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Older Women in a State-Wide, Evidence-Based Falls Prevention Program: Who Enrolls and What Benefits Are Obtained?

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ABSTRACT

Background: Older women who are vulnerable to falls and their negative consequences have been shown, in controlled randomized clinical trials, to benefit from fall prevention programs. The purpose of this study was to identify personal characteristics of female participants enrolled in a falls prevention program, the effectiveness of the program for female participants, and whether personal characteristics indicate which women might benefit most from programs delivered in real-world settings.

Methods: Data were collected from seniors enrolled in A Matter of Balance/Voluntary Lay Leader (AMOB/VLL) program sessions conducted in Texas over the 2-year period from 2007 to 2009. Baseline and postintervention data from 1,101 female participants were drawn from a larger, state-wide dataset and analyzed using structural equation modeling to identify relationships between variables of interest.

Findings: Analyses revealed that women who attended AMOB/VLL significantly increased falls efficacy from baseline to postintervention ($t = 1.680$; $p < .05$; $d = 0.143$) and reduced the number of times fallen ($t = 3.790$; $p < .01$; $d = 0.313$). Further, participants reported decreases in days of physical ($t = 3.810$; $p < .01$; $d = 0.323$) and mental health ($t = 1.850$; $p < .05$; $d = 0.156$) reported as not good.

Conclusion: Findings from this study support the effectiveness of evidence-based programs for reducing falls-related risks in older women. Identifying the characteristics of female participants enrolled in AMOB/VLL can enable public health professionals to better target and meet the health demands of the aging female population. Such translational research can help to guide the dissemination of additional state-wide health promotion programs for older women.

Introduction

With an estimated one out of three older adults falling each year (Centers for Disease Control and Prevention [CDC], 2006), falls are increasingly becoming recognized as a public health problem that disproportionately affects older women. Falls are the leading cause of injury deaths and nonfatal injuries for adults ages 65 and older (Nachreiner, 2007; Smith et al., 2010; Stevens & Dellinger, 2002). Injurious falls can lead to hospitalization or nursing home placement, restricted physical activity, and a decline in functioning and quality of life (Horton, 2007; Nachreiner, 2007). Falls are often associated with morbidity, lead to less mobility, and a decrease in the ability to perform daily activities and function independently (CDC, 2006; Stevens & Sogolow, 2005).

The risk of falls and fall-related injuries increase dramatically with age (Stevens & Sogolow, 2005), and these risks are higher for women as compared with men. Controlling for age, percentages of falls are higher for females than males (Nachreiner, 2007), and the CDC (2006) reports that women are 67% more likely than men to have a fall resulting in injury that is nonfatal. In addition to the injuries sustained from falls being 40% to 60% disproportionately higher for women than for men (Stevens & Sogolow, 2005), the prevalence for falls resulting in hospitalization among women is more than twice than that of their male counterparts in Texas (Smith et al., 2010).

Previous literature has documented reasons attributed to higher risk of falls among women when compared with men. Clinical and behavioral factors include 1) greater risk of reduced bone mass with aging (e.g., osteoporosis; Boele van Hensbroek, 2009) and 2) differences in lifestyle behaviors (e.g., the tendency to be less physically active leading to more muscle weakness, which in turn, increases ones risks for falling; Stevens & Sogolow, 2005). Although health promotion programs often

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attract women at unequal rates (Ory et al., 2002), it is important to understand women's unique personal and social circumstances when designing falls prevention programs for older adults.

Evidence-based falls prevention strategies should target populations with the greatest risks. Despite the need to increase fall awareness among all aging adults with regard to behavioral and environmental modifications to reduce fall risks, these efforts are especially important for women whose longer life expectancies put them at greater risk for recurrent and more injurious falls (Nachreiner, 2007; Overcash, 2008). To increase program effectiveness, interventions should be guided by gender differences in the underlying causes/circumstances related to falls (Stevens & Sogolow, 2005; Weeks, 2007).

A Matter of Balance Falls Prevention Program

A Matter of Balance/Volunteer Lay Leader Program (AMOB/VLL) is an evidence-based activity program that targets community-dwelling older adults and is intended to reduce the fear of falling and increase physical activity levels. AMOB/VLL incorporates the cognitive-behavioral therapy model as a means of identifying, evaluating, and changing participants' maladaptive belief systems and dysfunctional styles of processing information. The intervention includes eight classes, each lasting 2 hours, presented over a 4-week period by trained volunteer lay leaders, who act as facilitators and use an extensively detailed training manual and two instructional videos. AMOB/VLL focuses on practical coping strategies to reduce fear of falling and to diminish the risk of falling. The intervention is unique in its two-pronged approach to falls prevention because it focuses on changing both attitudes and behaviors that predispose older adults to falls. Early sessions focus on diminishing the fear of falling and promoting participants to adopt the mindset that falls are preventable. Later sessions assist participants in changing their environments to reduce fall-related risk factors and learn exercises to increase strength and balance (American Geriatrics Society, Geriatrics Society, & American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2001; Graafmans et al., 1996; Stevens & Dellinger, 2002). The curriculum includes lectures, group discussions, mutual problem solving, role play activities, exercise training, assertiveness training, and home assignments. Intervention processes are designed to change behavior with a focus on building fall self-efficacy and set realistic goals for increasing activity. The goal is to instill adaptive beliefs such as greater perceived control, greater confidence in one's abilities, and a more realistic assessment of failures.

Taking advantage of a national training effort by program developers (Partnership for Healthy Aging, 2009), an aging and public health infrastructure had been established in Texas to deliver this falls prevention intervention to seniors state wide. AMOB/VLL has been introduced in 26 of 28 Area Agencies on Aging regions in Texas, with the potential to reach older adults in 239 of the 254 Texas counties. The Texas AMOB/VLL program has a large and diverse geographic reach, targeting low-income minority seniors. Texas Area Agencies on Aging sites continue to build fall prevention capacity within existing and new partners including residential facilities, health care institutions, public health departments, faith-based organizations, business sectors, and local government (Ory, Smith, Wade, Wright, & Parrish, 2010).

The purposes of this study are to 1) identify personal characteristics of female participants entering AMOB/VLL, 2) determine, through the examination of baseline and postintervention measures, the ways in which this state-wide intervention is effective for female participants, and 3) identify characteristics of female participants who benefit most from AMOB/VLL.

Methods

Participants and Procedures

Delivery sites collected data from 1,340 participants enrolled in the Texas AMOB/VLL between September 2007 and March 2009. Local Area Agencies on Aging and other community-based organizations recruited participants to the program. The researchers obtained institutional review board to assess secondary data on program participants and outcomes in which all data are deidentified.

Instrument

Program lay leaders surveyed participants at each delivery site using identical instruments at baseline and upon completion of the 8-week intervention. The self-report questionnaire was nine pages long, paper-based, and consisted of 28 items. Survey instrument items included Likert-type scales, yes/no, closed-response, and open-ended formats. Each measure included in the instrument was selected by public health and aging experts who established a common database for evaluating program effectiveness in a national consortium of studies (National Council on the Aging, 2007). Baseline and postintervention instruments took participants approximately 15 minutes each to complete.

Data and Measures

Of the 1,340 older adults enrolled in the Texas AMOB/VLL, 82.2% (n = 1,101) were female. This study analyzed only data collected from this subsample of older female participants. Participants were drawn from individual classes delivered across the participating Area Agencies on Aging regions in Texas. This study included two types of variables: immutable personal characteristics of the participants measured at baseline and variables hypothesized to be influenced by the 8-week intervention (i.e., intervention variables measured at baseline and postintervention). Personal characteristics of participants utilized in this study were age (treated as a continuous variable based on the participant's birth date), race/ethnicity (scored 0 if the participant is non-Hispanic White, and 1 if non-White), education (scored 0 if the highest level of education received by the participant was less than high school, 1 if graduated high school, and 2 if more than a high school education), number of chronic conditions (scored 0 if the participant had one chronic condition, and 1 if two or more chronic conditions), percent of the population residing the participant's zip code area over age 65 years (geocoded based on the participant's residential zip code, scored as a ratio to the overall population in that ZIP code), and the density of the participant's residential setting (geocoded using rural–urban continuum codes based on the participant's zip code, scored 0 if the participant resided in an area with over 1 million people, and 1 if less than 1 million).

The baseline and postintervention variables utilized in this study were the Falls Efficacy Scale ($\alpha = 0.869$; a composite score of five 4-point Likert-type scale items, ranging from 5 to 20, scored 1 for "not sure at all," and 4 if "absolutely sure"), number of times fallen (scored 0 if the participant reported having not fallen in the previous 30 days, and 1 if the participant had fallen one or more times in the previous 30 days), number of days physically active (scored 0 if the participant reported not meeting the Surgeon General's guidelines for physical activity in the previous 7 days, and 1 if the participant met these guidelines), number of physical days not good (scored 0 if the participant reported no bad physical days in the previous 30 days, and 1 if the participant reported one or more bad physical days in the previous 30 days), number of mental days not good (scored 0 if the participant reported no bad mental days in the previous 30 days, and 1 if the participant reported one or more bad mental days in the previous 30 days), and number of days limited from usual activities (scored 0 if the participant reported no days limited from their usual activities in the previous 30 days, and 1 if the participant reported one or more days limited from their usual activities in the previous 30 days).

Researchers performed descriptive and multivariate analyses. They analyzed data with and without data imputation to determine the effectiveness of the AMOB/VLL intervention and examine relationships between variables of interest.

Data Imputation

Raw data were examined for normality, linearity, and outliers. No significant departures were observed. Cases were assessed for patterns in missing data and assumed to be missing at random. The majority of variables had a low percent of missing data (5%), although a few had percentages as high as 15%. This was especially true for postintervention variables located toward the end of the instrument. Multiple imputation was used for missing data. Missing data were imputed using Monte-Carlo Markov Chains in SAS using PROC MI to generate a posterior distribution from which cases were then sampled (Rubin, 1987; Schafer & Olsen, 1998). A total of 10 imputations were performed (resulting in 10 distinct datasets) and analyzed in MPLUS (Muthen & Muthen, 1998). Combined results from multiple imputations are reported in this study.

Data Analysis

Researchers calculated frequencies for participant personal characteristics and intervention variables of interest. They performed Pearson's chi-square tests to assess the goodness of fit for frequency distributions and the independence between categorical participant personal characteristics (Chernoff & Lehmann, 1954).

To assess the effectiveness of the intervention, researchers compared baseline and postintervention variable values using a mixed model repeated measures regression in SAS (SAS, Inc., Cary, NC). Restricted maximum likelihood (REML) was used as the estimating algorithm. A mixed model approach was selected to account for covariates and cluster effects. All aforementioned participant personal characteristics were added as covariates in the model. Researchers estimated cluster effects using classes as the cluster metric, assuming a compound symmetry covariance structure within each class. The repeated measure component was performed on each participant's baseline and postintervention scores, which allowed each pair to be correlated with an autoregressive structure. Researchers analyzed baseline and postintervention score differences with a post hoc procedure based on the least-squares means of the pre- and posttests with all covariates set at their respective averages.

Researchers used a structural equation modeling (SEM) framework to model relationships between participant personal characteristics, baseline outcome scores, and postintervention outcome scores. SEM was selected to simultaneously model the endogenous (response) variables while enabling researchers to examine this complex structure with mediator effects. Necessary and sufficient assumptions for these analyses were accounted for and met (Kline, 2005; Schafer & Olsen, 1998). The fit statistics for this model were acceptable when compared with generally followed criteria (χ^2/df = 2.731; Tucker-Lewis index = 0.904; confirmatory fit index = 0.990; root mean square error of approximation = 0.040; standardized root mean square residual = 0.014) and paths between measures were statistically significant (Bentler, 1990; Bentler & Bonett, 1980; Browne & Cudeck, 1993; Marsh & Hocevar, 1985).

Results

Sample

Sample characteristics of study participants are presented in Table 1. The study population included 1,101 older females, ranging from 50 to 100 years old, with a mean ± standard deviation age of 76 ± 10.19 years. The majority of participants were non-Hispanic White (64.7%), between the ages of 75 and 84 years (41.1%), had more than a high school education (53.2%), resided in a large urban area (80.2%), and had more than one chronic condition (65.7%). At baseline, almost one fourth of the participants reported having fallen one or more times in the previous 30 days (22.2%) and 38.0% reported being limited from their usual activities for one or more days in the previous 30 days. A majority of female participants reported having not met Surgeon General's guidelines for physical activity over the previous 7 days (76.3%) and one or more physical days reported as not good in the previous 30 days (56.5%).

Characteristics of Female Participants before the Intervention

Using SEM, the researchers examined the strengths of relationships between participant personal characteristics and baseline intervention variables in a system with all variables accounted for in the model (including postintervention outcome

Table 1
Personal Characteristics

	%	χ^2	Sig.
Age (yrs)		215.05	.001
<65	13.44		
65–74	28.79		
75–84	41.05		
≥85	16.08		
Race/ethnicity		89.97	.001
Non-Hispanic White	64.47		
Non-White/minority	35.53		
Education		196.26	.001
Less than high school	23.98		
High school graduate	22.80		
More than high school	53.22		
Number of chronic conditions		51.92	.001
1	37.87		
>1	62.13		
Percent population >65 years old		600.94	.001
0%–9%	31.52		
10%–19%	65.71		
≥20%	2.78		
Reside in large urban area		401.66	.001
Yes	80.20		
No	19.80		

variables). Table 2 provides detailed descriptions of relationships between personal characteristics and baseline intervention variable scores. Upon entering the intervention, strong direct effects indicated female participants of older ages reported less falls self-efficacy ($\beta = -0.17$; $p < .001$), more days of physical activity ($\beta = 0.07$; $p < .05$), fewer physical days reported as not good ($\beta = -0.07$; $p < .05$), and fewer mental days reported as not good ($\beta = -0.09$; $p < .01$). Female participants with two or more chronic conditions reported less falls self-efficacy ($\beta = -0.13$; $p < .001$), more recent falls ($\beta = 0.08$; $p < .05$), more physical days reported as not good ($\beta = 0.15$; $p < 0.001$), and more days of limited usual activity ($\beta = 0.07$; $p < .05$). Participants with more than a high school education entered the intervention with higher falls efficacy scores ($\beta = 0.15$; $p < .01$).

Intervention Effectiveness

Researchers evaluated changes in outcome variable values from baseline to postintervention to determine the effectiveness of AMOB/VLL. Table 3 contains detailed descriptions of self-reported participant improvement resulting from the intervention using mixed model repeated measures regression. Holding all personal characteristics constant from baseline to post-intervention assessment, participants reported having higher levels of falls self-efficacy ($t = 1.68$; $p < .05$; $d = 0.14$), fewer falls in the previous 30 days ($t = 3.79$; $p < .001$; $d = 0.31$), fewer physical days reported as not good in the previous 30 days ($t = 3.81$; $p < .001$; $d = 0.32$), and fewer mental days reported as not good in the previous 30 days ($t = 1.85$; $p < .05$; $d = 0.16$). Improvements in days physically active and days limited from usual activity were not significant.

Relationships between Intervention Variables of Interest

Figure 1 illustrates relationships between baseline and postintervention outcomes accounting for participant personal characteristics. When investigating relationships between baseline outcomes, falls efficacy had a direct effect on the number of times fallen ($\beta = -0.10$; $p < .05$) and days physically active ($\beta = 0.09$; $p < .05$) indicating participants with higher self-reported falls efficacy scores had fallen less in the previous 30 days and met Surgeon General's guidelines for physical activity in the previous 7 days. The number of times a participant fell had direct effects on physical days not good ($\beta = 0.17$; $p < .01$) and mental days reported as not good ($\beta = 0.07$; $p < .05$), indicating that participants who had fallen one or more times in the previous 30 days had one or more physical and mental days not good in the previous 30 days, respectively. The effects of falls efficacy were on physical and mental days reported as not good were mediated by the number of times a participant fell in the past 30 days. Physical days reported as not good had strong direct effects on mental days not good ($\beta = 0.38$; $p < 01$) and days limited from usual activity ($\beta = 0.39$; $p < .01$), indicating that participants with one or more physical days reported as not good in the past 30 days also had one or more mental days reported as not good and one or more days limited from daily activity in the previous 30 days, respectively. Mental days reported as not good had a strong direct effect on days limited from usual activities ($\beta = 0.19$; $p < .01$), indicating that participants with one or more mental days reported as not good in the previous 30 days had one or more days limited from usual activity in the previous 30 days. This effect also mediated the relationship between physical days reported as not good and days limited from usual activity.

When investigating relationships between postintervention outcome variables, researchers discovered the structural model associations as identified at baseline remained; however, effects of these relationships were stronger (Figure 1). Additionally, direct effects emerged from falls efficacy to physical days reported as not good ($\beta = -0.08$; $p < .05$), mental days reported as not good ($\beta = -0.10$; $p < .01$), and days limited from usual activity ($\beta = -0.23$; $p < .01$), indicating that participants with higher self-efficacy scores after the intervention had fewer physical and mental days reported as not good and fewer days limited from physical activity in the previous 30 days, respectively. A strong covarying relationship emerged between number of times fallen and days limited from usual activity ($\beta = 0.52$; $p < .01$), indicating that participants who fell one or more times in the previous 30 days had one or more days limited from usual activity in the previous 30 days. Further, direct effects observed at baseline between physical and mental days reported as not good and days limited from usual activity covaried strongly at postintervention indicating a complex interaction among these variables.

Table 2
Structural Equation Modeling Relationships Between Personal Characteristics and Intervention Variables

	β	S.E.	*p*-Value
Relationships at baseline			
Age			
Falls efficacy scale	−0.171	0.035	.000
Days physically active	0.073	0.034	.030
Physical days not good	−0.072	0.030	.017
Mental days not good	−0.086	0.032	.007
Number of chronic conditions			
Falls efficacy scale	−0.13	0.030	.000
Number times fallen	0.083	0.037	.024
Physical days not good	0.154	0.032	.000
Days limited from usual activity	0.072	0.029	.012
More than high school education			
Falls efficacy scale	0.150	0.052	.004
Relationships at postintervention			
Age			
Falls efficacy scale	−0.206	0.037	.000
Mental days not good	−0.090	0.031	.003
Days limited from usual activity	−0.114	0.031	.000
Number of chronic conditions			
Physical days not good	0.105	0.027	.000
Race/ethnicity			
Mental days not good	−0.087	0.031	.003
Days limited from usual activity	−0.09	0.040	.033
More than high school education			
Days limited from usual activity	0.09	0.037	.013

Table 3
Baseline and Postintervention Variable Score Changes

	Pre Mean	Post Mean	t	S.E.	*p*-Value	Cohen's d
Falls efficacy scale	13.89	16.04	1.680	1.547	.047	0.143
Number times fallen**	0.35	0.23	3.790	0.039	.000	0.313
Days physically active*	0.40	0.42	0.610	0.024	.270	0.052
Physical days not good **	5.49	4.17	3.810	0.420	.000	0.323
Mental days not good**	3.49	2.65	1.850	0.574	.032	0.156
Days limited from usual activity**	2.56	2.14	0.910	0.283	.182	0.076

* Within previous 7 days.
** Within previous 30 days.

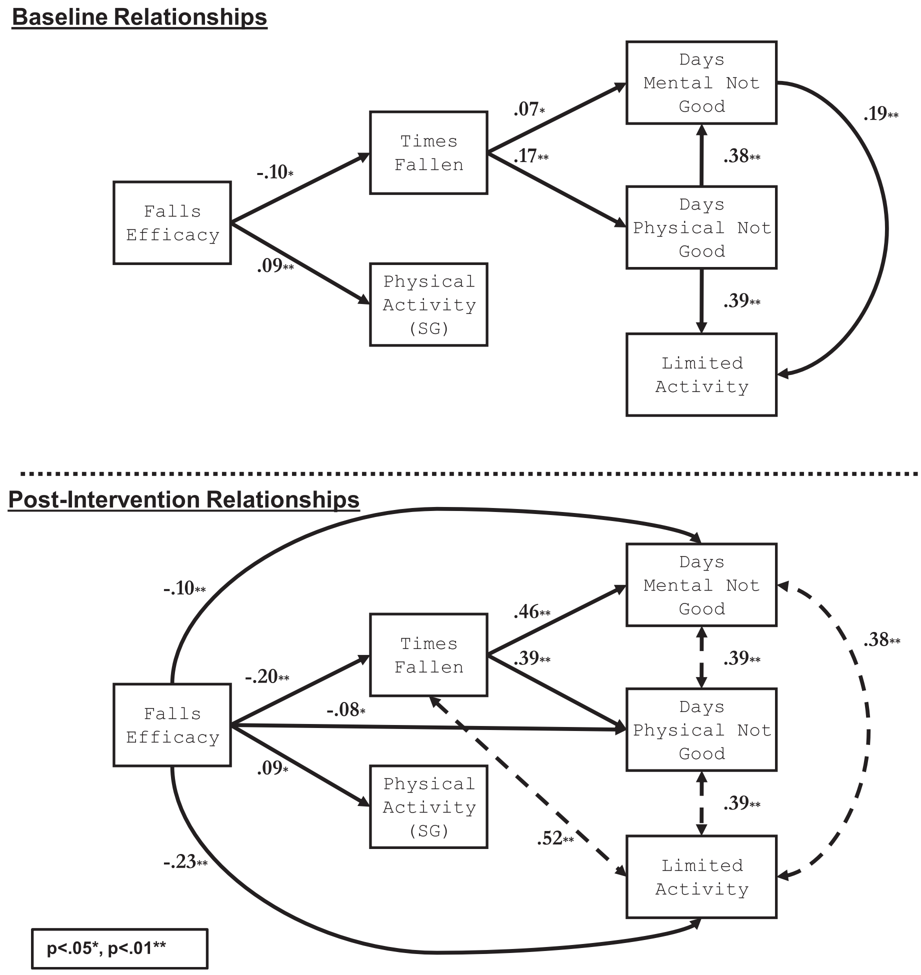

Figure 1. Structural equation modeling at baseline and postintervention.

Characteristics of Female Participants Benefiting from Intervention

Using SEM, the researchers examined the strengths of relationships between participant personal characteristics and postintervention outcomes in a system with all variables accounted for in the model (including baseline outcome variables). Table 2 provides detailed descriptions of relationships between personal characteristics and postintervention outcomes. After the intervention, strong direct effects indicated female participants' of older ages reported less falls self-efficacy ($\beta = -0.21$; $p < .001$), fewer mental days reported as not good ($\beta = -0.09$; $p < .01$), and fewer days limited from usual activity ($\beta = -0.11$; $p < .001$). Female participants with two or more chronic conditions reported more physical days as not good ($\beta = 0.11$; $p < .001$). Non-White participants reported fewer mental days as not good ($\beta = -0.09$; $p < .01$) and fewer days limited from usual activity ($\beta = 0.09$; $p < .05$). Participants with less than a high school education reported fewer days limited from usual activity ($\beta = 0.09$; $p < .05$). Female participants who entered the intervention having fell one or more times in the previous 30 days exited the program with fewer physical ($\beta = -0.07$; $p < .01$) and mental days reported as not good ($\beta = -0.09$; $p < .01$) in the previous 30 days, respectively.

Discussion

Findings from this study illuminate key translational research issues surrounding the dissemination of evidence-based programs in real-world settings in which people live, work, play, or pray (Glasgow, Lichtenstein, & Marcus, 2003). This study contributes to knowledge about women's health by focusing on how to better target high-risk women for falls prevention programming. Although women are the predominant participants in health promotion programs for seniors (Ory et al., 2002), it is especially important to understand more about the personal characteristics of women enrolled in evidence-based fall prevention programs, and who among this group might benefit most. AMOB/VLL attracts older women with multiple comorbidities, a range of educational experience, those who are non-Hispanic White, and those who reside in predominantly urban areas. The authors note, however, that there is less racial diversity among women 75 years and older, and the residential distribution in this study is likely a reflection of where classes are taught rather than rural women not wanting to join the program.

Findings from this study (positive program effects on falls efficacy and quality-of-life outcomes), are similar to the outcomes reported in seminal studies on AMOB/VLL (Healy, 2008). Moreover, this study provides evidence suggesting that

AMOB/VLL can reduce actual falls risk, even within a relatively short time frame. The authors attribute this positive finding to the class-based exercises designed to increase balance and strength and reduce falls risk (National Institute on Aging, 2009).

These study findings provide additional support for the individual and societal benefits of evidence-based programming to improve the health of older women (National Council on the Aging, 2006; Wilcox, Dowda, Griffin, Rheaume, & Ory, 2006). A major contribution of this study is the examination of more complex causal pathways between health-related beliefs, health behaviors, falling, and quality-of-life indicators seen among older women. For example, the strong influence of falls efficacy on quality-of-life outcomes reinforces the value of the AMOB/VLL intervention's emphasis on building skills for mastering falls self-efficacy (Bandura, 1997). This research provides further evidence of the presumed linkage between falling and self-efficacy, and explains why falls prevention strategies are critical in helping older women reduce risks associated with falls.

The statistical analyses and analytical approaches selected for this study were ideal to investigate the effectiveness of AMOB/VLL. The current analytical approach recognizes the importance of framing behavior change as occurring within a systems approach (Singer & Ruff, 2001). Although increasingly used in some fields including public health, structural equation modeling has not yet become common in the aging literature. Often, researchers utilize regression analyses to examine intervention-related change from baseline to postintervention. Although these methods have great merit, they lack the ability to simultaneously examine study variables as a system. A major innovation of this study was the use of SEM modeling, which allows the investigator to better document pathways between personal characteristics and intervention outcomes as they relate to, interact with, and are moderated by one another. Another benefit to using SEM is the ability to examine the interactive effects of intervention-related variables on multiple outcome measures simultaneously and without isolation (Bollen, 1989; MacKinnon, Fairchild, & Fritz, 2007).

These study findings help to elucidate how personal characteristics are associated with various health-related outcomes. Because AMOB/VLL is a multifaceted program that addresses both behavioral and physical aspects, it is not surprising that female participants with differing personal characteristics may report differing benefits. The finding that oldest women had better outcomes (fewer mental days reported as not good and fewer days limited from usual activity) is welcomed news and critical to debunk the stereotype that older persons cannot benefit from health promotion programs (Ory, Hoffman, Hawkins, Sanner, & Mockenhaupt, 2003). There are several possible explanations for this finding. It may be that older women were entering the program in better health (e.g., the sample contained >16% individuals over age 85 years), supporting the idea of the robustness, and potential resilience, of older women who live longer than usual lives. Another explanation may be that younger women who self-selected into the program had more chronic conditions than their older counterparts. Possibly these individuals had more favorable scores at baseline and thus had less room to improve as a result of attending the intervention.

Another finding was that racial/ethnic minority participants had better outcomes (i.e., fewer mental days reported as not good and fewer days limited from usual activity). One explanation for this finding may be that community organizations who adhere to principles of community participatory research (Bolin & Ory, 2007) are more familiar with their constituents when compared with typical university settings. Such community organizations may therefore provide intervention strategies that resonate among minorities who have had relatively less exposure to self-management tools. Minorities who are used to "taking care of themselves" may benefit dramatically when provided with skills for overcoming behavioral and environmental barriers to falls-risk reduction. Another interpretation of this effect may be a methodological artifact, reflecting self-selection biases in participation. In this instance, minority participants may have entered the intervention with worse levels of health and therefore had more room to improve during the course of the intervention. Whereas no significant change on days limited from usual activity was found from baseline to postintervention for the overall study population, a significant improvement was seen among those with less than a high school education in this arena. This finding indicates that AMOB/VLL does benefit, and should target, participants from all educational levels.

Limitations

There were limitations associated with this study, although these are seen as relatively minor and not detracting from the overall robustness of the findings. Data collected from participants at baseline and postintervention were self-reported. Some measures required the participant to recall occurrences within the previous week or month, which may have introduced recall bias. Despite the potential for these biases, the selection of measures was carefully considered to balance scientific rigor with the realities of obtaining data from large numbers of respondents (Glasgow et al., 2005). As mentioned, each measure utilized in this study had been well vetted with public health and aging experts who established a common database for evaluating program effectiveness in a national consortium of studies (National Council on the Aging, 2007). The pre–post intervention design, although not as strong as a random, controlled trial design, is appropriate for translational research in which the emphasis is on expanding the program to scale state wide and concerns about external validity are predominant (Wilcox et al., 2006; Wilcox et al., 2008).

The current study investigated outcomes from one intervention administered in one state; however, the included sample contained a large number of participants from a large, geographically and demographically diverse state. Participation in the intervention was voluntary; therefore, the study may have been subjected to self-selection bias. Although this study included a more diverse population than in many health promotion studies (Wilcox et al., 2006), this study's high representation of non-Hispanic White female participants (64.5%) residing in urban areas (80%) may limit generalizability to the overall Texas population.

Although the authors recognize the importance of assessing treatment fidelity (e.g., the extent to which intervention components were delivered as intended) when implementing and disseminating evidence-based programs, in-depth study of fidelity issues was beyond the scope of this study. Centralized training helps to standardize program instruction, and the minimization of program drift is important in program implementation (Frank, Coviak, Healy, Belza, & Casado, 2008). Toward this end, the Texas Healthy Lifestyles Program employed an implicit fidelity plan where each geographic site was encouraged to follow processes and protocols highlighted by the program developers and taught during lay leader training session.

Implications for Practitioners and Policy Makers

This study helps to identify the characteristics of female participants who benefited from AMOB/VLL. Recognizing the overall benefits to participants in this sample, especially the oldest and minority participants, will assist the future direction of these programs to tailor recruitment to target these populations. Alternatively, program administrators may use this information to modify recruitment techniques and community adoption to redesign the program, without compromising delivery fidelity, to enhance intervention effectiveness. Conducting debriefing sessions with older women participants after the intervention may assist program deliverers to identify aspects about the intervention that participants liked or did not like, which may help to inform future recruitment and implementation activities. Focusing on tailoring efforts is a key behavioral change principle, and the information presented in this study may inform trainers about how to be more supportive to participants entering the program with particular personal characteristics and/or baseline intervention variable scores. For example, findings from this study indicate a strong relationship between the number of times fallen and the number of physical and mental days reported as not good in the previous 30 days at baseline. These relationships were strengthened after the intervention. Understanding this relationship may inform recruitment methods to target seniors who have experienced a fall because they are most at risk of negative physical and mental ramifications.

Given the overwhelmingly positive outcomes found for older women in this study, a next step is to identify strategies that can help embed AMOB/VLL into ongoing community organization serving older women and more widely disseminate these types of programs. In this vein, there is a strong research to practice connection. Research on program costs and benefits can help to inform key decision makers to support an expansion of falls prevention programs, which may be given greater emphasis under prevention provisions being discussed under the new health care reform legislation. More physician counseling about falls prevention can be expected in the Welcome to Medicare visit (Beattie & Bedlin, 2010). Knowing which programs are evidence based, and their effects on women, can help to guide both physician counseling and reimbursement policies for falls prevention.

Future Directions

Although this study adds to the emergent literature on the effectiveness of evidence-based programs for improving the lives of women at risk for falls and negative fall-related sequelae, it also has implications for future research on older women's health. The authors recommend that future efforts examine the effectiveness of this and other evidence-based programs as it relates to dose-response (e.g., 8-week attendance rates of AMOB/VLL classes) and other class characteristics (e.g., class size, delivery site type). Additionally, the authors suggest that these self-reported measures be complemented with clinical measures (e.g., timed get-up-and-go, stand-to-sits) to validate findings of this study. In addition to validating these findings with functional variables, future research should investigate the relationships between AMOB/VLL and cost variables and health care utilization to examine the emergence of any systematic differences across the genders.

This research has contributed to our knowledge of the effectiveness of evidence-based falls prevention programming for older women, and helped us to understand the heterogeneity of treatment responses within older women. The widespread dissemination of such programming through existing aging and health networks can help to improve public health by reducing older women's falls risk and positively impacting on overall health and quality of life.

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