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Physical Activity Counseling for Older Women

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Physical inactivity is a major factor in increasing women's risk for chronic disease, disability, and premature mortality. This study compared the effectiveness of five behavioral counseling (BC) sessions with a comparison group receiving one BC session based on the five A's (ask, advise, assist, arrange, and agree) to increase moderate-intensity physical activity, muscle strengthening, and stretching activity. The health promotion model provided the framework for the intervention. A pretest/posttest comparison group design was used, with random assignment of 46 women recruited from an urban midwestern community. A significant group interaction was found only for cardiorespiratory fitness ($p < .001$). Significant time effects were found ($p < .001$) for both groups in increasing handgrip, leg strength, and flexibility. BC is a promising intervention to achieve physical activity behavior change with older women.

Keywords: *activity; behavioral counseling; older women; strength; flexibility*

Leading an active lifestyle is a critical determinant of overall health, yet women engage in less vigorous exercise and leisure-time physical activity than men, and their level of activity decreases further as they age (Barnes & Schoenborn, 2003). These outcomes have a tremendous impact on society because of the increasing numbers of older women in the United

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States. Only 14% to 16% of women between the ages of 45 and 74 years engage in moderate-intensity physical activity for 30 minutes a day on 5 or more days of the week, 11% to 16% conduct strengthening exercises, and 22% to 27% conduct stretching exercises 2 or more days of the week (U.S. Department of Health and Human Services [USDHHS], 2000). These low levels of activity lead to loss of muscular strength and flexibility, as well as overweight and obesity, and result in disability and premature mortality from coronary heart disease, non-insulin-dependent diabetes mellitus, cancer, and osteoporosis (USDHHS, 2000).

Healthy People 2010 advises all Americans to engage in a minimum of 30 minutes of moderately intense physical activity on all or most days of the week, conduct muscle-strengthening activity at least twice a week, and improve joint flexibility through stretching activities (USDHHS, 2000). Achievement of these physical activity goals is difficult for many, and research is needed to identify intervention strategies most effective at increasing physical activity levels in older women. Behavioral counseling (BC) by health care providers is an intervention strategy recommended by the U.S. Preventive Services Task Force (USPSTF) (2002) for health behavior change. Whitlock, Orleans, Pender, and Allan (2002) suggested using the five A's (ask, advise, assist, arrange, and agree) as a unifying construct for behavioral counseling.

Behavioral Counseling for Physical Activity

Behavior counseling can involve a range of strategies to assist changes in health-related behaviors. The required frequency, intensity, and duration for effective behavior change to occur as the result of the BC is not known. Previous studies involving health care providers have found that incorporating 2 to 5 minutes of BC in a primary care visit with handouts and telephone or postcard follow-up produced significant increases in minutes of physical activity per week within 4 to 6 weeks (Calfas et al., 1996; Lewis & Lynch, 1993) and 6 months of initiating an exercise program (Bull, Jamrozik, & Dphil, 1998). Others have found no significant change in physical activity within similar time periods (Goldstein et al., 1999; Norris, Grothaus, Buchner, & Pratt, 2000).

The study described here used a theoretically based BC intervention framed within the health promotion model (HPM; Pender, Murdaugh, & Parsons, 2002), with Bandura's (1986) social cognitive theory as an underlying foundation. The HPM behavior-specific determinants of perceived

self-efficacy, perceived barriers to action, perceived benefits, and interpersonal influences, described as the critical core for behavior-change intervention research, were integral components of the BC intervention.

The BC was organized using the five A's to provide structure and consistency in content and format. The five A's were derived from the successful use of the four A's developed by the National Cancer Institute for physicians to assist patients in smoking cessation (Whitlock et al., 2002). In a recent Cochrane review of nursing interventions for smoking cessation, brief interventions were found to be less effective, whereas longer interventions with multiple contacts by nurses as part of their job role was advised (Rice & Stead, 2005). The five A's have had limited use within intervention studies for health behavior change beyond smoking cessation. Ockene et al. (1995) incorporated the five A's into a physician education program for lipid intervention strategies, and Goldstein et al. (1999) used the five A's in a single-session BC intervention for physical activity and found no significant changes in adoption of physical activity. The use of the BC intervention incorporating the five A's to increase minutes in moderate-intensity activity, muscle strengthening, and stretching activity might be as effective as it has been for smoking cessation to assist older women in meeting the Healthy People 2010 goals.

Moderate-Intensity Activity

Health benefits of moderate-intensity physical activity have been found to be similar to those associated with vigorous-intensity physical activity over time (King, Haskell, Taylor, Kraemer, & DeBusk, 1991; Perry et al., 2002). Increases in moderate-intensity physical activity occur with intervention strategies that incorporate activity into women's daily routines (Dunn et al., 1999; Kriska et al., 1986; Pereira et al., 1998; Perry et al., 2002) and use cognitive-behavioral strategies, such as mail, telephone contact, or face-to-face counseling (Chen et al., 1998; Cox, Burke, Gorely, Beilin, & Puddey, 2003; King et al., 1991; King, Taylor, Haskell, & DeBusk, 1988). Meta-analyses of interventions to increase physical activity among adults in general (Dishman & Buckworth, 1996) and older adults in particular (Conn, Valentine, & Cooper, 2002) have found some consistent and some contradictory characteristics of effectiveness. Characteristics of successful interventions with adults in general were targeting generally healthy populations and combined age groups, using mediated, rather than face-to-face delivery, and home-based unsupervised settings. In contrast, characteristics of successful interventions with older adults were targeting patient populations, using more

intense face-to-face contacts between interventionists and participants, and having center-based supervised settings. Both meta-analyses found that other characteristics of successful interventions included employing principles of behavior modification (particularly self-monitoring for older adults) and targeting groups rather than individuals. Both analyses suggested that further evaluation of these components of activity interventions is needed.

Strengthening and Stretching Activity

Incorporating muscle-strengthening activity provides women with an alternate form of physical activity that results in improved performance and increased joint flexibility, and it allows activities of daily living to be conducted with minimal difficulty (Barbosa, Santarem, Filho, & Marucci, 2002). Community-based intervention studies involving education and training with older adults found increased adherence for strengthening activity (King et al., 2000) and significant increases in strength in the quadriceps muscle, pectorals, handgrip, and altissimo dorsa (Damush & Damush, 1999; Heislein, Harris, & Jette, 1994). Few studies report effective stretching interventions to increase flexibility in women. King et al. (2000) conducted a stretching-activity intervention with older adults based in both home and class settings and found significant increases in flexibility during 12 months. DiBrezzo, Shadden, Raybon, and Powers (2005) found significant increases in upper- and lower-body strength and upper-body flexibility following a 10-week exercise class that included stretching and strengthening exercises.

Purpose

The purpose of this study was to compare the effectiveness of five versus one BC session to (a) facilitate change in moderate- or greater-intensity physical activity, muscle strengthening, and stretching; and (b) determine the percentage of women who reach the Healthy People 2010 goal of 30 minutes of moderate-intensity physical activity 5 or more days of the week among sedentary women 50 to 65 years of age in a 12-week time period.

Design

The study employed an experimental pretest/posttest comparison group design with random assignment of women to BC intervention groups, with

the intervention group receiving five BC sessions and the comparison group receiving one BC session during 12 weeks.

Sample

The inclusion criteria were (a) age of 50 to 65 years, (b) English fluency, (c) readiness for physical activity as shown by answers of "no" to all questions on the Physical Activity Readiness Questionnaire (PAR-Q; American College of Sports Medicine [ACSM], 2000) or by written clearance from a physician to become more active, and (d) ability to come to the testing site. The exclusion criteria were (a) functional inability to walk without a walker and/or crutches and (b) being in the action or maintenance stage for physical activity as measured by the stage of exercise behavior questionnaire (Marcus, Rossi, Selby, Niaura, & Abrams, 1992; Marcus, Selby, Niaura, & Rossi, 1992).

The sample size for the study was calculated on the basis of a power analysis using data from a smaller preliminary study for total number of minutes of moderate- or greater-intensity physical activity ($\eta^2 = .225$, alpha = .05, and power of .80). A minimum sample size of 19 women per group was needed for repeated measures analysis of variance (RM-ANOVA) with two time points. Allowing for a 25% attrition rate yielded a sample size of $N = 50$ (25 per group).

Women were recruited through an advertisement on the university's Intranet site, distribution of flyers throughout the community, and word-of-mouth. Women contacted the principal investigator (PI) by phone or e-mail to express interest in the study. Each potential participant was provided information on the study and completed a preliminary screening to establish eligibility.

The initial sample included 51 women; 5 (9.8%) withdrew following baseline data collection and 46 (21 in the intervention group and 25 in the comparison group) completed the study. Reasons for withdrawal included personal injury from a car accident ($n = 1$), no time ($n = 3$), and failure to keep subsequent appointments ($n = 2$).

The mean age of the intervention (five-session) group was 54.0 ($SD = 4.01$) and the comparison (one-session) group was 55.0 ($SD = 3.87$). The majority of the sample was Caucasian (98%), married (65%), employed full-time (80%), with a graduate degree (52%). No significant differences were found between groups for age, body mass index (BMI), blood pressure, resting heart rate, or perceived exertion levels. The majority of the

women in both groups were overweight (BMI 25.0-29.99) or obese (BMI ≥ 30.0). The intervention group had 38.1% overweight and 40% obese; the comparison group had 33.3% both in the overweight and obese category.

Method

The university's Institutional Review Board approved the study. Appointments were made for eligible participants to meet one-on-one with the PI. Women in the intervention group received five 30-minute individual BC sessions at Weeks 1, 3, 5, 7, and 9, and women in the comparison group received one 30-minute individual BC session at Week 1. The approximate time required by women was 2 hours at Week 1 for data collection and a counseling session, 30 minutes at Weeks 3, 5, 7, and 9 and 1.5 hours at Week 12 for data collection only. The PI, an advanced practice nurse, conducted all BC sessions.

Intervention

The baseline procedures for women in both groups included information on benefits, safety, and Healthy People 2010 goals for physical activity. Each woman self-selected a physical activity within the setting of her choice, identified barriers, and stated a goal to achieve for physical activity. Additional instruction was given to conduct stretching activity after each episode of moderate-intensity physical activity and conduct strengthening activity twice a week. Activity logs were provided for the women to record their physical activity, stretching activity, and strengthening activity.

Women in the intervention group were instructed to return for 30-minute BC sessions at Weeks 3, 5, 7, and 9. Return appointments were made at the time of each visit. Each BC session included a review of minutes spent in activity per week, personal benefits gained with the activity, progress at overcoming barriers, progress at achieving set goals, and identification of new goals. The intervention group at Session 2 received resistive bands and a videotape prepared for older women's instruction on use of resistive bands (available from the University of Nebraska Medical Center, 2002).

The comparison group was instructed to return with their completed activity logs at Week 12 following the baseline BC session. Women were contacted 1 to 2 weeks before the scheduled visit to confirm the date and time for their appointment. Women in the comparison group received the resistive bands and videotape after completing the posttests at the final visit.

The BC intervention was structured in terminology, frequency, intensity, and duration using the five A's (assess/ask, advise, agree, assist, and arrange) as recommended by The Counseling and Behavioral Intervention Work Group of the USPSTF on physical activity BC (Whitlock et al., 2002). *Assessment* for both groups at baseline included an assessment of the current level of activity, physical activity readiness (PAR-Q), and barriers. Subsequent sessions with the intervention group reassessed minutes of activity, ability to overcome barriers, and accomplishment of goals. *Advise* for both groups at baseline discussed the benefits of physical activity, the Healthy People 2010 goal, overcoming barriers, and the importance of interpersonal support. Women were advised to engage in moderate-intensity physical activity, gradually increasing minutes of activity to 30 minutes at least 5 days a week, 10 to 15 minutes of strengthening activity twice a week, and completing stretching activity after each episode of activity. This advice was reinforced at subsequent visits with the intervention group. *Agree* for both groups at baseline required women to self-select a type of physical activity and a muscle-strengthening activity including specifics on frequency, intensity, and duration. Follow-up visits with the intervention group required women to reset their activity frequency, intensity, and duration. *Assist* at each session for both groups involved using face-to-face self-efficacy enhancement strategies including (a) self-awareness of performance mastery with weekly progress; (b) verbal encouragement with success at overcoming barriers, reaching goals, and making weekly progress; (c) vicarious experience or role modeling by engaging family or friends' support in physical activity and providing a muscle-strengthening videotape with women (the videotape was given at the second visit for women in the intervention group and the final visit for women in the comparison group); and (d) awareness of physiological state gained with self-rating of perceived exertion levels using the Borg Scale. *Arrange* involved setting the follow-up visit with the PI every 2 weeks for the intervention group and at 12 weeks for the comparison group.

Measurement of Variables

Moderate- or greater-intensity physical activity. The behavioral marker for moderate- or greater-intensity physical activity was total minutes of self-reported activities with MET ≥ 4.0 within the previous 7 days measured by the Modified 7-Day Activity Recall. The instrument has sensitivity, construct, and concurrent validity (Hellman, Williams, & Thalken, 1996, 1997).

The biomarker for moderate- or greater-intensity physical activity was estimated VO^2_{max} measured by the Rockport Fitness Walking Test (RFWT; Fenstermaker, Plowman, & Looney, 1992). The Rockport Walking Institute and the ACSM (2000) recommend RFWT as a safe submaximal aerobic field test. The test requires completion of brisk walking for a 1-mile distance while being timed. An estimate of VO^2_{max} is calculated using an equation including gender, weight, age, track walk time in minutes, and a 15-second recovery heart rate. The level of VO^2_{max} increases as levels of cardiorespiratory fitness improve. The test has test-retest reliability in women aged 50 to 69 (Fenstermaker et al., 1992; Hageman, Walker, Pullen, & Pellerito, 2001) and validity (Fenstermaker et al., 1992).

Muscle-strengthening activity. Biomarkers for muscle-strengthening activity were upper- and lower-body strength. Upper-body strength was indicated by grip strength measured by the hand dynamometer to measure maximal grip effort in kilograms per force (McArdle, Katch, & Katch, 1996). Participants stood, with arms flexed at a 90-degree angle, and gripped the device with maximal effort. Three measures were taken at each assessment, and the best measure was used for the data analysis. The handgrip-strength test has test-retest reliability and predictive validity for upper-extremity strength (Anstey, Smith, & Lord, 1997; Bohannon, 1998). Lower-body muscle strength was assessed using a timed sit-to-stand test that measured the time required to perform a given number of repetitions. Women were seated in a straight-back chair with arms comfortable at their sides. They were asked to complete 10 full stands from the sitting position as quickly as possible while being timed (ACSM, 2000). The timed sit-to-stand test has demonstrated test-retest reliability, criterion-related validity, and discriminate validity (Jones, Rikli, & Beam, 1999).

Stretching activity. The biomarker for stretching activity was flexibility, involving women's hip joints, small muscles within the lower back, and the larger hamstring muscles. Flexibility was measured in centimeters by the sit-and-reach test (ACSM, 2000). Women completed the flexibility assessment after walking 1 mile to allow for adequate warming of the involved muscles. Participants sat on the floor, knees extended, with heels against the testing box. They placed one hand over the other, with the middle fingers even, and reached forward as far as they could by sliding their hands against a measuring device on top of the box. The best of three attempts was used for data analysis. The sit-and-reach test has high test-retest reliability and criterion-related validity for hamstring flexibility in women (Baltaci, Un, Tunay, Besler, & Gerceker, 2003; Liemohn, Sharpe, & Wasserman, 1994).

Behavioral markers of strengthening and stretching activity were intended to be women's self-reports on activity logs that were returned to the PI at each counseling session. Inconsistency in return of the activity logs and lack of documentation on the activity logs yielded insufficient data for analysis.

Analysis of Data

Behavioral markers and biomarkers were measured in both groups at baseline and at 12 weeks. RM-ANOVA was used to assess and determine differences in the effectiveness of the interventions as reflected in change in the behavioral and biomarkers for physical activity outcomes from baseline to 12 weeks. Results from the RM-ANOVA were examined to identify significant interaction (Time × Group) and main (time) effects and post hoc tests. The statistical analysis used to analyze the ordinal level of measurement in determining the proportion of women who met the Healthy People 2010 goal was a nonparametric statistic, Ridit Analysis (Fleiss, 1981). This statistical technique was used to analyze differences with the proportion of total minutes of activity for both groups of women taking into account the natural rank order and identifying the proportion of discrete categories falling at or below the midpoint of each interval.

Findings

Independent *t* tests were used to compare the groups on all study outcome variables at baseline. No significant differences were found between the groups. RM-ANOVA results are summarized in Table 1. Changes in means from baseline to 12 weeks are shown in Table 2.

Moderate- or Greater-Intensity Physical Activity

The Time × Group interactions were significant only for cardiorespiratory fitness ($VO^2_{max\ est.}$, $p = .008$, large $\eta^2 = .15$). The post hoc comparisons within groups revealed the $VO^2_{max\ est.}$ increased significantly from baseline to 12 weeks in the five BC group ($p < .001$) and did not change in the one BC group ($p = .380$).

The Time × Group interactions were not significant for total minutes spent in moderate or greater-intensity activity ($p = .536$), but a significant time effect was found ($p = .025$, medium $\eta^2 = .11$), with only the one BC

Table 1
2 × 2 Repeated Measures Analysis of Variance *F* Ratios for Outcome Variables

		T × G	Time	Effect Size[a]	
Outcome Variable	*df*	*F* (*p*)	*F* (*p*)	T × G	*T*
Mins. of moderate- or greater-intensity activity	1, 44	.39 (.536)	5.42 (.025)	0.01	0.11
$VO^2_{max\ est}$	1, 44	7.81 (.008)	15.95 (< .001)	0.15	0.27
Right-hand grip (kg)	1, 44	0.74 (.394)	4.03 (.051)	0.02	0.08
Left-hand grip (kg)	1, 44	0.16 (.688)	18.86 (< .001)	0.00	0.30
Leg strength (sec)	1, 44	0.98 (.328)	37.52 (< .001)	0.02	0.46
Flexibility (cm)	1, 44	0.85 (.361)	13.74 (<.001)	0.02	0.24

Note: T × G = Time × Group.
a. Partial eta square with a small effect size of .01, medium effect size of .06; and large effect size of .14.

group significantly increasing total minutes of activity ($p = .034$) from baseline to 12 weeks. Both groups reported a wide range of minutes of moderate- or greater-intensity activity at baseline (intervention group 0-780 minutes; comparison group 0-630 minutes) and at 12 weeks (intervention group 0-540 minutes; comparison group 0-840 minutes).

Muscle Strength

The Time × Group interactions were not significant for right-hand grip ($p = .394$), and no significant time effects were found, although a trend toward significance was noted ($p = .051$). The Time × Group interactions were not significant for left-hand grip ($p = .688$), but a significant time effect was found ($p < .001$, large $\eta^2 = .30$), with both groups improving strength from baseline to 12 weeks. Similarly, Time × Group were not significant for leg strength ($p = .328$), but significant time effects were found ($p = .000$, large $\eta^2 = .46$), with both groups improving leg strength from baseline to 12 weeks.

Flexibility

The Time × Group interactions were not significant for flexibility ($p = .361$). Significant time effects were found ($p = .001$, large $\eta^2 = .23$), with both groups increasing from baseline to 12 weeks.

Table 2
Means and *SD* of Outcome Variables at Baseline and 12 Weeks

Outcome Variable	Group	Baseline	12 Weeks		
		M (*SD*)	*M* (*SD*)	% Change[a]	*p*
Mins. of moderate- or greater-intensity activity	Intervention	121.43 (225.20)	182.62 (161.75)	50.4%	.254
	Comparison	92.40 (154.51)	198.40 (235.94)	114.0%	.034
$VO^2_{max\ est}$	Intervention	24.03 (6.82)	26.88 (5.97)	11.8%	<.001
	Comparison	23.33 (8.32)	23.83 (8.91)	2.1%	.380
Right-hand grip (kg)	Intervention	30.95 (4.73)	31.95 (4.58)	3.2%	.058
	Comparison	29.80 (4.36)	30.20 (4.73)	1.3%	.400
Left-hand grip (kg)	Intervention	31.14 (3.99)	32.23 (4.31)	3.5%	.011
	Comparison	29.24 (4.57)	30.56 (4.01)	4.5%	.001
Leg strength (sec)	Intervention	21.48 (6.69)	17.93 (4.64)	16.5%	<.001
	Comparison	20.69 (6.54)	18.12 (5.13)	12.4%	<.001
Flexibility (cm)	Intervention	21.80 (8.02)	24.57 (7.22)	2.7%	.003
	Comparison	24.06 (7.38)	25.72 (7.80)	6.9%	.045

a. Change was upward for all variables but leg strength.

Proportion of Women Meeting Healthy People 2010 Guideline

The total minutes per week of moderate or greater intensity of physical activity (MET ≥ 4.0) self-reported by women was used to determine whether they met the Healthy People 2010 guideline for physical activity. The percentage of women who reached the recommended Healthy People 2010 guidelines of 150 minutes or more (at least 30 minutes on 5 days a week) at 12 weeks were 47.8% in the intervention group and 40.0% in the comparison group, both of which exceeded the Healthy People 2010 goal of 30.0%. There was no significant difference in the proportions of women in the categories of fewer than 150 minutes (30 minutes on fewer than 5 days), 150 to 210 minutes (30 minutes on 5 to 7 days), or greater than 210 minutes (30 minutes or more on 7 days) of moderate-intensity physical activity ($z = .0615$, $p > .05$).

Discussion

This study expands the body of knowledge and provides empirical support for BC using the five A's. Offering a BC intervention using behavior-specific determinants of perceived self-efficacy, perceived barriers to action, perceived benefits, and interpersonal influences for behavior change within a community setting provided an opportunity for older women to increase moderate- or greater-intensity physical activity, muscle strengthening, and stretching activity without visiting a primary care provider's office. The behavioral counseling intervention structured with the five A's within a community setting provided consistency throughout all BC sessions and allowed the PI to provide an established frequency (five BC sessions versus one BC session in 12 weeks), intensity (face-to-face interaction), and duration (30 minutes of BC).

During the 12-week study period, significant increases in time spent in moderate- or greater-intensity physical activity were found among women who received one BC session but not among those who received five sessions. Other studies have found self-reported increases in total minutes of activity for women and men after a single 2- to 5-minute BC session (Calfas et al., 1996; Goldstein et al., 1999; Norris et al., 2000; Peterson, Yates, Atwood, & Hertzog, 2005). Comparisons of these studies are difficult because of differing age groups, self-report instruments, behavioral counseling methodologies, and intervention time lengths.

In this study, women who received five BC sessions in a 12-week time period increased their cardiorespiratory fitness levels significantly ($p < .001$;

11.8% from baseline) despite the fact that the 50.4% increase in self-reported minutes of activity on the 7-Day Activity Recall was not large enough to be statistically significant. Other studies with larger sample sizes using the 7-Day Activity Recall have found increases in minutes of moderate-intensity physical activity as well as in cardiorespiratory fitness (Asikainen et al., 2002; Dunn et al. 1998, 1999). In contrast, women who received one BC session had a significant increase in minutes of moderate- or greater-intensity activity without a significant increase in their cardiorespiratory fitness. These women may have overestimated their minutes and/or intensity of activity on the 7-Day Activity Recall. They did not have the opportunity to review their activity with the researcher every 2 weeks, as did women who received five BC sessions, and this may have led to decreased attention, awareness, and a tendency to overreport their time engaged in moderate- or greater-intensity activity.

Another possible reason for these findings relevant to both groups may be the administration technique used. The 7-Day Activity Recall originally was designed to be administered using an interview technique (Blair et al., 1985). In this study a noninterview technique was used, with women completing the instrument while sitting next to the PI, who was available for questions. The women in the study did not seem to have difficulty completing the tool, questions were addressed, and all items were completed. Dishman and Buckworth (1996) found that larger effect sizes were reported in studies that used objective measures of outcomes, such as cardiorespiratory fitness, a biomarker of moderate or greater-intensity activity employed in the study. Based on the finding that cardiorespiratory fitness increased in the five-BC-session group and not in the one-BC-session group, it can be concluded that greater intensity of face-to-face contact between the interventionist and older women led to greater change in moderate-intensity activity. This is consistent with Conn et al.'s (2002) meta-analysis that found a significant ($p < .01$) relationship between the level of program intensity and the effect size for increase in physical activity among older adults.

Lower-body strength and flexibility increased in women in both groups. Walking was the predominant choice of physical activity in the study, with some women reporting participating in jazzercise, yoga, and swimming classes. Women were encouraged to complete stretching after each walking episode, which may explain the increased flexibility found. Women who conducted other forms of activity may have included stretching activity. Use of the resistive bands by women who received five BC sessions would have provided additional strengthening and stretching activity, yet the groups did not differ on these outcomes. Barbosa et al. (2002), in a study with women engaged in resistance training, found that flexibility significantly increased along with significant changes in strength from resistance training.

These findings cannot be generalized beyond this convenience sample of women who were well educated and primarily Caucasian. Bias may have been introduced because the PI, who was not blinded to group assignment, conducted both the assessments and intervention. The study focused on the adoption phase of physical activity within the initial 12 weeks, which may not have been long enough for many of the women to make behavioral changes in their physical activity.

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