



PHYSICAL ACTIVITY, EXERCISE, AND NUTRITION INTERVENTIONS FOR WEIGHT CONTROL IN AFRICAN AMERICAN WOMEN

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Abstract. The purpose of this paper was to review the physical activity, exercise, and nutrition related weight control interventions done with African American women that were published between 2006 and 2010 and suggest ways of enhancing these interventions. A total of 13 studies met the inclusion criteria. The review found significant results with regard to impact of intervention. Twelve of those studies revealed significant increase in physical activity and weight reduction behavior. In terms of use of theory in designing the interventions only five interventions used a theory. In three of those cases social cognitive theory was used. Appropriate sample size was found to be the major strength of most of the interventions. Six interventions used randomized controlled design. Recommendations for enhancing the effectiveness of physical activity interventions in African American women are presented.

Key words: physical activity, African American, Black, women, programs.

Introduction

There is higher rate of coronary heart disease, hypertension, and diabetes in African American women than their white counterparts [1, 2]. Several studies have shown that moderate and regular physical activity could reduce the risk for developing or dying from coronary heart disease, noninsulin-dependent diabetes, hypertension, and colon cancer [3, 4]. The major factors that contribute to the obesity problem among African American women include larger portion sizes, the availability of high-fat and high-calorie food consumption and physical inactivity [5]. Studies show that African American women in general do not engage in physical activities. For instance, the US Surgeon General report [3] and Taylor, Baranowski & Young [4] indicated that approximately 25% of American adults are inactive and only 22% consistently engage in sustained physical activity. About 43% of African American women lead a sedentary life while sedentary lifestyle among White women is just about 22% [6]. According to Behavioral Risk Factor Surveillance System (BRFSS) survey done in 2007, 58.6% African Americans did not meet the recommended guidelines for moderate-intensity physical activity [7]. In order to address the issue of physical inactivity in African American women several health interventions have been designed.

Sharma, Sargent and Stacy [8] indicated that identification of specific and modifiable determinants for African American population is needed in order to plan meaningful health education interventions that can be implemented to promote physical activity among African American women. Eyler and colleagues [9] indicated that modifiable psychosocial, social support; and environmental factors can increase African American women participation in physical activity. Greater perceived benefits, higher self-efficacy and fewer barriers are reported to have greater increased in physical activity participation [2, 9]. Key predictors of physical activities among African American are support from friends and families. Sharma, Sargent and Stacy [8] also affirmed that self-efficacy and social support from friends are significant predictors of physical activity and therefore physical activity interventions among African American women must build on the constructs of self-efficacy and friends' social support.

There have been some review articles on physical activity interventions such as the one published by Bank-Wallace and Conn [10]. They acknowledged that more reviews are invaluable to the body of knowledge. The most recent review conducted by Pekmezi and Jennings [11] was restricted to physical activity interventions reported between 2000 and 2007 which focused on interventions to promote physical activity among African Americans in general. Since the publication of these reviews several intervention studies have been published and there is the need to synthesize the newer studies and evaluate their effectiveness. The purpose of this paper is to review and examine the physical activity, exercise, and nutrition interventions among African American women and use the review findings to make meaningful recommendations for future interventions.

Methods

In order to collect the materials for the study, a search of MEDLINE, ERIC, and CINAHL databases was conducted for published studies between 2006 and 2010. Key words used to identify articles included exercise, physical activity, Black women, African American women, minority women, and intervention. In MEDLINE a total of 850 articles were found with various combinations of the above key words. In ERIC a total of 39 articles were found and in CINAHL 372 articles were found. Abstracts of all these articles were read and the following inclusion criteria were used in making final selection of the articles. Inclusion criteria were: (1) only published articles in refereed journals; (2) studies reported in English; (3) studies conducted in the United States or Canada; (4) studies that focused on increasing physical activity, (5) studies that published the final results and not merely baseline results or descriptions (6) studies that had a sample of at least 40% of African American women, and (7) had a study population of adults (older than 18 years). All those studies that did not meet the listed criteria above were excluded from this review. In addition, effect sizes for all studies with significant findings were calculated using G*Power, Version 3.1 (Erdfelder, Faul, & Buchner, 1996).

Results

A total of 13 studies met the inclusion criteria for this review. Nine studies focused exclusively on African American women. The remaining seven studies included from 45% to 94% African American women subjects. Studies were reported from 2006 to 2010. All the studies under review were published in refereed journals. Table 1 presents the summary of the 13 studies included in the review. The studies have been arranged in chronological order in Table 1.

Table 1. Summary of physical activity, exercise, and nutrition interventions for weight control in African American women

Study & year	Sample Characteristics	Setting/Study design	Intervention	Theory	Focus area/ Measurement	Effect size	Major findings
Yancey et al 2006 [12]	African American women 100% n=366	Black-owned community health club, Community role models were invited as guest instructors. Randomized two-group trial; attention and control groups	8 week culturally targeted nutrition and physical activity intervention. Attention group received 2 –hr exercise instruction and training and nutrition education	Social Cognitive Theory	Nutrition and physical activity	Small effect size of 0.08	Attention and control participants showed significant improvement in fitness. Control exhibited significant waist circumference
Young & Stewart 2006 [2]	African American women 100% n=196	Church-based intervention in Baltimore. A cross sectional intervention. Two groups: Intervention and control	6-month church-based aerobic exercise intervention. Intervention group received 1 hour weekly exercise class and control group received weekly low intensity stretching class	Social Cognitive Theory	Physical activity Baseline and 6 month assessment	Small effect size of 0.13	Higher baseline social support predicted change in physical activity regardless of treatment
Banks-Wallace 2007 [13]	African American women 100% n=21,	Group meeting and Home-based walking intervention Single group, pre –post design	12- Month 3 hour monthly home based intervention featured professional and personal storytelling, interactive learning group physical activity and walking partners.	Social cognitive theory	Physical activity Baseline, 12 months and 18 months assessments	Small effect size of 0.36	Significant increase in physical activity among the participants
Whitehead et al., 2007[14]	African American 69% female 82.6% n=207 mean aged 50 years old	Clinic based intervention. Randomized control trial design to experimental and attention control group. Study did not give number of participants in control or experimental group	Intervention participants were mailed stage-targeted physical activity information, whereas control participants received low-sodium diet brochures.	Transtheoretical model	Physical activity Baseline, 1 and 6 months assessments	Small effect size of 0.11	Intervention participants reported more physical activity than control participants at 1 month. Gains attenuated by 6 months
Beaudoin, et al., 2007[15]	African American 59.5%	Mass media campaign in New Orleans. Single	High-frequency paid television and radio	There was no theoretical	Walking, Snack food avoidance,	Small effect size	From the baseline, there was significant increase in

Study & year	Sample Characteristics	Setting/Study design	Intervention	Theory	Focus area/ Measurement	Effect size	Major findings
	and white 35.2% others 5.3% n=4637 mean age 50 years	group pre-test (2004) post test (2005)	advertising as well as bus and streetcar signage	framework	fruit and vegetable consumption	of 0.03	messages recall measures, positive attitude toward fruits and vegetable consumption and positive attitude toward walking.
Fernandez, et al., 2008 [16]	AA women 45.7% n=65 mean age of 72 years old	Community based intervention, A pre-post design	Six weekly and two monthly booster group sessions on lifestyle to improve blood pressure. Participants were assigned to either Intervention condition (IC) (35) or waitlist condition (WC) (30)	There was no theoretical framework	Diet and physical activity	Small effect size of 0.20	There was a significant reduction in average systolic blood pressure for the intervention group and compared with the control group.
Wilbur, et al., 2008 [17]	African American women 100% n=281. Mean age of 48.6 years old	Community based intervention. Quasi-experimental design. Participants assigned to either Minimal Treatment (MN) (n=125) or Enhanced Treatment (ET) (n=156)	ET intervention component included 60 minutes workshop to discuss benefits, barriers etc of walking. Workshops were followed by telephone calls. MT component was telephone calls only	There was no specific theoretical framework. African American role model was used	Adherence to walking, PA, Aerobic Fitness, and Body composition. Baseline, 24 wks and 48wks	Small effect size of 0.10	Walking adherence was significantly higher in the ET participants than MT group. Both group showed significant (p<.05) improvement in PA from baseline to 24 and 48 wks.
Pekmezi et al., 2008 [18]	AA women 91% n=214, mean age of 47 years old	Clinic based intervention. Randomized control trial design to experimental and attention control group. Study did not give number of participants in control or experimental group	The intervention group received the stage matched print intervention along with 5 newsletters and 2 telephone contacts	Motivational interviewing and Transtheoretical Model	Physical Activity	No effect size	Both groups reported increases in PA from baseline to 6 months, but there were no significant group differences. In addition, results indicated no significant changes in self efficacy and decisional balance from baseline to 6 months for either group
Tan et al., 2009 [19]	African American	Both community and home based intervention.	Both EC and WHAS interventions	There was no specific	Physical activity Baseline and 3	Small effect size	Participants in EC group reported sustained

Study & year	Sample Characteristics	Setting/Study design	Intervention	Theory	Focus area/ Measurement	Effect size	Major findings
	women 100% n=221. Mean age 72.1 years old	Participants assigned to either Experience corps (EC) (n=71) or Women's Health and Aging Studies (WHAS) (n=150)	components were not reported in the current study but was reported elsewhere.	theoretical framework but construct of self-efficacy was used.	year follow-up	of 0.12	increase in PA as compared to WHAS. At the 36 months, EC participants reported 670 kcal/week compared with 410 kcal/week in WHAS
Kumanyika et al., 2009 [20]	AA women 90% n=344 mean age of 46.5	Family based intervention. RCT design, participant were randomly assigned to either family/friend stratum (n=281) or individual stratum (n=63) The participants were further assigned to high or low social support stratum	SHARE (Supporting Healthy Activity and eating Right Everyday) was a 2-year trial of a culturally specific weight loss program	There was no theoretical framework but the study incorporated social support and was culturally tailored	Physical activity and nutrition. Measurement were done at 6, 12, 18 and 24 month	Small effect size of 0.09	The family participant weight loss was greater among the participants whose partners attended more personally tailored counseling sessions at 6 months in the high support group and at 6, 12, and 24 months in the low support group (all $p < .05$)
Rimmer, et al., 2009 [21]	AA women 94% n=92 mean age of 58.8 years old	Hospital based intervention, RCT design participants randomly assigned to one of three treatment groups: awareness (n=31), lower support (n=31), and higher support (n=30)	Awareness intervention included informational brochure, no coaching; lower support included phone coaching only; and higher support included phone coaching plus monthly exercise support group	There was no theoretical framework but the study was based on social support	Body weight and body mass index, blood pressure, cholesterol, physical Activity. Baseline and 6 months assessments	Small effect size of 0.20	The higher support group had the greatest reduction in (BMI) (7.4%) compared with a 0.2% and 1.6% increase in BMI for the lower support and awareness groups, respectively ($p < .01$). There was a significant increase in physical activity in both the higher and lower support groups compared with the awareness group ($p < .05$).
Woodson et al. 2010 [22]	AA women 86% n=950 mean age 51 years old	Community and church multifaceted approach intervention. Single group intervention	12-week physical activity lifestyle modification, 4-week walking club	There was no theoretical framework	Physical activity Baseline, 12 week and 6 months assessments	Small effect size of 0.05	There were improvement in BMI, lean body mass and waist, hip, and abdominal circumferences
Parker, et al., 2010 [23]	AA women 100% n=28	Church based intervention. Participants	10-week intervention designed to reduce	There was no theoretical	Physical activity and nutrition. Pre	Large effect size	There was a significant reduction in weight

Study & year	Sample Characteristics	Setting/Study design	Intervention	Theory	Focus area/ Measurement	Effect size	Major findings
	mean age of 52.44 years old	were assigned to either spiritual n=19 or non-spiritual n=9	obesity in this rural population. Two different interventions (spiritually based and nonspiritually based)	framework	and post test assessment were done	of 0.64	among participants in both intervention but the spiritually based intervention higher improvement in weight loss

Discussion

The purpose of this article was to review and examine the interventions designed to promote physical activity, exercise, and modify nutrition behaviors among African American women and use the review findings to make informed recommendations for future interventions. The results of the review show significant findings in twelve of the interventions. For example, seven of the interventions reviewed in the studies showed significant increase in physical activity [2, 13, 14, 17, 18, 16, and 19], some of the interventions combined physical activity with weight loss and nutritional program [15, 16, 17, 20, 21 and 23] and all those studies reported significant changes in physical activity behavior, weight loss and positive attitude towards fruit and vegetables. The effect sizes of these studies have generally been small from 0.08 to 0.36, however one study has large effect size of 0.64 and one study has no effect size at all because the intervention was not significant in bringing about behavior change. Two main factors may account for the reasons why those interventions in the review brought about significant participants' behavioral change. The first reason can be attributed to the component of social support in those interventions [20 and 21]. The role of social support has been found to be positively related to the level of physical activity among African American women. Sharma, Sargent and Stacy [8] confirmed in their study that social support from friends was a significant predictor for physical activity among African American women. However, the studies did not identify which type of social support; emotional, informational instrumental, and appraisal [8] that was used in the intervention. Identification of specific type of social support can help future interventionists to know which type of social that would help achieve the maximum effect. Therefore researchers should continue to include social support in interventions aimed at increasing physical activity among African American women and they should also be specific about with type of social support they are using so as to facilitate replication of such studies.

The second factor that might have contributed to the success of the interventions reviewed is the use of theories in many studies [12, 2, 13, 14, 18]. Three out of five of those studies used social cognitive theory [12, 2, 13] and two used transtheoretical model and motivational interviewing [14, 18]. Even though one study [19] did not use theory, nonetheless it incorporated the construct of self-efficacy in the intervention. Within social cognitive theory the construct of self-efficacy was the most popular. Use of theory helps the intervention in several ways. It helps in replication and dissemination of information in a scientific way. It helps in identifying which constructs of the theory are working and which ones are not. It helps in sequencing the intervention and also reduces the duration of the intervention by focusing on important aspects. Of the five interventions that have used theories, none of them have measured the change in constructs from before to after the intervention. Such measurement is vital for future interventions as it gives insight as to which constructs are working and which are not and thereby helps to improve the theory.

In terms of the setting where the intervention took place it was found that three interventions were church-based [2, 22, 23], four interventions were community-based [12, 16, 19, 22], three interventions were hospital-based [14, 18, 21] two were home-based [13, 20] and the remaining one was not specific as to where the interventions took place. All the interventions that took place in the church setting reported positive behavior change. All the clinic or hospital based interventions also reported positive results. Young and Stewart [2] observed that churches are good intervention setting for African American. This is because churches provide social support for intervention participants. When African American women receive social support there is the likelihood that they will increase their participations in physical activity. Given the fact that this review shows that churches and clinic based interventions yielded significant results it can be recommended that these two settings should be used by future interventions.

In addition, all the interventions except for one [13] included in the review had adequate sample size which is among the strengths of the interventions in this area. The use of an appropriate sample sizes in the intervention will provide reliable results that can be generalized to the target population. The small sample size makes it difficult to generalize the study to the target population and it makes it

more difficult to analyze the educational level, socio-cultural and economic status background of the participants [10].

Another strength of the studies is the use of randomized controlled trials (RCT). Six of the studies [12, 14, 17, 18, 19, 21] used RCT and this strengthens the confidence in causal relationship in the studies [10], minimizing confounding factors and enhances the chances of generalizing the results to target population.

Four of the articles acknowledged using convenience samples as a limitation of their study. The use of single pre and post group design poses threat to the internal validity of the studies. This means that even though the results may have been statistically significant, it does not necessarily mean that the interventions were effective. There might be confounding factors that brought about positive results. If the internal validity is threatened it means the external validity is consequently weakened and therefore the generalizability of the study to the target population becomes questionable. Even if participants are not randomly selected, it is of great importance to randomly assign participants to comparison and study group. When this is done the researcher will be able to determine the effectiveness or causality of the intervention after mitigating obvious confounding factors.

Another issue in the reviewed interventions has been the nature of programs or the type of education given to the participants. While some of the articles chronicled the steps of treatments, most of the studies did not give details as to how the education programs were executed. It is important to give the details of the program so that the study can be replicated to validate the findings. Also given treatment without monitoring the adherence to the program could be wasting of resources.

Another limitation that has been found in the reviewed interventions is that instruments have been used without documented validity and reliability. Young and Stewart [2] also contended that most interventions did not use reliable and valid instruments and quite a few interventions are based on culturally sensitive or gender specific behavioral theory. The testing for validity and reliability of instruments must be done for all interventions among African American women [4, 11].

Recommendations for future interventions

For future intervention research it is recommended that appropriate samples size should be used to obtain power so as to be able to do subgroup analyses among participants and generalize the results. Again, researchers should continue to randomly assign participants to experimental and comparison group to improve confidence in causality of the intervention. They should try to avoid single-group pre and post designs so that threats to internal validity will be minimized. Besides, more future interventions should be designed based on theoretical frameworks. Social cognitive theory seems to be a useful theory in the context of promoting physical activity in African American women. Particularly the constructs of self-efficacy and social support have been found to have empirical support and must be reified more by future interventions. Researchers should try as much as possible to use instruments with documented validity and reliability.

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