Southern Online Journal of Nursing Research

www.snrs.org

Issue 1, Vol. 6
February 2005

Sister to Sister: A Pilot Study to Assist African American Women in Subsidized Housing to Quit Smoking

Jeannette O. Andrews PhD, RN, FNP, ACNP[1]
Gwen Felton PhD, RN, CS, FAAN[2]
Mary Ellen Wewers PhD, RN, MPH, FAAN[3]
Jennifer Waller PhD[4]
Pat Humbles PhD, RN[5]

[1]*Assistant Professor, School of Nursing, Medical College of Georgia, Augusta*
[2]*Professor, College of Nursing, University of South Carolina, Columbia*
[3]*Professor, College of Nursing, Ohio State University, Columbus*
[4]*Associate Professor, Office of Biostatistics, Medical College of Georgia, Augusta*
[5]*Assistant Professor, School of Nursing, Medical College of Georgia, Augusta,*

Abstract

A multi-component community-partnership model, consisting of a nurse and community health workers, was implemented in a subsidized housing development to assist southern African American women to quit smoking. The community health workers assisted with the recruitment and retention of the participants and promoted social support and self-efficacy with the cessation process. The nurse provided group, stage-based education, behavioral strategies, and nicotine replacement therapy for the participants (*n*=15). Data analysis revealed the 24-hour point prevalence abstinence rates at weeks 6 and 12 were 80% and 73%, respectively, and the 2-month sustained abstinence rate was 60%. There were significant differences in the progression along the stages of change, social support and self-efficacy scores. This innovative community partnership using community health workers may be a feasible approach to provide low socioeconomic African American women access for effective smoking cessation treatment. Further research is needed to validate these findings and other novel approaches to eliminate health disparities among African American women.

Keywords: ***Community Health Workers, Tobacco Cessation, Ethnic Minority Women, Community Partnerships***

Introduction

Over the past several decades, smoking patterns have evolved that strongly link cigarette smoking to geography, gender, and class. The smoking prevalence is higher in the Southeastern United States (US) (30.5%) than the U.S. average (24.5%) for the overall population.[1] Urban African American women of lower socioeconomic status report prevalence rates of tobacco use as high as 40%-60% in some communities, which is at least twice the rate of women in the general population.[2-5]

Not only do African Americans have high prevalence rates, they tend to smoke high nicotine and menthol cigarettes and are more likely to be highly dependent on nicotine.[6-9] The patterns of menthol and high nicotine consumption among African Americans are likely a product of the interactive effects of several factors: 1) the physiological and pharmacological

sensory effects of menthol; 2) the promotional marketing of mentholated and high nicotine cigarettes to African Americans by the tobacco industry; and 3) the cultural effects of health-related beliefs and norms.[10] It has been shown that it takes longer to clear nicotine and its metabolites (i.e., cotinine) from the bloodstream in African Americans because of physiological differences in metabolism of nicotine.[6] These factors may partially explain why African Americans suffer more tobacco related diseases such as coronary heart disease and cancer, have greater difficulty with cessation, and experience higher mortality rates than other population groups.[6-7,10-12]

Literature Review

African American women living in low-income housing face unique barriers to tobacco cessation that include social norms for smoking, lack of financial and health resources, lack of knowledge of smoking related health risks, and lack of information on quitting. [3-4,13] Focus groups with low-income African American women smokers report profound social isolation, ascribable to the physical seclusion in housing developments from other parts of the city, and limited mobility because of poverty and presence of children. These women often distrust their neighbors and keep to themselves, avoiding much contact with others in the community. Typically, social support for these women occur from a sister, mother, or a close woman friend.[3-4,13] Women who are successful in quitting smoking are more likely to report greater social support during the cessation process.[4,14-15] Women prefer assisted cessation programs such as formal group programs that promote encouragement and understanding of their situations and social support with the cessation process.[4,15] A mechanism known as “sister circles” is often enhanced in organized group sessions with homogenous African American women with the common bonds facilitating communication of vital information, psychosocial and spiritual support, and mentoring to their members.[16]

In addition to social support with the cessation process, the concept of self-efficacy, or the belief that one is confident in her ability to change a behavior, is a strong predictor of smoking cessation and stage of readiness to quit in women.[4,17-18] Research findings show that an increase

in self-efficacy during treatment is the best predictor of length of smoking abstinence.[4,19] Low-self efficacy, or the belief that she will not be successful in quitting on her own, is a predictor for group participation in women.[20]

Multiple intensive behavioral and pharmacological strategies to promote tobacco cessation have been described in the literature.[21-23] The Public Health Service (PHS) Clinical Service Guideline, *Treating Tobacco Use and Dependence,* recommends that intensive smoking cessation interventions include: 1) 4 to 7 sessions that are 20–30 minutes in length over a minimum of a two week period; 2) individual and group counseling with problem solving training; 3) clinician-delivered social support; 4) relapse intervention; and, 5) pharmacotherapeutics (e.g., nicotine replacement therapy).[21] The National Cancer Institute recommends that cessation programs should: 1) target high risk populations; 2) tailor the education for the targeted audience; and, 3) use community networks to promote outreach of the program in high risk populations; and, 4) target specific stages of cessation (i.e. Transtheoretical Model of Change).[24] The Transtheoretical Model of Change has been used to understand the stages that smokers' progress through when changing behavior, and the cognitive and behavioral processes that are used to influence health behaviors. Individuals are classified into different stages of the behavior change process, which range from precontemplation (not thinking about quitting), to contemplation (thinking about quitting), to preparation (thinking about quitting in the next 30 days), action (actively attempting cessation), and maintenance (abstinence from tobacco for a specified period of time).[17,25]

In experimental settings with primarily Caucasian smokers, the combined use of pharmacotherapy and intensive behavioral treatment yield quit rates that are approximately four times of those with no interventions.[21-22] Although hospital and clinic-based smoking cessation strategies are effective in reducing smoking prevalence in the mainstream culture, they are often not accessible for "hard to reach" populations, especially those who are socioeconomically disadvantaged and who lack resources.[26] To reach these vulnerable populations, innovative community partnership models are often needed to promote outreach and

access for the targeted groups.[27] Community partnership models addressing tobacco cessation have the capacity to disseminate information and services to larger groups of smokers and to reduce community norms in some low-income populations.[28] In African American communities, indigenous community health workers (CHWs) are being asked to provide outreach, screening, and educational services to their community members.[29] Indigenous CHWs, e.g., members from the community who share the same language, culture, attitudes, and beliefs of the population, provide the mechanism for social networks through which community members offer and receive social support among one another.[29-30] On this premise, indigenous people who are familiar with their environment have first hand knowledge of the problems of their community and may be more able to counsel and communicate with "hard to reach" populations.[31] In prior studies, CHWs have been effective in promoting prostate cancer screening in rural, southern, African American men,[32-33] and cervical cancer and mammography screening in African American women.[34-35] With tobacco-related interventions, CHWs effectively mobilized low-income African Americans in the community to promote the availability of smoking cessation programs.[36] There are no known studies that have used CHWs to assist with the delivery of tobacco cessation interventions in African American women.

Purpose and Research Questions. The aim of this pilot study was to determine the feasibility and effectiveness of a community-partnership model consisting of a nurse and CHWs to deliver a quit smoking intervention (the *Sister Intervention)* for U.S. southern African American women residing in a subsidized housing development. Specifically, the purposes were to explore the feasibility and effectiveness of the intervention by the following: 1) recruitment and retention rates of participants and CHWs during this 12-week study period; 2) cessation rates of participants; 3) progression along the stages of change among participants; and, 4) levels of social support and self-efficacy of participants. This pilot data will also be used to generate estimates to guide sample size determination for a larger study with a control group for comparison.

Methods

A repeated-measures design with one group was used for this pilot study. Participants received weekly group education and behavioral counseling for six weeks and a booster education and counseling session at week 12. Measures were taken at baseline (week 1), week 6, and week 12.

Sample. Participants were recruited from an inner-city housing development located in Augusta-Richmond County, Georgia. Approximately 250 women resided in this housing development and an estimated 100 women were current smokers.[4] Flyers, word of mouth, Community Advisory Board (CAB) members, and CHWs were used to recruit 20 women to participate in the study. Sixteen women met the inclusion criteria and 15 women agreed to participate. Criteria for inclusion were the following: 1) non-pregnant African American woman over 18 years of age; 2) current smoker as validated by expired carbon monoxide air level $\geq$ 9 parts per millimeter (ppm); 3) resident of targeted public housing development, or female relative or friend of resident in the housing development; 4) absence of diagnosed mental health disorder, unstable angina or recent myocardial infarction within the past month; and 5) no plans to move from the housing development within three months. All group sessions were held in a small meeting room in the community center, which was located in a central location in the housing development.

Instruments. The following variables were measured using self-report questionnaires: a) smoking status; b) stage of change; c) self- efficacy; and d) social support. Smoking status was defined as the presence or absence of smoking. Two levels of smoking abstinence were measured: 24-hour point prevalence abstinence and 2-month prolonged abstinence. The 24-hour point prevalence abstinence was the abstinence of smoking at least 24 hours prior to the designated follow-up assessment period (weeks 6 and 12). The 2-month prolonged abstinence was the abstinence of smoking without relapse over a two-month period. Smoking status was measured by self report and validated by the EC50-Smokerlyzer, a hand-held breath carbon monoxide (CO) electrochemical sensor that provided a numerical measure of CO in the range of 0 – 500 ppm.[37] Ranges of $\leq$ 8 ppm were classified as “abstinent,” 9-20 ppm “light smoker,” 21 – 30 “moderate

smoker," and > 40 "heavy smoker."[38] Participants were instructed on the 15-second breath-hold technique before exhaling completely into the mouthpiece. Two carbon monoxide readings were assessed at each data point, and the average of the two were recorded. The reported sensitivity and specificity of the EC50-Smokerlyzer are both 90%.[38]

A three-item instrument, Stage of Change Questionnaire, determined the staging of tobacco cessation.[17,39] The individual was categorized into one of the following categories: precontemplation, contemplation, preparation, action, and maintenance.[17,25] The Stage of Change Questionnaire has been shown to have high reliability and stability[40] and high predictive and construct validity.[41]

Smoking cessation self-efficacy was measured with the Smoking Efficacy/Temptation Scale, which assessed smokers' level of temptation to smoke in 20 challenging situations.[42] This instrument consisted of three subscales: 1) the negative affect subscale, which measured the degree of confidence when frustrated or facing conflict or emotional distress; 2) the positive affect subscale, which measured confidence in resisting temptation in social or celebratory situations; and, 3) the habitual/craving subscale, which measured the degree of confidence when the urge to smoke was felt. The item responses range from 1 (not at all tempted) to 5 (extremely tempted). Summation of the total subjective responses provided an overall score. Possible subscale score range from 6–30 (negative affect and positive affect) and 5-25 (habitual/craving), with the lower the score, the higher the self-efficacy in refraining from smoking in these challenging situations. Reported reliability coefficients range from .88-.92.[42] Acceptable construct and predictive validity have been demonstrated based on hypothesis testing and confirmatory factor analysis.[17,42]

Social support was measured with the Medical Outcomes Study of Social Support Survey (MOS-SSS).[43] The MOS-SSS instrument was not designed to measure social support with smoking cessation, but rather general social support measures. The19-item scale measured the individual's perception of the availability of support along four dimensions: 1) emotional/ informational; 2) affectionate;

3) tangible; and 4) positive social interaction. This instrument asked how often the different types of support were available with responses ranging from 1 (none of the time) to 5 (all of the time). Scores were averaged for each item in the subscale; the higher the score, the higher the social support. The reported internal consistency reliability of the total scale and subscales are high, with Cronbach alpha ranging from .91-.97. The reported construct validity is based on confirmatory factor loadings of items in each subscale (r=0.69–0.82).[43]

Procedure. This study received Human Assurance Committee approval from two universities. As part of the larger study, a 12-member CAB was formed, consisting of both formal and informal leaders of the community and representatives from eight local supporting organizations. The CAB participated in the development of the intervention protocol, recruitment of participants, identification of CHWs, and location for the intervention sessions.

The *Sister Intervention* included individual and group sessions weekly for six weeks and one session at week 12. The protocol for the educational and behavioral sessions was adapted from the American Cancer Society's *Fresh Start* intensive smoking cessation program, PHS Guideline recommendations,[21] and the Transtheoretical Model's stages and processes of change.[25] Both the CAB and CHWs assisted in adapting the intervention protocols to reflect the ethnicity and culture of southern African American women (e.g., ethnic graphics, spiritual tools, and food at meetings). An outline of the major themes and stage-based education strategies for each group session is shown in Table 1.

Table 1
Stage-Based Education for the Sister Intervention

Time	Stage of Change	Major Themes
Week 1	Pre-Contemplation/Contemplation	Risks of Smoking (Consciousness raising) Understanding Why I Smoke (Self – reevaluation) Benefits/Rewards of Quitting Process of Quitting
Week 2	Contemplation/Preparation (Set Quit date by week 2 or 3)	Overview of Cessation Methods Setting a Quit Date Coping Mechanisms/Stimulus Control/Counter Conditioning Self efficacy/Self Liberation Social Support/Helping Relationships
Week 3	Preparation/Action	Coping Mechanisms/Stimulus Control/Counter Conditioning Self Efficacy/Self Liberation Social Support/Helping Relationships Reinforcement Management (short-term)
Week 4	Action	Coping Mechanisms/Stimulus Control/Counter Conditioning Self Efficacy/Self Liberation Social Support/Helping Relationships Reinforcement Management
Week 5	Action	Coping Mechanisms/Stimulus Control/Counter Conditioning Self Efficacy/Self Liberation Social Support/Helping Relationships Reinforcement Management (short term)
Week 6	Maintenance	Reinforcement Management (long term) Relapse Prevention Social Support/Helping Relationships Self-Efficacy/Self Liberation
Week 12	Maintenance	Reinforcement Management (long term) Relapse Prevention Social Support/Helping Relationships Self-Efficacy/Self Liberation

Four CHWs were identified by the CAB and recruited for this study. All four CHWs were African American women, residents of the targeted community, considered as credible and influential among their peers, and all were former smokers. The CHWs received role training, orientation to the study protocols and procedures, protocols for telephone or other personal contacts with the participants, and confidentiality and ethical requirements. Each CHW was assigned 2-5 participants to assist during the 12-week study period. The CHW role was to attend the weekly group sessions with their assigned participant and to make at least one additional phone or personal contact weekly. The CHWs were instructed to share their own personal

experiences with smoking cessation, in their own language and style, and to provide social support and build the confidence of participants attempting to quit smoking. The CHWs were paid $10 per hour during the study period.

During the designated weekly session, the nurse facilitated the education and group discussions during the first 45 minutes of the session. Following the group sessions, the nurse provided individual counseling with each participant to include problem-solving skills and individualized behavioral strategies. The CHW then made a weekly personal/phone contact with the participant outside the group sessions to assess progress, provide social support, and enhance self-efficacy with the cessation process. Phone numbers of the nurse and CHWs were provided to all participants for additional support as needed.

During the initial group sessions, the participants who committed to quit smoking were assisted to set a quit date (by weeks 2-3). The nurse supplied over-the-counter nicotine replacement therapy (NRT) in the form of nicotine transdermal patches (Habitrol™). Participants who smoked greater than 10 cigarettes per day were offered the 21 milligram (mg) patch; those who smoked 10 or fewer cigarettes per day were offered the 14 mg patch. The dosage of the patches was tapered during the intervention period (i.e. from 21 mg, to 14 mg, to 7 mg) based on the clinical response of each individual, clinical judgment of the nurse, and drug manufacturer's recommendations. A maximum of six weeks supply of the nicotine patches was offered to each individual at no cost. Participants were paid $20 for each of the following sessions attended: week 1, week 3, week 6, and week 12 for a total of $80. Participants were paid at the end of week 12.

Demographic data were obtained on all participants at baseline. Data were collected on study variables in face-to-face interviews and questionnaires were read aloud to participants at baseline (week 1), week 6, and at the individual follow-up session at week 12.

Data Analysis. All statistical analyses were conducted in SAS version 8.2 and all statistical significance tests were set at an alpha level of 0.05. Descriptive statistics were calculated for all variables. To determine if differences existed between smoking status, social support measures, and self-efficacy

measures, a repeated measures analysis of variance model (ANOVA) was used for each outcome of interest. Participant was included in the model and considered a random effect. Time (week 1, 6, and 12) was included and considered a fixed effect. The participant x time interaction was not included in the model as this was the error term for testing the time variable. Post hoc differences were assessed using a Bonferroni correction procedure to the overall alpha level of 0.05 on the adjusted least square means to determine where differences occurred between time points.[44] Additionally, the partial eta-squared was determined for each effect in the model (SS_{effect}/ SS_{effect} + SS_{error}).[45]

Results

The demographic data and baseline smoking characteristics of the participants are summarized in Table 2. Sixty-seven percent (67%) of the participants were 50 years of age or older and 80% received < $1000 total household income per month. Three of the participants (20%) received food stamps, and one (7%) participant received disability income. Only three (20%) of the participants were currently married. The majority of the participants (67%) were the only adults living in their homes; half (53%) had at least one minor child living in the household. The women smoked an average of 25 years (SD=13.6), with the amount of smoking varying considerably among the participants from one cigarette to two packs (40 cigarettes) per day. Although the participants reported they smoked an average of 12 cigarettes in a typical day (SD=9.6), they reported smoking an average of 8 cigarettes in the past 24 hours (SD=5.6). The most frequent brands smoked were Newport (43%) and Kool (33%), both of which are high nicotine and mentholated cigarettes. All participants were in the contemplation or preparation stage of change at baseline, and were current smokers as validated by an expired air CO level of > 9 ppm.

Table 2
Mean, Range, and Standard Deviation of Demographic Variables and Baseline Smoking Characteristics (*n* =15)

Variable	Mean	Range	Std Deviation
Age (years)	49.8	29-63	10.06
Education	11.8	8-15	1.78
Income/month	780.0	0-2300	590.59
Work hours/week	19.3	0-50	18.64
No. years smoked	24.8	4-45	13.6
Average no. cigs/day	12.2	1-40	9.6
No. cigs/past 24 hours	7.9	1-20	5.6

To determine if the first purpose of the study was met, the participation and retention rates were evaluated for the participants and CHWs. Participation was operationalized as attending at least 70% of the weekly sessions. With six weekly sessions and one follow-up session at week 12, there were a total of seven sessions possible for the participants to attend. Twelve participants attended all seven sessions, two attended six sessions, and one attended five sessions. Retention was operationalized as participants completing the data collection at all time periods. All 15 participants attended the data collection sessions at week 1, week 6, and week 12 and were retained throughout the study period. Three CHWs attended all seven sessions, and one community health worker attended six sessions.

The second purpose of the study was to determine the smoking cessation rates of the participants. The 24-hour point prevalence abstinence rates at weeks 6 and 12 were 80% and 73%, respectively, as shown in Table 3. Table 4 shows the results for the repeated measures ANOVA for self-report cigarette use and CO levels. Self report cigarettes per day (F=20.68, p<0.0001) and mean CO levels (F=18.12, p<0.0001) showed decreases over time. Post hoc-analyses showed that participants in week 1 had significantly higher cigarette use and significantly higher CO levels than weeks 6 (p<0.0001) and 12 (p<0.0001). The 2-month prolonged abstinence rate was 60%, indicating that nine women maintained smoking abstinence for a

minimum of two months from weeks 3-12 without relapse.

Table 3
24-hour Point Prevalence Abstinence Rates (*n* =15)

Time	*n*	% Abstinent
Week 1	15	0.0%
Week 6	12	80.0%
Week 12	11	73.3%

Table 4
Repeated Measures Analysis of Variance (ANOVA) for Changes in Smoking Status (*n*=15)

Outcome	Mean	Std. Error	Partial Eta^2	*F*-value	*p*-value
Self Report					
Cig/24 hours					
Participant			0.4125	1.40	0.2152
Week			0.5963	20.68	<0.0001
1	7.87	0.96			
6	0.27	0.96			
12	0.40	0.96			
Carbon Monoxide (CO)					
Participant			0.4919	1.94	0.0665
Week			0.5641	18.12	<0.0001
1	16.27	1.69			
6	4.87	1.69			
12	3.00	1.69			

The third purpose of the study was to examine the progression along the stages of change of the participants during the study period. Two individuals were at the contemplation stage at baseline, with one progressing to the preparation stage and the other progressing to the action stage over time. Thirteen participants began the study in the preparation stage, with two remaining in the preparation phase, and 11 progressing to the action stage over time. Bowker's test for symmetry validated that there was a significant progression along the stages of change among the participants (Q_B=8.333, DF=1, p=0.0039). Bowker's test of symmetry tested the null hypothesis that data were symmetric in the diagonal cells.[46] A significant test indicated that the two-way tables were not symmetric and there were changes in the variable

from baseline to week 12.

The final purpose of the study was to explore changes in the social support and self-efficacy measures of the participants during the intervention period. Repeated measures ANOVA results for social support measures are provided in Table 5. Significant differences between the time points were detected for affectionate support (F=4.51, p=0.020). All of the subscale scores (i.e., emotional, tangible, affectionate, and positive interaction) showed increases from baseline to week 6. The subscale scores, with the exception of tangible support, demonstrated slight declines from week 6 to 12. All 12-week scores were higher than baseline scores, but none were significant in post-hoc analyses.

Table 5
Repeated Measures Analysis of Variance (ANOVA) for Changes in Social Support (*n*=15)

Outcome	Mean	Std. Error	Partial Eta^2	*F*-value	*p*-value
Emotional/Informational Support					
Participant			0.8308	9.82	<0.0001
Week			0.0636	0.95	0.3988
1	4.28	0.11			
6	4.48	0.11			
12	4.38	0.11			
Tangible Support					
Participant			0.7377	5.63	<0.0001
Week			0.1516	2.50	0.1001
1	3.93	0.14			
6	4.30	0.14			
12	4.33	0.14			
Affectionate Support					
Participant			0.7837	7.25	<0.0001
Week			0.2438	4.51	*0.0200*
1	4.13	0.12			
6	4.60	0.12			
12	4.51	0.12			
Positive Social Interaction					
Participant			0.7573	6.24	<0.0001
Week			0.1839	3.16	0.0581
1	4.11	0.13			
6	4.56	0.13			
12	4.40	0.13			

Table 6 summarizes the repeated measures ANOVA for the self-efficacy measures. Significant differences between the time points were detected

for positive affect (F= 19.52, p<0.0001), negative affect (F=18.71, p<0.0001), and habit/craving, (F=23.58, p<0.0001). Although the scores showed slight increases from weeks 6 to 12 in positive affect and habit/craving subscales, post hoc analyses show that positive affect was higher at week 12 than at baseline (p<0.0001), negative affect was higher at week 12 than baseline (p<0.0001), and habit/craving was higher at week 12 than baseline (p<0.0001).

Table 6
Repeated Measures Analysis of Variance (ANOVA) for Changes in Self Efficacy (n=15)

Outcome	Mean	Std. Error	Partial Eta^2	*F*-value	*p*-value
Positive Affect					
Participant			0.5606	2.55	0.0169
Week			0.5824	19.52	<0.0001
1	20.53	1.24			
6	10.60	1.24			
12	11.53	1.24			
Negative Affect					
Participant			0.4667	1.75	0.1009
Week			0.5720	18.71	<0.0001
1	25.40	1.44			
6	14.67	1.44			
12	14.60	1.44			
Habit/Craving					
Participant			0.2823	0.79	0.6745
Week			0.6275	23.58	<0.0001
1	19.47	1.20			
6	9.00	1.20			
12	9.87	1.20			

Discussion

The aim of this pilot study was to determine the feasibility and effectiveness of a tailored smoking cessation intervention for women living in subsidized housing developments delivered by a nurse and CHWs. The baseline use of high nicotine and mentholated cigarettes and smoking fewer cigarettes per day (i.e., than Caucasian women) were consistent with the literature.[7-9] Typically, cessation studies eport 7-day point prevalence abstinence rates as outcomes, and the 24-hour abstinence rates at weeks 6 and 12 reported in this study may represent a serious quit attempt. However, the reported abstinence rates at weeks 6 and 12 among these participants (80% and 73%) were higher than other studies using nurse-managed intensive group interventions with low-income women

reported in the literature. A previous study with 122 low-income women who participated in a nurse-managed intensive smoking cessation group reported quit rates of 31%, 24%, 22% at 1, 3, 6 months, with non-quitters reducing their consumption to 10, 8, and 7 cigarettes per day on average.[47] There are no known studies that have used a combined nurse/CHW group intervention approach to assist African American women to quit smoking.

The stage of change progression in this pilot study was consistent with the findings of the abstinence rates, which was validated by other studies.[26,48-49] Thirteen of the participants progressed forward to a higher stage of change during the intervention. There were at least two previous cessation intervention studies with African Americans that demonstrated significant, positive progression along the stages of change, and both used multi-component strategies and both were church-based.[26,49] Further research is needed to evaluate stage of change progression in community-based intervention studies with African American women.

The women's self-efficacy with abstaining from smoking improved significantly over time. These results support other studies demonstrating that an increase in confidence during treatment served to enhance cessation rates.[4,18-19] During group sessions, the nurse and CHWs facilitated discussion and problem-solving techniques for handling tempting situations in the context of women's lives, which included cravings, social interactions, and negative affects. After engaging in the quitting process, the participants often shared tempting smoking situations from the prior week, and the individual and the group evaluated the progress and/or lack of progress made with each participant.

The *Sister Intervention* showed promise in increasing affectionate support in this limited sample. The women received both intra-treatment support from the nurse, CHWs, and other participants, and extra-treatment support from the CHWs. These findings corroborate other reports that show women who quit smoking were more likely to report greater social support during the cessation process. [15,36,50-51] A meta-analyses of smoking cessation interventions revealed that cessation programs that enhance both intra-treatment and extra-treatment social support mechanisms are twice as likely

to promote cessation as those that do not provide social support.[21]

It is noteworthy that cessation rates, self-efficacy, and social support were improved at week 6, but diminished slightly at week 12. Relapse of smoking over time after intensive group cessation interventions was not uncommon and was expected.[21] The changes in self-efficacy and social support from weeks 6 to 12 may have been contributed to the lack of group interaction and support between weeks 7-11. At the end of the 12-week program, 80% of participants recommended that future interventions include weekly group sessions over a longer period of time; 47% recommended at least twice weekly meetings to reinforce the support with cessation.

An unexpected occurrence in this study was the extent of bonding among the participants. At the beginning of the study, many participants knew of one another because of their geographical proximity, but did not share social interactions with other participants. By the end of the fourth week, one of the participants claimed that this was not a "Sister to Sister" group, but a "Sistah to Sistah" group. The shared values and beliefs, cultural norms, and personal experiences were comparable in these women because of their similar ethnicity, age, social class, and geographical boundaries. As trust among the group solidified, the women shared personal stressors impacting their struggles with smoking cessation within the context of their daily stressors. For example, in their own authentic voice, 6 of the 15 participants disclosed during the 12-week period the personal stressors of having either a son, grandson, partner, or spouse in prison. The women knew, understood, and supported one another within the framework of their own lives. The commonality of their experiences expressed through the personal sharing and storytelling supports is illustrative of "African American's womanist ways of knowing."[52] Providing the opportunities for women to share their own experiences and supporting each other may have played a vital role in establishing the credibility of the smoking cessation intervention.[52] The group maintained a solution–oriented approach to solve their own problems and to find ways within themselves to abstain from one of the major sources of comfort in their lives--the cigarette. At the 6th session, the participants were

asked to recite a poem, narrative, or song that best described their journey through this smoking cessation process. These recitations commonly expressed the oppression and struggles among the individuals and group members, but also the hope and the empowerment the collective group had adopted to quit smoking and attain healthier lifestyles. Because of the intense bonding, at least one-half of the participants decided to keep meeting on a regular basis on their own for social interaction and fellowship after the study ended.

Perhaps the predominant theme of "turning it over to God" and "having faith that God could deliver me from tobacco" also boosted both the self-efficacy and social support among individual and group members. The individual and collective spiritual ambience of the group was observed initially and was sustained during the study period. For example, during an initial group session, the entire group of participants and the CHWs "laid their hands" and prayed over another 50 year-old woman who had smoked since the age of nine. This group prayer provided individual and collective reassurance and comfort. In subsequent sessions, the participants asked to pray at the end of each session, as they wanted to "turn this over to God" and asked God to "take the taste away." The voluntary prayer took place in a closed circle with women holding hands together and delivering a prayer aloud. These findings were consistent among low-income African Americans, as spirituality tends to be deeply rooted in relationships and the community.[53] Elderly African Americans link spirituality and God to providing comfort during stress and see God and the community of worshipers as a comfort system.[53]

The CHWs were effective in bridging the cultural gap and often served as translators between the participants and nurse researcher. The CHWs were instrumental in initially recruiting participants to enroll and then assisting with retention throughout the study period. The CHWs were able to help the researcher understand the world-view of the women and the intrapersonal, interpersonal, community, cultural and policy factors that affected their health.[31,54-55] With process evaluation measures, the CHWs social support provision were highly valued by the women in the study and viewed as contributing to their success with

cessation. The women stated they looked forward to the weekly contacts outside the group meetings with the CHWs and benefited from the personal contact and support. Prior studies have shown that CHWs were instrumental in providing varying types of social support with African American women in health promotion interventions.[29,55-56] Both the researcher and participants viewed the CHWs as key empowerment models for the women to adapt and maintain healthier lifestyles and to abstain from smoking. The CAB, with a key understanding of the processes of the community itself, was also instrumental in recruiting CHWs and participants, and in facilitating the implementation of the study, and is supported by previous findings with African American women.[29,31,55]

Because of the limited sample size, one group, and short-tem outcome data, a larger sample size with comparison group and a minimum of one year of outcome measurements are needed to effectively evaluate the effectiveness of this pilot intervention. The use of cash incentives for the participants may have impacted the recruitment and retention rates in this study. The intervention may need to occur over a longer period of time to sustain the initial outcomes, with further dosage and intensity of the intervention explored in future studies. Spirituality may serve as a mediating variable for smoking cessation in U.S. southern African American women and should be measured in this population.

The results of this pilot study show promise for CHWs in reaching African American women living in subsidized housing developments for smoking cessation interventions. CHWs may also be effective in promoting social support and self-efficacy with the cessation process in women who share similar cultural experiences and worldviews. Experimental studies are needed to evaluate different uses and levels of activities of community health workers with smoking cessation and other lifestyle behavioral problems with low socioeconomic African American women. Further research is needed to evaluate the recruitment, retention, and delivery of effective health promotion interventions for residents of subsidized housing communities. Finally, both process and outcome evaluation measures are needed to effectively evaluate community partnership models with hard-to-reach populations.

References

1. U.S. Department of Health and Human Services. (2000). *Reducing tobacco use: A report of the Surgeon General*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. Atlanta, Georgia: Author.
2. Ahluwalia, J., Resnicow, K., & Clark, W. (1998). Knowledge about smoking, reasons for smoking, and reasons for wishing to quit in inner city African Americans. *Ethnicity and Disease, 8*, 385-393.
3. Manfredi, C., Lacey, L., Warnecke, R., & Buis, M. (1992). Smoking-related behavior, beliefs, and social environment of young Black women in subsidized public housing in Chicago. *American Journal of Public Health, 82*, 267–272.
4. Grady, G., Ahluwalia, J., & Pederson, L. (1998). Smoking initiation and cessation in African Americans attending an inner-city walk-in clinic. *American Journal of Preventive Medicine, 14*, 130-137.
5. Andrews, J. (2004). Sister to Sister: A community partnered tobacco cessation intervention in subsidized housing developments. Unpublished doctoral dissertation, University of South Carolina, Columbia, South Carolina.
6. Perez-Stable, E., Herrera, B., Jacob, P., & Benowitz, N. (1998). Nicotine metabolism and intake in Black and White smokers. *Journal of the American Medical Association, 280*(2), 152–156.
7. Ahijevych, K., & Gillespie, J. (1997). Nicotine dependence and smoking topography among black and white women. *Research in Nursing and Health, 20*, 505–514.
8. Ahijevych, K., & Wewers, M.E. (1994). Patterns of cigarette consumption and cotinine levels among African American women smokers. *American Journal of Respiratory and Critical Care Medicine, 150*, 1229–1233.
9. Ahijevych, K., & Wewers, M.E. (1993). Factors associated with nicotine dependence among African American women cigarette smokers. *Research in Nursing & Health, 16*, 283-292.
10. Castro, F. (2004). Physiological, psychological, social, and cultural influences on the use of menthol cigarettes among Blacks and Hispanics. *Nicotine & Tobacco Research, 6*, Suppl 1, S29-41.
11. U.S. Department of Health and Human Services. (1998). *Tobacco use among U.S. racial/ethnic minority groups. A report of the Surgeon General.* Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. Atlanta, Georgia: Author.
12. American Cancer Society. (2004). *Cancer prevention and early detection facts and figures 2004.* Atlanta, GA: Author.
13. Manfredi, C., Lacey, L., Warnecke, R., & Balch, G. (1997). Method effects in survey and focus group findings: Understanding smoking cessation in low socioeconomic African American women. *Health Education and Behavior, 24*(6), 786-800.
14. Pohl, J., & Caplan, D. (1998). Smoking cessation: Using group intervention methods to treat low-income women. *Nurse Practitioner, 23*(12), 13–37.
15. Gritz, E., Nielson, I., & Brooks, L. (1996). Smoking cessation and gender: The influence of physiological, psychological, and behavioral factors. *Journal of the American Women's Association 51*(1), 35–42.

16. Baldwin, D. (1996). A model for describing low-income African American women's participation in breast and cervical cancer early detection screening. *Advances in Nursing Science, 19*(2), 27-42.
17. DiClemente, C.C., Prochaska, J.O., Fairhurst, S.K., & Velicer,W,F. (1991). The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *Journal of Consulting and Clinical Psychology*, 59, 295-304.
18. Hahn, L., Folsom, A., Sprafka, & Norsted, W. (1990). Cigarette smoking and cessation behaviors among urban blacks and whites. *Public Health Report, 105*, 290–295.
19. Brandon, T.H., Tiffany, S.T., Obremski, K.M.,& Baker, T,B. (1990). Post-cessation cigarette use: The process of relapse. *Addictive Behaviors, 15*, 105–114.
20. Pohl, J. (2000). Smoking cessation and low-income women: Theory, research, and interventions. *Nurse Practitioner Forum, 11*, 101-108.
21. Fiore, M., Bailey, W., Cohen, S., Dorfman, S., Goldstein, M., Gritz, E., et al. (2000). *Clinical Practice Guideline: Treating Tobacco Use and Dependence.* AHRQ Publication No. 00-0032. Rockville, MD: U.S. Department of Health and Human Services.
22. Fiore, M., Bailey, W., Cohen, S., Dorfman, S., Goldstein, M., Gritz, E., et al. (1996). *Smoking Cessation: Clinical Practice Guideline No. 1.* AHCPR Publication No. 96-0692. Rockville, Maryland: *U.S.* Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research.
23. Fiore, M., Novotny, T., Pierce, J., Giovini, G., Hatziandreu, E., Newcomb, P., et al (1990). Methods used to quit smoking in the United States. *Journal of the American Medical Association, 263*(20), 2660–2765.
24. National Cancer Institute. (1998). *Tobacco Research Implementation Plan: Priorities for Tobacco Research Beyond the Year 2000.* Bethesda, MD: Tobacco Research Implementation Group, National Cancer Institute, National Institutes of Health.
25. Prochaska, J., & DiClemente, C. (1983). Stages of process of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, *51*, 390–395.
26. Voorhees, C., Stillman, F., Swank, R., Heagerty, P., Levine, D., & Becker, D. (1996). Heart, body, and soul: Impact of church-based smoking cessation on readiness to quit. *Preventive Medicine, 25,* 277-285.
27. Flaskerud, J., Lesser, J., Dixon, E., Anderson, N., Conde, F., Kim, S. et al. (2002). Health disparities among vulnerable populations. *Nursing Research, 51*(2), 74–85.
28. Hunkeler, E., F., Davis, E., M., McNeil, B., Powell, J., W., & Polen, M.R. (1990). Richmond quits smoking: A minority community fights for health. In N. Bracht (Ed.), *Health Promotion at the Community Level* (pp. 278-303). Newbury Park, CA: Sage.
29. Andrews, J.O., Felton, G., Wewers, M.E., & Heath, J. (2004). The use of community health workers in research with ethnic minority women. *Journal of Nursing Scholarship*, *36*(4), 358-365.
30. Swider , S. (2002). Outcome effectiveness of community health workers: An integrative literature review. *Public Health Nursing, 19*(1), 11-20.
31. Hill, M., Bone, L., Butz, A. (1996). Enhancing the role of community-health workers in research. *The Journal of Nursing Scholarship, 28*(3), 221-226.

32. Powell, I., Gelfland, D., Parzuchowski, J., Heilbrun, L., & Franklin, A. (1995). A successful recruitment process of African American men for early detection of prostate cancer. *Cancer*, *75,* 1880–1884.
33. Weinrich, S., Boyd, M., Weinrich, M., Greene, F., Reynolds, W., & Metlin, C. (1998). Increasing prostate cancer screening in African American men with peer educator and client navigator interventions. *Journal of Cancer Education, 13*, 213-219.
34. Davis, D., Burstamante, A., Brown, C., Wolde-Tsadik, G., Savage, E., Cheng, X., & Howland, L. (1996). The urban church and cancer control: A source of social influence in minority communities. *Public Health Reports, 109*(4), 500–506.
35. Earp, J., Eng, E., O'Malley, M., Altpeter, M., Rasucher, G., Manyen, L., et al. (2002). Increasing use of mammography among older, rural African American women: Results from a community trial. *American Journal of Public Health, 92*(4), 646-654.
36. Lacey, L., Manfredi, C., & Balch, G. (1992). Social support in smoking cessation among Black women in Chicago public housing. *American Journal of Public Health, 82*, 99–103.
37. Bedfont Instruments. (2002). EC50 Smokerlyzer (Brochure). Medford, NJ: Author.
38. Society for Research on Nicotine and Tobacco [SNRT] Subcommittee. (2002). Biochemical verification of tobacco use and cessation. *Nicotine and Tobacco Research, 4*, 149-159.
39. Velicer, W.F., Fava, J.L., Prochaska, J.O., Abrams, D.B., Emmons, K.M., & Pierce, J. (1995). Distribution of smokers by stage in three representative samples. *Preventive Medicine, 24,* 401-411.
40. Morera, O., Johnson, R., Freels, S., Parsons, J., Crittenden, K., Flay, B., & Warnecke, R. (1998). The measure of stage of readiness to change: Some psychometric considerations. *Psychological Assessment, 10*, 182-186.
41. Crittenden, K., Manfredi, C., Warnecke, R., Cho, Y., & Parsons, J. (1998). Measuring readiness and motivation to quit smoking among women in public health clinics: Predictive validity. *Addictive Behaviors, 23,* 191-199.
42. Velicer, W., DiClemente, C., Rossi, J., & Prochaska, J. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors, 15*, 271-283.
43. Sherbourne, C., & Stewart, A. (1991). The MOS social support survey. *Social Science Medicine, 32*(6), 705-714.
44. Shaffer, J. P. (1995). Multiple hypothesis testing. *Annual Review of Psychology, 46*, 561-584.
45. Cohen, J., Cohen, P.,West, S. G.,&Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.
46. Bowker, A.H. (1948). Bowker's test for symmetry. *Journal of the American Statistical Association*, *43*, 572-574.
47. O'Loughlin, J., Paradise, G., Renaud, L., Meshefedjian, G., & Barnett, T. (1997). The "Yes I Quit" smoking cessation course: Does it help women in a low-income community quit? *Journal of Community Health, 22*(6), 451– 468.
48. Segan, S., Borland, R., & Greenwood, K. (2004). What is the right thing at the right time? Interactions between stages and processes of change among smokers who make a quit attempt. *Health Psychology, 23*(1), 86-93.

49. Schorling, J., Roach, J., Siegel, M. Baturka, N., Hunt, D., Guterbock, T., & Stewart, H. (1997). A trial of church-based smoking cessation interventions for rural African Americans. *Preventive Medicine, 26*(1), 92-101.
50. Gritz, E., Thompson, B., Emmons K., Ockene J., McLerran, D., & Nielson I. (1998). Gender differences among smokers and quitters in the working well trial. *Preventive Medicine, 27*, 553 – 561.
51. McBride, C.M., Curry, S.J., Grothaus, L.C., Nelson, J.C., Lando, H., & Pirie PL. (1998). Partner smoking status and pregnant smoker's perceptions of support for and likelihood of smoking cessation. *Health Psychology,17*(1), 63-69.
52. Banks-Wallace, J. (2000). Womanist ways of knowing: Theoretical considerations for research with African American women. *Advances in Nursing Science, 22*(3), 33-45.
53. Musgrave, C., Allen, C., & Allen, G. (2002). Spirituality and health for women of color. *American Journal of Public Health, 92*(4), 557-560.
54. Love, M., Gardner, K., & Legion, V. (1997). Community health workers: Who they are and what they do. *Health Education and Behavior, 2*(4), 510-522.
55. Eng, E. (1992). Lay health advisors as community change agents. *Family Community Health, 15* (1), 24-40.
56. Flax, V., & Earp, J. (1999). Counseled women's perspectives on their interactions with lay health advisors: a feasibility study. *Health Education Research, 14*(1), 15-24.

Acknowledgement

This study was funded by the American Cancer Society and supported by the Principal Investigator's NIH pre-doctoral fellowship, 1F31-RR08065