Original Report:
Research Design

Learning and Developing Individual Exercise Skills (L.A.D.I.E.S.) for a Better Life: A Church-Based Physical Activity Intervention – Baseline Participant Characteristics

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Objective: Physical activity (PA) is beneficial for health, yet most African American women do not achieve recommended levels. Successful, sustainable strategies could help to address disparities in health outcomes associated with low levels of PA. The Learning and Developing Individual Exercise Skills (L.A.D.I.E.S.) for a Better Life study compared a faith-based and a secular intervention for increasing PA with a self-guided control group.

Design Setting Participants: This cluster randomized, controlled trial was conducted from 2010 – 2011 in African American churches (n=31) in suburban North Carolina. Participants were 469 self-identified low active African American women.

Measures: Baseline data were collected on participant demographics, objective and self-reported PA, and constructs related to social ecological theory and social cognitive theory.

Results: Complete baseline data were available for 417 participants who were aged 51.4 ± 12.9 years, with average BMI (kg/m^2) 35.8 ± 9.9; 73% of participants were obese (BMI >30). Participants averaged 3,990 ± 1,828 pedometer-assessed daily steps and 23.9 ± 37.7 accelerometer-assessed minutes of daily moderate-to-vigorous PA, and self-reported 25.4 ± 45.4 minutes of weekly walking and moderate- and vigorous-intensity PA. Baseline self-reported religiosity and social support were high.

Conclusions: L.A.D.I.E.S. is one of the largest PA trials focused on individual behavior change in African American women. Baseline characteristics suggest participants are representative of the general population. Findings from the study will contribute toward understanding appropriate strategies for increasing PA in high-risk populations. *Ethn Dis*. 2017;27(3):257-264; doi:10.18865/ed.27.3.257

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Introduction

The benefits of physical activity are known,[1] yet only 20% - 32% of African American women report achieving national recommendations.[2] Consequently, African American women have high rates of chronic disease associated with low levels of physical activity including obesity (56.9%), type 2 diabetes (12%), and hypertension (44%).[3-5] Successful and sustainable physical activity promotion strategies are needed to address disparities in health outcomes associated with low levels of physical activity.

The faith community has long been recognized as an important partner in health education/health promotion efforts for hard-to-reach populations.[6,7] Faith-based interventions have been successful in reducing weight, improving dietary practices, and increasing physical activity among African American women.[8,9] Previous studies have identified positive linkages between cultural adaptation, spirituality/religion and social support, and promotion of health-related behaviors among African American women,[10-16] perhaps through their impact on self-efficacy, self-confidence, and "normalizing" behaviors through role modeling and accountability partners. Learning and Developing Individual Exercise Skills (L.A.D.I.E.S.) for a Better Life was designed to increase physical activity in low active African American women through a culturally adapted intervention that incorporated social support and religiosity into intervention content. This article

summarizes baseline characteristics for enrolled participants and discusses these characteristics in relation to existing literature and health status data to understand whether L.A.D.I.E.S. participants are representative of African American women in the general population.

Methods

A detailed description of L.A.D.I.E.S. has been published elsewhere.[17] Briefly, churches (n=31), and

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participants (n= 12–15 per church) were recruited for the study. Churches were randomized to a faith-based, secular, or self-guided physical activity program. The faith-based program incorporated biblical scriptures and faith tenets, and the secular program incorporated general readings to illustrate concepts related to increasing physical activity. Both programs integrated key concepts from social ecological[18] and social cognitive theory[19] and leveraged points for influencing adult behaviors, including social environment, self-efficacy, incentives or values placed on external health reinforcements, and social support for health-related behaviors. Faith-based and secular program participants met with women from their own churches 25 times over a 10-month period. Self-guided program participants received a publicly available guide[20] to review on their own. Participant data were collected at baseline and post intervention (10 months). Participants were followed for an additional 12 months to assess post-intervention maintenance; final data collection occurred 22 months after study enrollment.

We previously described the process for recruiting churches to participate in the study.[21] Eligible churches self-identified as predominantly serving African American congregants and were willing to accept randomization to either of the three programs. Eligible participants were: 1) female, African American, regular attendees at the church being recruited; 2) aged > 18 years; 3) self-reported low active (ie, achieving < 150 minutes per week of moderate-to-vigorous physical activity); 4) no physical limitations or medical conditions that would be impacted by physical activity; and 5) no plans to move from the area within a two-year period. Churches identified interested participants and study staff conducted information sessions to describe study requirements and eligibility criteria, answer questions, and obtain participant informed consent. Activities occurred at the church from which the participant was recruited unless a different, mutually agreed upon, location was requested.

Churches and participants were enrolled between 2010 and 2011. Randomization assignments occurred using a blocked randomization allocation ratio of 1:1:1 after baseline data collection was completed at each church to reduce participation bias. Study team members and participants were not blinded after assignment to interventions.

Outcome variables included pedometer-assessed daily walking and accelerometer-assessed (Phillips Respironics, Inc; Bend, OR)[22] and self-reported physical activity. Constructs related to the theoretical framework that guided the intervention included physical activity self-efficacy;[23] perceived social support;[24] desire for exercise;[25,26] psychological distress,[27] personality,[28] and perceived religious social support, private and organized religious practices, and overall self-ranking of religiosity.[29-33] General participant characteristics were assessed by self-report with questionnaires. Study staff measured height and weight to calculate body mass index (BMI), resting systolic and diastolic blood pressure, and resting pulse rate.

Statistical Analysis

Sample and power calculations for L.A.D.I.E.S. were previously published elsewhere.[17] L.A.D.I.E.S. was powered to test whether the faith-based or secular interventions were more effective than the self-guided program for increasing physical activity among low active African American women. Enrolling 10 churches per condition and 15 participants within each church provided at least 80% power to de-

tect an effect size of .6, even when accounting for a potential intraclass correlation coefficient (similarities between participants from within the same church congregation) of .06.

Summary values for overall scores and subscales were calculated for self-report measures using scoring algorithms specified for each instrument. Accelerometer data were evaluated in one-minute bouts and 10-minute bouts using standardized methods.[34,35] Averages for measures assessed by study staff were used to report anthropometric characteristics. Variables of interest were summarized using descriptive statistics such as mean, median, proportions, and 95% confidence intervals.

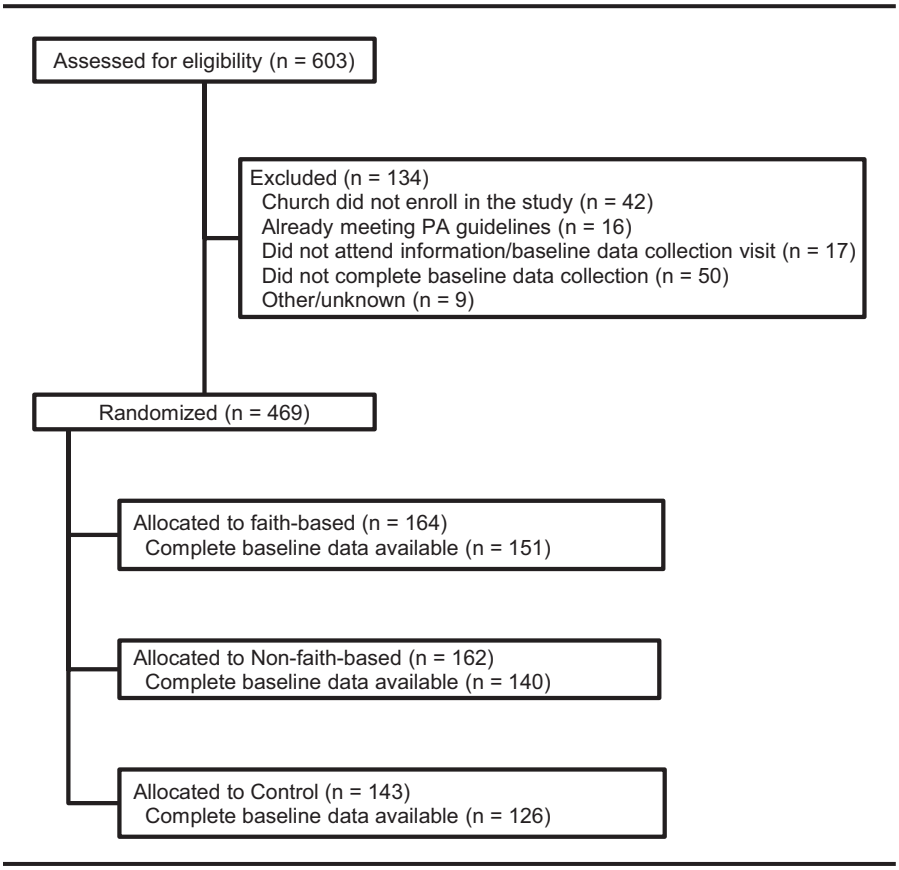

Figure 1. Participant enrollment

Results

Thirty-one churches, representing 30 study sites (two churches were combined) were recruited for participation in L.A.D.I.E.S. Churches required, on average, 3.5 ± 3.0 months of multiple contacts prior to enrollment (range 0 – 9 months).[21] During recruitment, 603 women completed pre-screen questionnaires indicating interest in the study; 469 (78%) enrolled in the study (Figure 1). Complete baseline data were available for 417 women (89%), including 151 randomized to the faith-based (n= 10 churches), 140 randomized to the secular (n=10 churches), and 126 randomized to the control (n=10 churches) conditions. There were no differences between groups by randomization assignment.

Recruited participants were aged 51.4 ± 12.9 years (range 18 – 85 years), mostly college educated (54.8%) and married (45.1%), and just over one third (35.8%) were raising children. Most (73%) participants were obese; average BMI (kg/m^2) was 35.8 ± 9.9. Despite high obesity rates, average blood pressure was in the normal range (127±19.4 / 79±14.9 mm Hg). Only 30% of participants self-rated their health as "excellent" or "very good."

Participants walked 3,990 ± 1,828 steps/day. When one-minute accelerometer bouts were considered, participants engaged in 781 ± 206.2 minutes of sedentary behavior (~13 hours), 635 ± 197.7 minutes of light-intensity (~11 hours), and 23.9 ± 37.7 minutes of moderate/vigorous-intensity physical activity daily. When 10-minute bouts were considered, participants engaged in 694 ± 212.6 minutes of sedentary behavior (~12 hours), 521 ± 208.8 minutes of light-intensity (~9 hours), and 9.7 ± 19.9 minutes of moderate/vigorous-intensity physical activity daily. Participants self-reported 25.4 ± 45.4 minutes of walking/moderate-intensity/vigorous-intensity activity weekly. Few participants reported no or low desire to exercise at a moderate intensity for 30 minutes or less; however, nearly half of participants reported no or low desire to be able to exercise for at least 60 minutes.

Participants recruited from churches enrolled in the study reported strong general and religious social support and high religiosity.

Table 1. Baseline participant characteristics

Variable	Faith-based			Non-faith-based			Control		
	N	Mean or %	SD	N	Mean or %	SD	N	Mean or %	SD
Age, years	151	52.2	22.17	140	52.1	18.89	126	49.7	24.37
Education									
≤High school	69	46%		64	46%		48	38%	
Some college/college graduate	80	53%		75	54%		74	59%	
Marital status									
Married	72	48%		62	44%		54	43%	
Not married	76	50%		75	54%		71	56%	
Raising grand/children	52	34%		45	32%		52.	42%	
Annual income									
1≤$14,999	22	15%		25	18%		14	11%	
2=15,000 to 34,999	58	38%		64	46%		55	44%	
3≥50,000	47	31%		34	24%		35	28%	
4=Don't know/refused	24	16%		17	12%		22.0	17%	
Excellent or very good self-reported health	52	36%		33	24%		42	37%	
Body mass index, kg/m2	151	35.6	10.3	140	35.9	6.83	126	35.85	12.04
Body mass index groups									
Under/normal weight, <25.0	12	8%		9	6%		14	11%	
Overweight, 25.0 - <30.0	33	22%		25	18%		21	17%	
Obese, ≥ 30.0	106	70%		106	76%		91	72%	
Systolic blood pressure, mm Hg	143	127.0	21.17	133	127.9	18.13	123	126.30	17.95
Diastolic blood pressure, mm Hg	143	79.1	16.37	133	79.5	12.2	123	77.34	14.84

The mean overall score for general social support was 75.0 (95 % CI 74.0–76.0), religious support was 22.5 (95 % CI 22.1–23.0), and religiosity was 29.7 (95 % CI 29.0–30.4). Additional detail on these variables has been reported elsewhere.[36]

Discussion

L.A.D.I.E.S. successfully recruited 31 African American churches and 469 low active women within churches for a program to increase physical activity. To our knowledge, this is one of the largest trials ever conducted in the United States focused on increasing physical activity through group-based, individual behavior change strategies in African American women.[37-41] Yanek and colleagues recruited 529 African American women from 16 churches to participate in a church-based physical activity and nutrition study.[42] A study in rural North Carolina recruited 587 African American participants from 12 churches; however, the study focused on improving behaviors related to colorectal cancer prevention and not physical activity.[43] Other studies have recruited larger samples of African American women for participation in community-based walking programs but did not include individual behavior change components.[44]

Our sample was somewhat different than the general population of African American women in the United States. Women in the study sample were slightly older (aged 51 years) than African American women in the United States and North Carolina (32, and 34 years, respectively).[45] The proportion of married women in the study sample (45.1%) was slightly higher than the national average for African American women (32.0%).[46] Educational attainment in the sample was similar to 2015 US Census data, where 55.4% of African American women aged >18 years reported some college education or being a college graduate.[47] Income levels in the study sample were similar to the general population; 46.0% of the study sample reported household earnings totaling >$35,000. Median household income reported by African American women in the US. Census was $38,097. Only one-third of women in our current study reported raising children or grandchildren, which is lower than the 2010 US Census estimates that indicated that 46% of

Table 2. Baseline physical activity characteristics

	n	Mean or %	SD	n	Mean or %	SD	n	Mean or %	SD
Steps (daily)	131	4005	2084	126	3978	1743	100	3984	1552
Moderate/vigorous PA, daily									
1 min bouts	145	22.9	29.32	131	26.3	48.41	120	22.7	20.07
10 min bouts	145	9.1	16.39	130	10.7	23.11	120	9.4	47.94
Accelerometer sedentary, daily									
1 min bouts	145	775.0	255.9	131	780.7	172	120	787.5	165.80
10 min bouts	145	688.3	253.40	130	696.9	180.70	120	698.2	185.70
Moderate/vigorous PA, self-report	149	16.9	27.54	139	15.0	26.05	123	24.96	47.94
No or low desire for exercise									
10 minutes	8	5%		9	6%		9	7%	
20 minutes	13	9%		12	9%		11	9%	
30 minutes	15	10%		11	8%		11	9%	
40 minutes	30	20%		31	22%		15	12%	
50 minutes	43	28%		40	29%		30	24%	
60 minutes	47	31%		44	31%		36	29%	
Desire for exercise	150	16.6	5.66	127	16.4	10.82	122	16.9	7.89
Self-efficacy	147	54.0	13.98	138	51.5	26.81	125	50.4	23.38
Self confidence	151	37.2	17.57	140	35.3	20.18	126	34.6	11.91
Neuroticism	149	24.7	6.72	139	24.4	5.08	123	24.8	7.36
Extraversion	147	36.6	6.04	137	37.4	5.51	120	35.9	3.99
Openness	146	30.8	6.91	139	30.1	4.66	122	31.2	4.93
Agreeableness	150	39.5	4.69	139	38.8	4.82	125	39.0	5.90
Conscientiousness	149	43.1	3.24	138	42.6	5.33	121	42.0	5.29
Positive symptom total	151	14.9	9.13	138	14.0	6.94	124	13.0	10.95
Positive symptom distress index	151	1.1	.36	138	1.1	0.53	124	1.1	.52
Perceived social support	143	75.6	7.83	120	73.9	7.40	99	75.4	11.26
Perceived religious social support	151	22.5	3.84	138	22.6	4.72	125	22.5	4.39
Private religious practices	150	12.6	7.05	139	12.0	3.64	123	12.5	7.80
Organizational religiousness	150	13.8	2.49	139	14.3	2.36	122	14.0	3.48
Overall religiosity	149	29.7	7.57	139	29.6	5.07	122	29.9	8.12

African American women had children aged < 18 years living at home.[48] Women with higher education and income levels and fewer children at home may be more likely to have real or perceived discretionary time that can be used for leisure time pursuits like engaging in physical activity or participating in weekly meetings.[49]

Our current study successfully recruited a sample of women who were low active. A previous study noted that 5,000 – 7,499 steps/day could be considered "low active."[50] Accelerometer-assessed physical activity showed that participants were not meeting national recommendations for daily moderate-to-vigorous physical activity, either all at once or in brief 10-minute bouts,[1] nor did participants self-report meeting recommendations. While not currently meeting national physical activity guidelines, most participants (~91%) reported a desire to exercise at the level recommended in the guidelines as evidenced by the desire for exercise scales. Individuals who enrolled in a program focused on physical activity likely have a higher desire for exercise than individuals who opted not to enroll in the program. Given that personal motivation is a common factor for achieving personal goals,[51] individuals with a higher desire for exercise may be more successful in achieving physical activity goals in the program.

Although obesity status was not an inclusion/exclusion criterion for enrollment in our current study, most study participants were obese. Obesity rates in African American women from national datasets range from 57.2% - 75.5%.[52, 53] The high obesity rate in our study may reflect a desire for obese women to join a program that could assist with weight loss efforts, but is also reflective of African

American women in North Carolina. Only one-third of the study sample participants rated their health as "excellent" or "very good." In contrast, nearly 57% of African American women who participated in the 2014 National Health Interview Survey rated their health as "excellent" or "very good."[54] A study focused on health may have attracted women who wanted a program that would improve their health. Despite the high proportion of obese participants and low ratings of perceived self-health, participant blood pressure was, on average, "normal" but in the "pre-hypertension" range (120 – 139 mm Hg). The average BMI and systolic blood pressure levels of the population recruited for our current study suggest a population that is appropriate for targeting disease prevention strategies.

Although obesity status was not an inclusion/exclusion criterion for enrollment in our current study, most study participants were obese.

Social support has been shown to influence success in behavior change,[51] and we deliberately chose to recruit within existing social structures in an attempt to capitalize on the existing social support within groups. Our current study successfully recruited participants who reported high levels of perceived social support and religious social support. Our current study compares a faith-based program with a secular program or a self-guided program. We wanted to recruit a population with high levels of religiosity. The baseline data suggest that we were successful in our attempts, given self-reported levels of private religious practices, organizational religiousness, and overall religiosity. Baseline similarities in religiosity across randomization groups will allow us to determine the extent to which intervention components can potentially impact religiosity and study outcomes.

Previous studies have identified individual-level/interpersonal characteristics associated with higher or lower levels of physical activity, including age (younger more active), education (higher more active), real or perceived lack of time (negatively), concerns about personal appearance (including body size and hair; negatively), personal health status (could prompt activity for disease management or hinder physical activity because of concerns about negative health effects or because condition limits ability to engage in physical activity), real or perceived family/caregiving responsibilities (negative), personal motivation (positive) and social support or partners for physical activity (positive if available, negative if not).[51, 55-58] In our current study, we have recruited a population that is: highly educated but older than average; primarily obese; and raising children/grandchildren that includes family/caregiving responsibilities. Most participants reported a high desire to exercise (motivation) and perceived social support within and outside of their church settings. The presence of factors associated with physical activity adherence in the recruited sample suggests a high likelihood that participants will successfully change physical activity behaviors during the study.

Our current study is not without limitations, including the potential for a biased sample if participants who volunteered to enroll in a research study are different from the general population, or if women who are regularly engaged with a religious organization are different from women who are not engaged with a religious organization. This study is being conducted in the Southeastern region of the United States and results might not be generalizable to women from other regions of the country or to men. Notable strengths of our study include: 1) the sample size, which provides sufficient power to detect differences in physical activity between either of the intervention groups and the control group; and 2) that recruited participants are similar to, and representative of, African American women in the United States.

Conclusion

Chronic diseases related to low levels of physical activity are high among African American women. Successful strategies to increase physical activity by addressing factors that have been shown to impact health-related behaviors are needed. Findings from L.A.D.I.E.S. will provide a significant contribution toward understanding appro-

priate strategies for increasing physical activity in high-risk populations.

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Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: Whitt-Glover, Goldmon, Karanja; Acquisition of data: Whitt-Glover; Data analysis and interpretation: Gizlice, Heil, Whitt-Glover; Manuscript draft: Whitt-Glover, Gizlice; Statistical expertise: Gizlice; Acquisition of funding: Whitt-Glover, Goldmon; Administrative: Whitt-Glover, Goldmon; Supervision: Whitt-Glover, Goldmon, Karanja

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