreetMap USA and to the corresponding census block group. We calculated the street network distance (shortest distance traveling over streets) between each woman's home and the corresponding data collection site using ArcGIS Network Analyst. The poverty rate (i.e., percent of residents with incomes below the federal poverty line) and the median household

income for the census block groups were obtained from the 2000 Census Summary Tape File 3 (STF-3).

All data were scanned and converted to SAS for analysis. Dichotomous variables were summarized as percentages, and numeric variables were summarized as means and standard deviations. Chi-square and student's *t*-tests were used to compare differences on age, distance from home to clinic site, recruitment strategy, and self-reported CVD risks between women who passed the initial screening and were oriented to the study and women who were eligible in the initial screening and were lost to attrition in later phases. A *p*-value of $<.05$ was considered significant. A logistic regression was used to predict factors associated with not enrolling (attrition and ineligible).

RESULTS

The participants were recruited and enrolled over a period of 19 months at the first data collection site and 17 months at the second site. For ease of

operation, recruitment began at one site 14 months before the other, with data collection overlapping for 5 months. Figure 1 summarizes eligibility, ineligibility, and attrition during each of the three phases of the screening protocol.

Attrition, Eligibility, and Ineligibility During a Three-Phase Recruitment Screening Protocol

Phase 1: Telephone screening. Over 28 months (from May 2002 to September 2004), a total of 696 calls were made to our program offices or women wrote their name on a sign-up sheet inquiring about the walking program in response to our recruitment strategies (see Fig. 1). The 78 women (17 with incorrect numbers or disconnected phones) whom we failed to make contact with were classified as having passive attrition at the telephone screening. Of the 617 women who were screened at Phase 1, 39 were classified as having active attrition. After hearing about the study protocol, they indicated they were not interested primarily due to time commitments

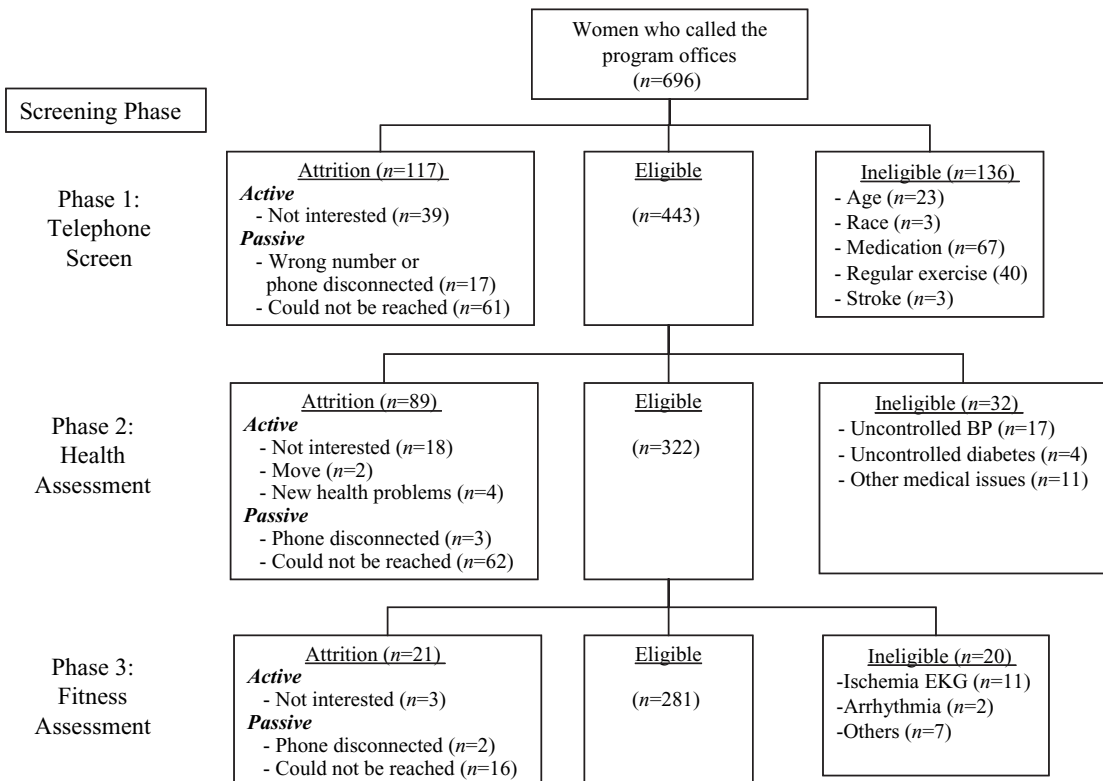


FIGURE 1. Attrition, eligibility, and ineligibility of volunteers by screening phase.

or because they were seeking a group-based program. Another 136 women did not meet the screening criteria. The primary reason for ineligibility at the time of the telephone-screening phase was taking an antihypertensive medication, such as a beta-blocker that would interfere with the aerobic fitness test. A total of 443 women were identified as eligible during the telephone-screening phase and were scheduled for the Phase 2 health assessment.

Phase 2: Health assessment screening. Of the 443 women scheduled for the Phase 2 health assessment, 247 (62%) kept their first appointment. During Phase 2, attrition was composed of 89 women who never completed the health assessment. Of these 89, 24 women had active attrition. Eighteen of these women were no longer interested, stating lack of time, two had moved out of state, and four had developed new health problems. Sixty-five women were lost due to passive attrition because they did not make appointments and provided no reason. Of the 354 women who completed the health assessment, a total of 293 (83%) signed the Authorization for Disclosure of Research Record Information. Forty-nine women had initial clinical findings on the health assessment that made them ineligible; however, of these, 17 returned as eligible following further evaluation and/or treatment, while 32 remained ineligible, primarily due to uncontrolled hypertension and diabetes. A total of 322 women were screened as eligible at the health assessment phase and scheduled for the aerobic fitness assessment.

Phase 3: Aerobic fitness assessment screening. Of the 322 women scheduled for the Phase 3 fitness assessment, 193 (60%) kept their first appointment. Attrition during Phase 3 was 21 women who never completed the fitness

assessment. Of these 21, three women had active attrition and canceled because they were no longer interested due to lack of time. Eighteen women (two with disconnected telephones) had passive attrition because they did not make appointments and provided no reason. Of the 301 who completed the fitness assessment, 36 women had initial clinical findings on the fitness assessment that made them ineligible; however, of these, 16 returned as eligible following further evaluation, while 20 remained ineligible, mostly due to abnormal EKG. In summary, of the 696 initial calls to the program expressing interest in the WWP, 281 women enrolled in the study, 227 were lost to attrition during one of three screening phases, and 188 were ineligible.

Effectiveness of Recruitment Strategies

Table 1 shows the recruitment strategies used during the recruitment, the number of women who responded by calling the toll-free telephone number for information, and the number of women who subsequently enrolled in the study. Social networking was the single most effective recruitment strategy for reaching this population, as over 50% of the 696 women who initially called the program offices said they heard about our program through their coworkers, friends, and families. Although major staff recruitment efforts were concentrated in the first 6 months of start-up at each site, recruitment continued for another year as calls continued to be generated through social networking.

It is possible that the women heard about the study from multiple recruitment strategies, as we aggressively targeted communities within a specific 3-mile radius of the data collection sites.

Table 1. Number of Women Responding and Enrolled in the Study by Recruitment Strategies

Recruitment Strategies	Responding <i>n</i>	Enrolled in Study <i>n</i>	Efficiency Ratio (%)
Brochures in the community ^a	161	76	47
Community presentations	31	15	48
Social networking	380	175	46
Community health fairs	28	7	25
Did not specify ^b	96	8	8

^aIncludes dissemination of print flyer and e-mail and newspaper announcements.

^bSeventy-eight women could not be screened for the eligibility over the telephone because the numbers they left was either incorrect/disconnected or simply could not be reached.

However, the women reported only their primary source of information. The efficiency ratio was highest for the community presentations (48%; 15 enrolled of 31 women responding to brochures) and community brochure distributions (47%; 76 enrolled of 161 women responding to brochures), followed by social networking (46%; 175 enrolled out of 380 responding) and community fairs (25%; 7 enrolled out of 28 responding). Ninety-six women, however, did not specify how they heard about the walking program. The majority of these women ($n = 78$) could not be reached for telephone screening. Thus, the overall recruitment efficiency ratio was approximately 40% (281 [number eligible] divided by 696 [number of women who contacted our offices with interest]).

Comparison of an Eligible Group, Attrition Group, and Ineligible Group During Recruitment Screening

Table 2 summarizes recruitment strategies and subject characteristics among three groups: eligible enrolled (women enrolled in the WWP), attrition (women lost to attrition during the health or fitness assessment phase), and ineligible (women who did not meet eligibility criteria during either the health or fitness assessment phase). Comparative data are available only on those women who were contacted and screened eligible at Phase 1. Women who did not meet the initial criteria at telephone screening could not be included in this analysis because no further data were collected.

Overall, the eligible enrolled group had the lowest self-reported CVD risk. Women in the attrition group, on the other hand, were most likely to smoke and were more likely to have family history of CVD than the eligible enrolled group. Those failing the health or fitness assessment (ineligible) were older and more likely to self-report hypertension, diabetes, and a family history of CVD and to have a higher systolic and diastolic blood pressure.

Women in both the attrition and ineligible groups tended to live in neighborhoods (census block groups) with higher poverty rates and lower median household incomes than women in the eligible enrolled group. Most of these low-income neighborhoods were surrounding the two community clinics sites; as a result, women in the attrition and ineligible groups lived significantly closer to their respective data collection site than their counterparts in the eligible enrolled group.

Predictors of not Enrolling (Attrition and Ineligibility) During a Recruitment Screening Protocol

Using self-report CVD risk factors and neighborhood characteristics as primary predictors, a logistic regression was conducted with not enrolling in the walking program as the dependent variable (Table 3). Because the only difference between the attrition and ineligible groups was rate of smoking (see Table 2), these groups were combined. Neighborhood poverty rate and family history of CVD were the most significant predictors of midlife AA women not enrolling in the walking program, whether they were lost to attrition or ineligible. Living in high-poverty areas and having a family history of CVD significantly increased the odds of not enrolling in the walking program for AA women following the initial telephone screening.

DISCUSSION

As others have found (Lee et al., 1997; Velicer et al., 2005), using reactive recruitment strategies (i.e., informing women about the walking program so that those who were interested could contact the researchers to participate) was an effective way for the WWP to meet recruitment goals. We used several of these reactive recruitment strategies and found that the type of strategy did not yield differing pools of women based on those who were eligible and enrolled versus those who did not enroll either due to attrition or ineligibility. Overall, the number of AA women who were screened on the telephone was substantially higher than the number of AA women who responded to an earlier walking intervention in the same urban environment over a similar time frame but not using culturally specific recruitment materials (579 vs. 175; Wilbur et al., 2001). The overall recruitment efficiency ratio in the study was 40% (number of women enrolled divided by number of women who responded to our recruitment channels and contacted our offices). However, if we use the percentage of women enrolled divided only by the number of women who were screened, which is more comparable to other studies, the overall ratio increased to 48%. This ratio is higher than the 39% for AA women reported in the prior study, in which targeted recruitment materials were not used (Wilbur et al., 2001), but similar to the ratio of 44% for AAs enrolled in the Women on the Move study that used targeted materials (Escobar-Chaves et al., 2002). This suggests that one way

Table 2. Individual Characteristics and Recruitment Strategies by Groups Defined as Eligible Enrolled, Attrition, or Ineligible After Passing Phase 1 Telephone Screening

Categorical Variable	Eligible Enrolled (n = 281)		Attrition (n = 110)		Ineligible* (n = 52)		χ^2 -Test	
	n	%	n	%	n	%	χ^2	p
Recruitment strategies							2.16	.904
Brochures in the community	76	27.0	33	30.0	12	23.1		
Community presentations	15	5.3	6	5.5	3	5.8		
Social networking	175	62.3	63	57.3	33	63.5		
Community health fairs	7	2.5	5	4.5	2	3.8		
Unknown (did not specify)	8	2.8	3	2.7	2	3.8		
Self-report CVD risk								
Smoker	49	17.4	34	30.9	8	15.4	8.71	.013 ^a
High BP or taking hypertension drug	81	28.8	38	33.6	25	47.2	7.01	.030 ^b
History of elevated cholesterol	64	22.8	25	22.7	19	36.5	4.10	.130
Diabetic	19	6.8	7	6.4	11	21.2	10.98	.004 ^c
Family history of CVD	53	18.9	36	32.7	20	38.5	12.84	.002 ^d
Stage of readiness for change							1.97	.370
Precontemplative	3	1.1	0	0	0	.0		
Contemplative	159	56.6	68	61.8	36	69.2		
Preparation	95	33.8	32	29.1	14	26.9		
Action	24	8.5	10	9.1	2	3.8		
Continuous Variables							F-test	
	Mean	SD	Mean	SD	Mean	SD	F	p
Age	48.5	5.97	47.6	5.88	50.38	6.33	3.85	.022 ^e
Self-report of chronic condition	.35	.57	.44	.72	.58	.94	2.94	.054
Residence characteristics								
Distance to health center (miles)	9.74	7.60	7.27	6.00	7.57	6.87	5.62	.004 ^f
Neighborhood poverty rate	19.4	16.3	26.0	15.6	26.7	18.8	8.53	<.001 ^g
Neighborhood median household income	42,787	20,364	35,629	16,916	34,967	16,888	7.64	<.001 ^h
Health assessment on CVD risk**								
BMI	34.6	7.6	36.2	10.1	36.7	9.5	1.62	.200
Blood pressure								
Systolic	126	15.6	122	15.3	147	19.6	34.98	<.001 ⁱ
Diastolic	78	9.2	76	8.8	86	13.5	14.71	<.001 ⁱ

CVD, cardiovascular disease; BP, blood pressure; BMI, body mass index.

^aAttrition group was more likely to smoke.

^bAttrition and ineligible groups were more likely to have high blood pressure or take hypertension medication.

^cIneligible group reported higher prevalence of diabetics.

^dAttrition and ineligible groups were more likely to report family history of CVD.

^eIneligible group was older than eligible enrolled and attrition group.

^fAttrition and ineligible groups lived closer to the community clinic center.

^gAttrition and ineligible groups were more likely to live in neighborhoods with higher poverty rate.

^hAttrition and ineligible groups were more likely to live in neighborhoods with lower median household income.

ⁱIneligible group had higher blood pressure (both systolic and diastolic).

*Failed either health or fitness assessment in later screening phases.

**Data were available only for those who completed the health assessment. Subjects lost to attrition in Phase 2 were not included (see Fig. 1).

Table 3. Logistic Regression of Factors Associated With not Enrolling into the Walking Program

Variable	Estimate	Odds Ratio	95% CI	p
Age ^a	-.001	.999	.962–1.037	.955
Number of chronic conditions ^a	.255	1.291	.937–1.778	.118
Neighborhood poverty rate ^a	.019	1.019	1.005–1.034	.008
Distance from clinic ^a	-.023	.977	.946–1.010	.174
Diabetes	.146	1.338	.636–2.815	.442
Smoker	.153	1.358	.814–2.265	.242
Family history of CVD	.377	2.126	1.326–3.409	.002
High blood pressure	.142	1.328	.833–2.119	.234
History of elevated cholesterol	.031	1.063	.637–1.777	.814

CVD, cardiovascular disease.

^aMeasured as a continuous variable.

to attract interest is to develop recruitment materials in partnership with women from the target group to increase recruitment materials' cultural relevance.

The study's efforts to get the word out were greatly enhanced by the women themselves, who, by communicating about the study through informal networks of family members, friends, and coworkers, further built interest and acceptance. Similar to what happened with AA women in the Women's Health Initiative (Fouad et al., 2004) and Women on the Move study (Escobar-Chaves et al., 2002), positive social networking proved to be an effective source of recruitment referrals in our study. Three hundred eighty (54%) of the 696 women who called the program offices indicated they had heard about the program through their coworkers, friends, and families. The success from using social networks may have resulted from the women responding to an intervention that was targeted specifically to them. As suggested by Banks-Wallace et al. (2004), we also believe that interaction with the research team members (including the telephone screeners, nurse practitioners, and exercise physiologist) during the screening phase provided affirmation and support for women in the program to become engaged in physical activity. We speculate that the women's satisfaction with their interaction with staff influenced them to encourage others to participate. It is possible, that, although the yield from community health fairs and presentations was lower, other women and men not in the program passed the word on to family members, friends, and coworkers.

Women picked up brochures placed within the communities serving the health centers that were data collection sites and distributed them widely. As a result, along with social networking,

recruitment tapped an AA community that lay far beyond the two data collection sites, with examination of subjects' addresses revealing 77 zip codes. Although not specifically queried, the vast majority of women from outside the area knew the communities and were familiar with both data collection sites. As one woman who lived outside the community stated, "AA women identify with these communities and are comfortable going to the study sites even if they live a distance." Familiarity with the community where the data collection sites are located may reduce any perceived power difference between the researchers and participants and be as influential on recruitment as proximity.

It is important to identify how successful the recruitment strategies are in getting out the word regarding a study. It is also important to identify differences between those who are eligible and enrolled and those who do not enroll either through attrition during screening or ineligibility. The proportion of women who could not be reached for Phase 1 telephone screening was very similar to the proportion of minority AAs and Latinas in the Women on the Move study (78 of 696 vs. 66 of 656; Escobar-Chaves et al., 2002). The large number of ineligible subjects at Phase 1 telephone screening was due to medications, such as beta-blockers that would interfere with providing an exercise prescription and was similar to screening results in our earlier walking program (Wilbur et al., 2001).

Demographic information other than age was not available for women not enrolled due to attrition and ineligibility. However, we had home address data on all subjects who passed the telephone screening at Phase 1, thus enabling the use of GIS to identify socioeconomic characteristics of their neighborhoods. To our

knowledge, we are among the first to use this technology to compare neighborhood socioeconomic characteristics of enrolled versus not enrolled subjects in a clinical trial. Overall, the women lost to attrition during health and fitness screening, for whom final eligibility is not known, were more similar to the ineligible women than to the eligible enrolled women. That is, women not enrolled due to attrition or ineligibility were more likely than enrolled women to live in neighborhoods with higher poverty rates and lower median incomes. We also found that women not enrolled tended to live closer to the data collection sites, which were located in some of the poorest neighborhoods in the city.

Those not enrolled were also more likely to have a family history of CVD and self-reported hypertension than those enrolled, suggesting that the women who were lost to attrition during screening may have been more likely to become ineligible if they had proceeded with the screening. Also, women lost to attrition had higher smoking levels, which placed them at greater risk for cardiovascular risks, such as hypertension. Unlike two smoking cessation studies that found that non-participants were less ready to stop smoking than participants, however, we found no differences among the groups in readiness to begin walking for exercise (Ahluwalia et al., 2002; Velicer et al., 2005).

Although screening attrition decreased once subjects passed the initial telephone screening, failure by some women to make the assessment appointments in Phases 2 and 3 of screening, despite repeated opportunities, is of concern. These women tended to live in neighborhoods with higher poverty, which is associated with more health problems and lower literacy. Ahluwalia et al. (2002) found that failure to return for randomization to a clinical trial was higher among those with lower literacy. Banks-Wallace et al. (2004) identified that the most disadvantaged and at-risk women may be the most reluctant and fearful of interactions with health care providers. For these women, creative strategies for overcoming barriers to screening need further identification and attention.

Essential to an exercise intervention is balancing any health risks associated with moderate intensity walking with the benefits. The study protocol assured that the health risks identified were communicated with the woman's health care provider and that the woman was adequately referred for care if desired. If the health risk was corrected, the woman could then enter the study. As a result of this protocol, 33 women who had

been ineligible due to findings on the health or fitness assessment became eligible after receiving further treatment from a health care provider. Thus, by setting a protocol for follow-up of findings during screening and including women regardless of BMI as well as women with controlled type 2 diabetes or stage 1 hypertension or both, fewer women were limited from participation due to overly restrictive exclusion criteria.

In summary, the WWP was successful in meeting recruitment goals and attracting lower income AA women. However, we were not as successful in preventing their attrition during screening. A major challenge was accommodating a no-show or cancellation rate of over 40%. This occurred despite flexible scheduling and multiple reminder calls. In light of this experience, we believe that it is essential to any recruitment program to have an adequate tracking system to follow multiple appointments and clear protocols for rescheduling efforts. The study gave incentives at the point of identified ineligibility or eligibility. Providing incentives at each phase of recruitment may have decreased attrition. A limitation of this study was that cost-benefit was not analyzed. This should be considered in future studies.

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