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Abstract

Little progress has been made toward increasing physical activity (PA) in women. This study aimed to determine if an 8-month theory-based book club intervention (*Women Bound to Be Active*) was effective in increasing: (a) self-worth, (b) benefits relative to barriers to PA, and (c) PA in women (n=51). Findings suggested a book-club was effective for improving: self-worth, the benefits relative to barriers to PA, and possibly participation in PA. This is an innovative model to help women become more active and learn skills that may enable them to be active on their own long after a PA program has ended.

Introduction

Meeting the recommendations for physical activity (PA) (i.e., participation in 30 minutes of PA on most if not all days of the week) is a daunting task for most women (Center for Disease Control [CDC], 2008; Eyler & Vest, 2002). Little progress has been made toward increasing PA participation in women over the past 10 years. The number of women who are completely inactive has hovered around 15% since 2001 (CDC, 2007). A significant amount of evidence suggests that women are less likely to be active compared to men and that activity decreases with age (Caspersen, Pereira, & Curran, 2000). Eyler and Vest (2002) reported that women enjoy sedentary pursuits (e.g., reading, television) because these activities are seen as “more relaxing”.

Health promotion professionals continue to conduct research aimed at designing, implementing, and evaluating interventions for women that may help them increase their PA participation and adherence. Some suggest that women are more likely to increase activity when interventions emphasize overcoming barriers and promote perceived benefits to PA (Juarbe, Turok, & Perez-Stable, 2002; White & Ransdell, 2003). Others believe that women who set goals, have some type of support, are able to overcome barriers, find activities they enjoy, participate in lifestyle activity, and have higher levels of self-efficacy and/or physical self-worth are more likely to start a PA program; however, adherence remains problematic (White, Ransdell, Vener, & Flohr, 2005).

Huberty, Ransdell, Sidman, Flohr, Shultz, & Grosshans et al. (2008a) studied women who participated in a 12-week PA behavior change program (UTAH-FIT) and were still active one to three years after the intervention had ended. The primary factor that promoted ongoing PA in these women was their self-worth (Huberty et al., 2008a). Women who remained active reported valuing themselves and their quality of life. They also reported prioritizing themselves over other demands, finding activities they enjoyed, and focusing on improving quality of life rather than body image as it relates to PA participation. (Huberty et al., 2008a).

Self-worth is defined as the satisfaction one has with oneself (Fox, 1997) and it has four sub-domains: academic, social, emotional, and physical. Academic self worth is a person's perception of his or her intellectual ability. Social self-worth is a person's perception about his or her interactions with others. Emotional self-worth is one's perceived ability to deal with stressors, the ups and downs of life, and various emotional challenges. Physical self-worth, also known as physical self-perception, is one's perception of his or her ability to participate in PA and the typical feelings that occur when participating in PA. Physical self-perception is further divided into components including body attractiveness, sports competence, physical strength, physical conditioning, and general physical self-worth (Fox & Corbin, 1989; Fox, 2001).

In the past, research has focused heavily on the physical domain of self-worth (i.e., physical self-perception) and its impact on PA. McAuley and colleagues (1997; 2000; 2000; 2005) have made considerable contributions to the literature related to the role of physical self-worth in increasing PA in adults and older adults. Stronger perceptions of physical self-worth are related to greater participation in PA and can foster increased self-efficacy (Elavsky & McAuley, 2005; McAuley et al., 1997; McAuley & Blissmer, 2000).

Despite evidence linking physical self-worth in women to PA participation, PA levels in women have not changed over the years. A number of studies have suggested alternative motivations, unrelated to physical aspects of participation, which may be more effective in promoting long-term PA. Strelan, Mehaffey, and Tiggerman (2003) reported that women who participated in PA for reasons related to their appearance (weight, body tone, and attractiveness) had lower levels of body satisfaction and self-esteem. Women who were active for more functional reasons (e.g., health, fitness, mood, and enjoyment) reported higher levels of body satisfaction and self-esteem. This suggests that goals related to weight loss may not be as effective for increasing PA participation as compared to goals related to health, well-being and stress reduction (Segar, Eccles, & Richardson, 2008). Huberty and colleagues (2008b) conducted pilot research that tested an innovative approach to increasing PA and self-worth in women that was based on the Transtheoretical Model and Social Cognitive Theory. Women participated in a book club (*Women Bound to Be Active* – WBA) that focused on improving all aspects of self-worth, not primarily focused on the physical dimension. Women read books (both fiction and non-fiction) and participated in weekly discussions for 8-months related to improving their self-worth, setting realistic and achievable goals, and overcoming barriers to improve their quality of life and increase their PA level. Although this was a feasibility study, the approach was useful for increasing PA and self-worth in women (Huberty, Vener, Sidman, Meendering, Blissmer, & Schulte, et al., 2008b). Because the study had no control group, empirical evidence supporting its effectiveness is lacking.

The WBA feasibility study mentioned above represented data from year two (2006-2007) of this innovative program. Data from the first year pilot (2005-2006) were not published. The current study builds on previously conducted feasibility work from year two, and reports findings from years three (2007-2008) and four (2008-2009). Years three and four of WBA were implemented with modifications from year two based on lessons learned (i.e., satisfaction surveys completed by participants and research team observations). The data from years three and four were combined due to small sample sizes. Additionally, to extend the findings of our previous pilot work (year 2), a control group was added to see if positive results were indeed due to the intervention. Therefore, the purpose of this study was to compare the effectiveness of a theory-based book club (*Women Bound to Be Active* – WBA) to a control group in increasing self-worth, perceived benefits relative to barriers of PA, and PA in adult women. It was hypothesized that compared to women in the control group, women in the intervention group would increase their self-worth, perceived benefits of PA (relative to perceived PA barriers), and participation in PA from pre- to post-intervention.

Methods

Participants – Intervention Group

Women were recruited using newspaper advertisements in local newspapers. Additionally, the local news reported on the pilot study (year one: 2006-2007). Women who contacted the research team after the report aired were asked if they would like to participate in WBA and were screened for inclusion criteria. All women who participated in WBA completed an informed consent form which was approved by the Institutional Review Board. Participants were at least 19 years of age and were either in the contemplation or preparation stages of the Transtheoretical Model (stage of change) (Marcus, Rossi, Selby, Niaura, & Abrams, 1992). Stage of change was assessed using the Physical Activity Stages of Change questionnaire (Marcus et al., 1992), which asks questions that categorize individuals in stages ranging from precontemplation (not thinking about exercise at all) to maintenance (participates in exercise regularly). Participants in this study were only included if they were categorized in stages 2 or 3

(contemplation or preparation, respectively). The Physical Activity Stages of Change questionnaire is reliable and valid in adult populations (Marcus et al., 1992). Participants were volunteers in year three (n=29, 2007-2008) or year four (n=52, 2008-2009) of WBA (information about the pilot study is published elsewhere; Huberty et al., 2008b).

The intervention was 8-months in length, beginning at the end of September or beginning of October and ending near the end of April or beginning of May for each of the cohorts. Of the 85 women who volunteered to participate in the intervention group, 81 met the inclusion criteria (four were either in stage four or five), and 51 completed the intervention (63% completion rate including baseline and post-intervention data collection (Figure 1)).

[INSERT FIGURE 1 HERE]

All eligible women were asked to complete a Physical Activity Readiness Questionnaire (PAR-Q) to determine whether they might have any underlying physical conditions that might prevent their full participation in WBA (American College of Sports Medicine [ACSM], 2006). If they answered “yes” to any of the questions, they were required to obtain a physician’s approval prior to participating in the program.

Participants – Control Group

The control group was recruited through existing social support groups (i.e., public library book clubs, card playing groups). Women were approached by the research team at their group meetings and asked to complete the same questionnaires as the intervention group at the same time (i.e., at the beginning and end of the intervention time period for both cohorts). Women who volunteered to be in the control group signed informed consent forms and were given a questionnaire packet (n=90). The packet included a letter, the study questionnaires, and a business reply envelope. The letter included a thank you for participating, provided instructions on completing questionnaires, and included contact information in case they had questions. It also reminded participants that they would be asked to complete the questionnaires again in 8-months and that they would receive a book for completing the follow-up questionnaires.

Control group participants who submitted complete baseline data and met inclusion criteria (i.e. 19 years or older, stage two or three of the Transtheoretical model; n=36) were contacted to complete study questionnaires eight months later. The subsequent questionnaires were sent via U.S. mail with a business reply envelope. Once complete post-study data were received by the research team (n=20), the book incentive was sent to the participant. Those who did not meet inclusion criteria (n=54) for the control group were sent a thank you letter for participating and were given their book incentive at that time.

Procedures

All intervention participants paid \$99.00 to participate in the study to cover the costs of discussion materials, books, and pedometers. Participants living in lower socioeconomic areas of the intervention city were able to participate at no cost (American Heart Association grant). A book club format was used to implement the intervention. The intervention focused on increasing PA, self-worth and perceived benefits of PA unrelated to weight loss. Topics of discussion included, but were not limited to: 1) getting started with PA, 2) benefits & barriers to PA, 3) improving adherence, 4) goal setting/relapse prevention, and 5) how to access social support etc. The intervention was based on tenets of the Social Cognitive Theory, as well as the Transtheoretical Model, and both fiction and non-fiction books were used.

Participants met weekly for the first half of the intervention (four months) and then twice monthly for the second half of the intervention (four months). This format was designed to help women become accustomed to making life changes on their own (including being active on their own), without frequent group support. Participants received a workbook written by the first author, which was used to drive discussion and facilitate strategies used during the intervention. For example, in one book, a character uses humor to discuss everyday life rituals (i.e., using public transportation, working at your computer) that women perform. In discussing this section of the book, women related this to their experiences (or lack thereof) associated with PA and changing health behaviors. The book club used a syllabus (requested from participants in the pilot group) to organize readings and homework (Table 1). Meetings were facilitated on different evenings during the week (depending on location) in spaces that were donated by local businesses throughout the community. Women were able to choose the location in which they wanted to participate. This provided most women with a place that was close to their residence or work and was easy to access.

[INSERT TABLE 1 HERE]

The intervention was delivered by graduate students in a Physical Activity and Health Promotion program who were trained by the first author and principal investigator. The training process is described elsewhere (Huberty et al., 2008b). Additionally, outside of the book club, the research team would have a “guest” instructor on occasional Saturdays to teach different modes of activity (e.g., samba dancing, belly dancing, and yoga). Participants were invited to come, but attendance was not mandatory. Instead, this was intended to help women find a mode of activity they enjoyed. Women were not provided a structured exercise regimen. They were not given specific goals for the number of steps to obtain on their pedometers. Participants were provided the tools and skills that they would need to be active on their own at their own pace in hopes of facilitating intrinsic and self-sustaining PA behavior. Participants were given several options for activity frequency, intensity, time, and mode, and the pros/cons and enjoyment of various formats of activity were discussed during book club sessions (Dacey, Baltzell, & Zaichkowsky, 2008; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). More details of the book club are reported elsewhere (Huberty et al., 2008b).

Instrumentation

All measurements were taken at the beginning of the intervention (week 1 or baseline) and again at the end of the intervention (week 32, 8-months, or post-intervention). The control group was assessed for all outcomes, except for an objective measure of PA due to the influence pedometers may have on motivation for PA (see objective measures for PA below) (Rooney, Smalley, Larson, & Havens, 2003; Thomas & Williams, 2006).

Demographics Questionnaire

As adapted by Howley & Franks (1992), all participants completed a demographic questionnaire to obtain age and ethnicity.

Body Mass Index (BMI) (wt/ht² or kg/m²)

Standardized procedures were used to measure weight and height (ACSM, 2006). Height was measured using a portable tape measure affixed to the wall. Weight was measured using a Seca 770 Digital Electronic Scale (Hamburg, Germany). The same facilitator (trained graduate student in PA in health promotion) collected the data before and after the intervention, and the same scale was used. Weight (kg) and height (cm) were then used to calculate body mass index (BMI, kg/m²).

Self-worth (SW)

Self-worth was assessed using the Global Self-Worth Scale of the Adult Self-Perception Profile (Messer & Harter, 1986). This scale measures one’s global perceptions of SW independent of any particular domain. A sample question asked, “Some adults are dissatisfied with themselves BUT other adults are satisfied with themselves.” Nine items are listed on the questionnaire with answers ranging from “really true for me” to “sort of true for me”. Higher scores on the questionnaire indicate higher self-worth. The internal consistency (Cronbach’s alpha) reported for this scale was .87 (Messer & Harter, 1986).

Benefits and Barriers Ratio Scale (BBRS)

The benefits and barriers to exercise were measured using the Exercise Benefits and Barriers Ratio Scale (Sechrist, Walker, & Pender, 1987). Women answered questions related to ideas about exercise. A sample question included, “Exercise improves disposition.” They indicated the degrees to which they agreed or disagreed with a statement by circling strongly agree, agree, disagree, or strongly disagree (Likert-type scale). The scale has three scores including: total benefits score, total barriers score, and total barriers subtracted from total benefits score (ratio of benefits to barriers). Typically the ratio score is used rather than the benefits or barriers score individually. A higher score on the ratio of benefits to barriers (i.e., barriers subtracted from benefits) indicates that the perceived benefits outweigh the barriers--which typically leads to increased PA. This questionnaire is a reliable and valid measure with a test-retest reliability range of 0.77 to 0.89 for total ratio score reported and internal consistency of 0.87 (Ansari & Lovell, 2009; Sechrist et al., 1987).

Objective Measure of PA

Physical activity was objectively measured using digital pedometers (Walk4Life, Inc., Plainfield, IL) in both intervention cohorts (2007-2008 & 2008-2009). Because pedometers can be a motivational tool for PA (Rooney, et al., 2003; Thomas & Williams, 2006), they were not provided to control group participants. Participants in the

intervention group were given instruction on how to wear and use the pedometers to ensure accuracy of PA measurement. They were also given checkbook-sized pedometer logs created by the first author so they could record their daily steps. Logs were collected at every meeting. A carbon copy was included with the pedometer logs so that participants could keep a copy for themselves and reflect on their steps or set future step count goals. If pedometers were not functioning properly, new ones were provided.

Subjective Measure of Physical Activity

In year three (2007-08), PA was subjectively measured using the 7-Day PA Recall Questionnaire; participants in year three were interviewed and asked to recall PA participation for the previous week in the morning, afternoon, and evening based on intensity categories of moderate, hard, and very hard. The minutes reported on the questionnaire in each category were then summed together to obtain the total number of PA minutes per week. The 7-Day Physical Activity Recall Questionnaire is reliable and valid in a number of populations and studies. Although the 7-day recall is a reliable and valid measure of PA, the instrument may have limitations when measuring the PA of women (Duncan, Sydman, Perri, Limacher, & Martin, 2001; Gross, Sallis, Budno, Roby, & Nelson, 1990; Jacobs, Ainsworth, Hartman, & Leon, 1993; Sallis, Haskell, & Wood, 1985). Specifically, women spend a significant portion of their day in household and family care activities (Eyler & Vest, 2002; White et al., 2005). The 7-day recall may not capture and include all types of activities performed by women in their daily lives, especially considering that the design of WBA was to educate women about how to meet PA guidelines through lifestyle based PA (Ainsworth, 2000).

Given the limitations of the 7 day recall, especially in terms of its ability to capture women's PA, the Modifiable Activity Questionnaire (MAQ) was used in year four (2008-2009). For the MAQ, participants reported the months in which they had been active and the mode, frequency and duration of the activities performed. The MAQ is reliable and valid in several populations and studies (Kriska, 1997; Vuillemin, Oppert, Guillemin, Essermeant, Fontvieille, et al., 2000).

To use data from two different questionnaires, minutes of time spent in activity from the raw data were calculated. The 7-day recall reported data in minutes of time in PA; therefore monthly minutes of PA time from the MAQ were converted to minutes of weekly PA. To convert monthly minutes of PA to weekly minutes, MAQ data were obtained by multiplying the number of months, the frequency per month, and the minutes per bout of exercise (i.e. (no. of mo) x (times/mo) x (min/time) = PA minutes for the year). The total was then divided by 52 to give the average minutes of PA per week (i.e. (PA min/yr) / (52 wks/yr) = PA min/wk). This equation was used for each mode of PA self-reported by each participant. The total for each mode was then summed to provide the average total amount of PA minutes per week for the participant (i.e. (170 min. walking/wk.) + (20 min. strength/wk.) = 190 PA min/wk).

After scoring both questionnaires and converting data to minutes per week of PA, women were classified in two categories: those not meeting PA recommendations (participating in less than 150 minutes of PA per week on average) and those meeting PA recommendations (participating in 150 minutes or more of PA per week).

Data Analysis

Data were analyzed using parametric and nonparametric statistical tests. To compare the intervention and control groups relative to changes in BMI, SW, and the BBRs, a repeated measures analysis of variance was used. Demographic data, such as education and income, were not collected, thus, we were not able to include such measures as covariates. Additionally, although we did collect data on race/ethnicity, the sample was not diverse enough or large enough to warrant inclusion of race/ethnicity in the data analysis. Since age is often a factor associated with participation in PA (United States Department of Health and Human Services [USDHHS], 2007) and some of the psychological determinants of PA (Cassidy et al., 2004; Stutts, 2002), age data were collected. To assess whether age was related to the dependent variables in this study and justify whether to use age as a covariate (Field, 2005; Mertler & Vannatta, 2001), analyses were run to determine if a significant relationship existed between age and the dependent variables. No significant relationships were found between age and BMI ($p=.506$), self-worth ($p=.434$), or BBRs ($p=.173$). Given the lack of a relation between age and the dependent variables, the authors determined that the repeated measures analysis of variance, without adjustment for age, was the most appropriate analysis.

To assess changes in the objective measure of PA (i.e., digital pedometer readings of steps/day) in the intervention group, a repeated-measures t-test was used to compare baseline and post-pedometer readings. To assess changes in the subjective measure of PA (i.e., met the PA recommendations or not using recall of PA in minutes) in the intervention and control groups, a Chi-Square Test for Independence was used. Effect sizes are presented as *d*. An alpha level of .05 was used for each analysis.

Results

Participant Characteristics

No statistically significant differences were observed in the age of participants between the intervention and control group $t(69) = -1.862, p = .067$ (Table 2). More ethnic minorities participated in the intervention group than in the control group. In terms of program attrition, of the 81 women who attended book club sessions, six quit for various reasons (job constraints – 1, medical reasons – 1, no time – 3, or did not like the program – 1). Of the 74 remaining, 51 (69%) completed data at both baseline and post-intervention. Sample size varied across analyses because some women did not complete all outcome measurements.

[INSERT TABLE 2 HERE]

The intervention group was assessed for all outcomes. The control group was assessed for all outcomes except the objective measure of PA (pedometer steps).

Body Mass Index (wt/ht² or kg/m²)

From pre- to post-test, no significant change was observed for BMI in the intervention group (32.27 ± 7.70 to 31.71 ± 7.01 kg/m²) or in the control group (30.65 ± 8.80 to 30.65 ± 8.79 kg/m²) (Table 3).

Self-Worth (SW)

A significant interaction was observed between time (pre vs. post) and group (intervention vs. control) for SW at follow-up, $F(1,67) = 4.855, p = .031$ (Table 3). The simple main effects test comparing groups at each level of time indicated that at pre-test, the mean SW for the intervention group was significantly less than the control, $F(1,67) = 4.437, p = .039, d = .41$. No significant difference was observed in SW between groups post-intervention, $F(1,67) = .023, p = .879$. The simple main effects test comparing SW over time for each group indicated a significant difference from pre- to post-intervention for the intervention group, $F(1,67) = 9.191, p = .003, d = .28$. However, no significant difference was observed from pre- to post-intervention for the control group, $F(1,67) = .46, p = .50$. The data suggest that SW in the intervention group increased while that of the control group did not change.

Benefits to Barriers Ratio Score (BBRS)

A significant interaction between time (pre vs. post) and group (intervention vs. control) was observed for mean BBRS, $F(1,69) = 4.193, p = .044$ (Table 3). The simple main effects test comparing groups pre- and post-intervention indicated that at post-intervention, the mean BBRS for the intervention group was significantly greater than the control, $F(1,69) = 10.112, p = .002, d = .74$, but no significant difference was observed between groups at baseline, $F(1,69) = 2.645, p = .108$. The simple main effects tests comparing time for each group also indicated a significant difference between pre- and post-intervention for the intervention group, $F(1,69) = 12.485, p = .001, d = .34$. However, no significant difference occurred from pre- to post-intervention for the control group, $F(1,69) = .041, p = .839$. The data suggest that like self-worth, the perceived benefits to barriers ratio score improved in the intervention group but did not change in the control group.

[INSERT TABLE 3 HERE]

Objective Measures of Physical Activity

Pedometer steps per day, the objective measure of PA used only in the intervention group, increased from pre- to post-intervention ($M = 5734.12$ steps/day, $SD = 2305.77$ and $M = 6609.46$ steps/day, $SD = 2784.54$, respectively), $t(30) = -2.166, p = .038, d = .39$.

Subjective Measures of Physical Activity (as reported by participants on 7-day recall or MAQ)

Minutes per week of PA did not increase significantly in either group; however, it trended in a positive direction in the intervention group and a negative direction in the control group (see Figure 2). The effect size was $d = .65$ for the increase in PA, as measured subjectively, in the intervention group.

The percentage of women meeting the recommendations did not differ significantly between groups at the beginning of the study (34% vs. 28%; $\chi^2(1)=.234, p=.628$) (Table 4). However, at post-intervention, 58% of the women in the intervention group were meeting PA guidelines, whereas the number of women meeting guidelines in the control group was the same as it was at baseline (28%) ($\chi^2(1)= 4.836, p=.028$).

[INSERT TABLE 4 AND FIGURE 2 HERE]

Discussion

It is estimated that 4-5 million book groups exist in the United States, and that number is rising (Kaufman, 2008). Reading groups have been known to offer women support and a place to explore their identity. A majority of women who participate in book clubs do so because they offer the comforts of discussion with like-minded peers and help women with the many complexities and contradictions in their lives (Long, 2003; Striphas, 2003). The purpose of this study was to investigate the effectiveness of a theory-based book club for increasing: (a) self-worth, (b) perceived benefits relative to barriers of PA, and (c) PA in adult women. Our most important finding was that for adult women, compared to a control group, an innovative book-club intervention was effective for improving self-worth, and increasing the ratio of perceived benefits compared to barriers towards PA. The impact of the WBA program on PA levels is still inconclusive because the objective measure of PA (pedometer steps/day) increased in the intervention group, but similar measures were not taken in the control group. Therefore, we cannot say with certainty that the WBA intervention increased PA. Additionally, while the subjective measures of PA demonstrated that the number of women meeting PA recommendations increased post-intervention in the intervention group, the measures of PA in the groups were not consistent, indicating the need to conduct the intervention again using consistent subjective measures of PA.

Self-worth increased in women participating in WBA as compared to the control group. Women Bound to Be Active was designed to increase self-worth through academic, social, and emotional domains --in addition to the physical domain. Women who participated in WBA were encouraged to change their attitudes or feelings about PA from negative to positive. They were also encouraged to assess their respective needs to support their behaviors related to PA. For example, women were asked to role-play with regard to whom they would ask to support their PA behavior and how they would do this. This facilitated further discussion about feeling empowered to ask for what they needed. They were also reminded about the importance of acknowledging their progress (big or small) rather than focusing on what they had not accomplished. They were encouraged to "be in the moment" related to their successes and be proud of their current achievements (Huberty et al., 2008b).

As a result of WBA, women reported more perceived benefits and fewer barriers to PA. Typically, women who can increase their perceived benefits and decrease barriers to PA are more likely to participate in PA, even amidst challenges (White & Ransdell, 2003; Wilbur, Vassalo, Chandler, McDevitt, & Miller, 2005; Williams, Bezner, Chesbro, & Leavitt, 2006). Therefore, the finding that the WBA intervention group was able to increase the benefit to barrier ratio is significant.

We believe that WBA was successful at increasing the benefit to barrier ratio because WBA was designed to help women increase their self-sufficiency related to PA. Women were encouraged to identify their own perceived benefits and barriers, rather than those they saw in the media etc. (i.e., the perception that better heart health may only be a benefit for those at risk of poor heart health). Women used books, a workbook, discussions, and their own experiences to create strategies for overcoming their personal barriers. These "self-evaluation" and "problem-solving" processes were important because barriers to PA can change over time (Eyler, 2003).

Another important finding from this study was that the intervention may have contributed to increased PA. Compared to the control group, the proportion of women in the intervention group meeting the PA recommendations increased from the beginning to the end of the intervention. Furthermore, the intervention group increased their PA as objectively measured in steps per day. Because objective measures (i.e., pedometer steps) were not assessed in the control group, and because different subjective measures of PA were used in year 3 and 4, these findings should be interpreted with caution.

Our study was unique in that the primary focus was on enhancing self-worth, increasing the benefit to barrier ratio relative to PA, and increasing PA in adult women. In addition to limitations related to the PA assessment, other limitations should be noted. This was not a randomized controlled study so that any changes observed cannot be

directly attributed to the intervention, and uncontrolled factors for which we did not collect data (e.g., education, health status etc.) may have affected any differences in outcomes observed between the two groups. Furthermore, participants were predominantly Caucasian, volunteers, and women who paid to participate in the program. Therefore, the sample was not representative of the typical female and thus the results may not be generalizable to other racial/ethnic or income groups. However, to expand the reach of the program, women were provided an option to make payments over the 8-months for the cost of the book club (\$99.00), and some women (living in lower socioeconomic areas of the intervention city) were able to participate at no charge through the use of a community foundation grant from the American Heart Association. Additionally, the control group selection process was different than the intervention group in that they were approached to participate (n=90) because they were part of an already existing social support group, which may have resulted in selection bias and thus further limited generalizability of the results. Of the ninety who were asked to participate in the control group, thirty-six were eligible, and only twenty completed questionnaires at both pre and post-intervention, which may have resulted in participation bias thus further limiting the generalizability of the results. Additionally, data on education and income were not obtained from the demographic questionnaire. Therefore, the lack of information about education and income may have precluded us from determining and controlling for the true effect of these factors on the outcomes of this study. Clearly, the omission of education and income may limit the generalizability of these findings to other samples of women. In the future, studies should collect data on education and income to ensure that those factors are considered in an analysis. Because of missing data, the limited size of the control group, the lack of a true experimental design, our ability to make meaningful statistical comparisons while controlling for potential confounding variables with adequate statistical power was limited.

Despite the limitations of this study, several important findings emerged. First, given the lack of research on increasing physical activity in women using interventions that are gender-specific, the innovative book club design used to improve psychological variables related to increasing women's participation in PA is significant. Changes in self-worth, the perceived benefits to barriers ratio, and possibly PA as a result of this intervention are worthwhile. Book clubs are a viable, desirable, and convenient intervention strategy that can be used to improve psychological predictors and mediators of PA in women.

Future Research Suggestions

Based on our experience with this study, several suggestions can be made for future research. First, researchers need to continue to develop and test in controlled trials innovative interventions that cater to women's likes and needs. This will help women become "attracted" to PA. These interventions should be assessed in diverse samples of women including women from different ethnic/racial and educational backgrounds. Second, the impact of the social connections made during the intervention could have affected the results and should be explored in future studies. Third, more research is needed to determine the best tool to measure PA levels of women participating in a program such as this (Ainsworth, 2000). Fourth, no tools currently exist to assess the various domains of self-worth, including academic, social, or emotional domains. More specific measures related to PA that focus on components of self-worth other than the physical dimension are warranted. Finally, longitudinal research is needed to determine the long-term effectiveness of various interventions. Longitudinal studies should not only contain quantitative assessment but also a qualitative assessment so that we can continue to investigate ways by which to empower women to maintain PA behavior during their lifetime.

Conclusion

The research reported here represents findings from an ongoing study investigating the influence of a woman's book club on self-worth, perceived benefits and barriers of PA, and PA participation in women who are contemplating or preparing for PA participation as per the Transtheoretical Model. This research extends previous findings through the use of a control group to test the efficacy of the intervention. Women Bound to Be Active was effective for improving self-worth, perceived benefits and barriers of PA, and possibly the number of women meeting national PA recommendations. Future research should focus on comparing the responses of the book club intervention participants to responses of an adequately sized sample of control participants. The use of modifications to the current format (i.e., internet, books on tape) to further enhance the programs' effectiveness on self-worth, perceived benefits and barriers to PA, and overall PA should also be explored.

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Table 1. Sample syllabus of book club meetings.

Week of	Packet	Book	Homework...
September 8	Introduction Pages 2-6, 63	Introduction	Workbook pgs.46-49 Read pages 1-100 in book
September 15	Pedometers Pg. 46-49	Book Name pgs 1-100	Workbook pgs. 19-22 Read pgs. 100-218
September 22	Getting started with physical activity Pgs. 19-22	Book Name pgs 100- 218	Workbook pgs. 25-28 Read chp. 1 in new book
September 29	Cardiovascular Fitness pgs. 25-28	Book Name Chp. 1	Workbook pgs. 29-43 Read chps. 2 in book
October 6	Strength Training/Adapting an Exercise Pgs. 29-43	Book Name Chp. 2	Read chp.3 in book

Table 2. Participant Demographics

WBA participants	Met Inclusion Criteria	Completed Intervention	Control
n	81	51	20
Age (yrs) Mean (SD)	51.9 (10.1)	52.7 (10.3)	*58.35 (13.6)
Caucasian (%)	81.5	92.2	100
African American (%)	17.3	7.8	0
Asian Pacific Islander	1.2	0	0

* $p > 0.05$ for difference between those who completed the intervention and those in the control groups.

Table 3. Means and standard deviations for outcome variables pre and post intervention.

	Intervention (I) Group Pre <i>n</i> =48	Control (C) Group Pre <i>n</i> = 20	Intervention Group Post (8-months) <i>n</i> = 48	Control Group Post (8-months) <i>n</i> = 20	p Values			
					I pre vs. C pre	I post vs. C post	I pre vs. I post	C pre vs. C post
BMI (kg/m^2)	32.27 ±7.70	30.65±8.80	31.71±7.01	30.65± 8.79	NS	NS	NS	NS
Self-Worth (SW)	2.73±0.61	3.08±0.65	2.97±0.63	2.99±0.65	.039	.879	.003	.500
Benefits Barriers Ratio Score (BBRS)	55.63±16.49	48.65±15.65	62.15±15.11	48.05±20.63	.108	.002	.001	.839

I pre vs. C pre - intervention group pre mean compared to the control group pre mean

I post vs. C post – intervention group post mean compared to the control group post mean

I pre vs. I post – intervention group pre mean compared to the intervention group post mean

C pre vs. C post – control group pre mean compared to the control group post mean

NS – interaction for BMI was not significant therefore the follow-up simple main effects test were not conducted

SW scores ranged from: Intervention pre 1.67 - 4.00, post 1.50 to 4.00 - Control pre 1.67 - 4.00, post 1.50 - 4.00

BBRS scores ranged from : Intervention pre 27.00 - 95.00, post 28.00 - 93.00 - Control pre 24.00 - 80.00, post 7.00 - 94.00

Table 4. Changes in subjective measures of PA in intervention and control groups.

	Intervention meeting guidelines (>150 minutes/week) n =50 (%)	Control Meeting guidelines (>150 minutes/week) n =18 (%)	Intervention Minutes per week reported n=50	Control Minutes per week reported n=18
Pre	17 (34)	5 (28)	145.42	139.37
Post	*29 (58)	**5 (28)	243.11	122.24

* p < .05 Intervention baseline vs post

** p > .05 Control baseline vs post

Figure 1. Study Compliance Flow Chart for Intervention Participants

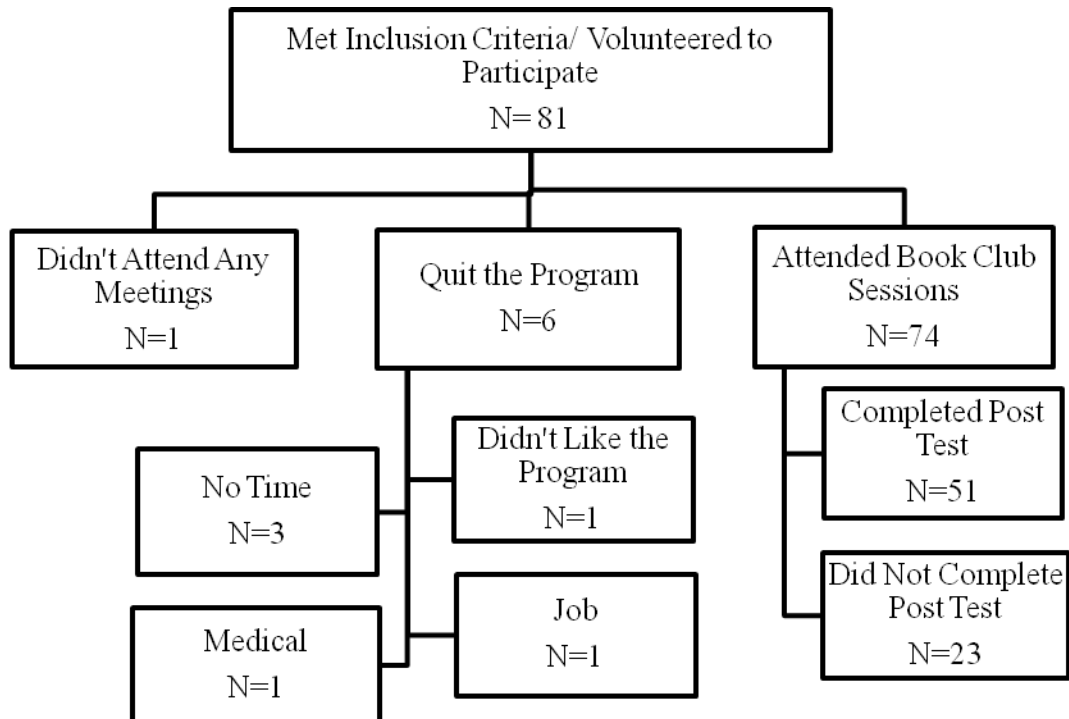
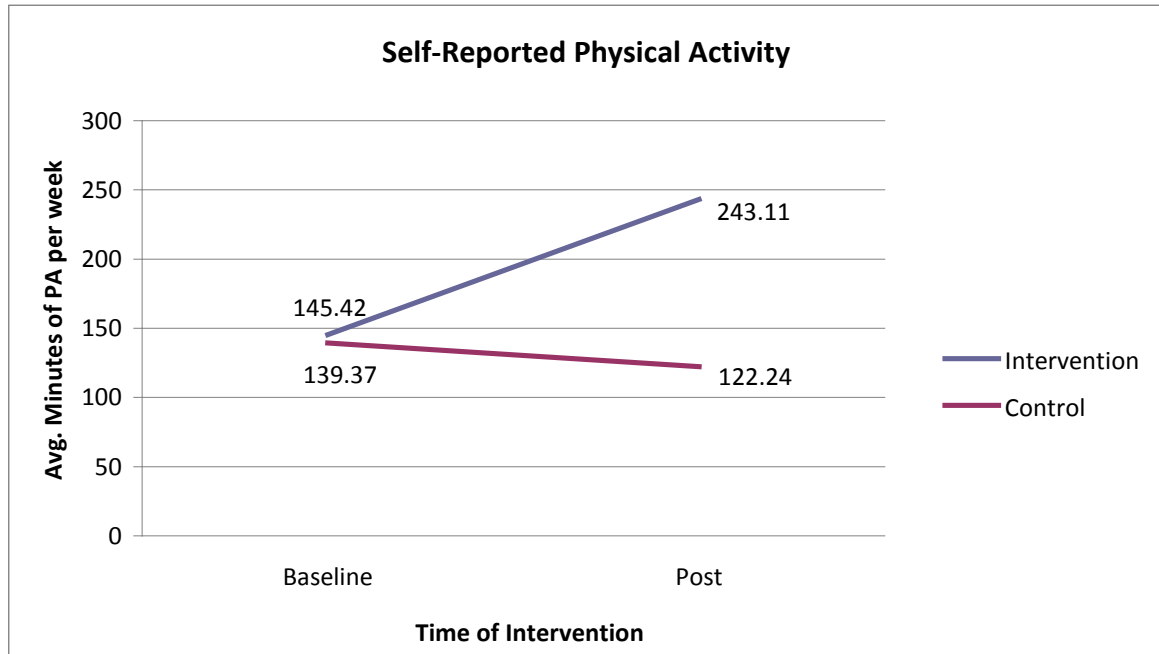


Figure 2. Self-reported PA levels



Note - Changes are not significant ($p > .05$)