

Title: Implementing and Disseminating a Falls Prevention Program in At-Risk Older Adults  
Living in a Naturally Occurring Retirement Community-Supportive Services Program

Corresponding Author:

Dale Chaikin, RN, MS

North Shore Long Island Jewish Health System

175 Community Drive, 2<sup>nd</sup> Floor

Great Neck, NY 11021

Phone: (516) 465-3179

Fax: (516) 465-2699

Email: [dchaikin@nshs.edu](mailto:dchaikin@nshs.edu)

Additional Authors:

Renee Pekmezaris, PhD, North Shore Long Island Jewish Health System

Rajni Walia, MA, North Shore Long Island Jewish Health System

Fredda Vladeck, LCSW, United Hospital Fund

Gayle Kolidas, LCSW, North Shore Long Island Jewish Health System

## Abstract

The overarching goal of this study is to test the impact of the implementation and dissemination of a falls prevention program in at-risk older adults living in a Naturally Occurring Retirement Community-Supportive Services Program (NORC-SSP). The literature cites that the most effective interventions, in targeting persons at risk to fall, include both a multifactorial fall risk assessment and management program conducted by a team of health professionals.<sup>1-2</sup> After NORC-SSP staff conducted a risk assessment utilizing a modified version of the Hartford Fall Risk Assessment tool,<sup>3</sup> a multifactorial intervention was implemented, utilizing a single group pre-post design. The process included communication of those risk scores to the residents' physicians, along with recommendations for follow-up interventions. NORC-SSP staff then facilitated the process by which those interventions could be accomplished. Post-intervention assessments showed a significant decrease in the mean composite fall risk score for residents (N=93) from 32.9 to 23.9, Wilcoxon signed rank,  $p \leq 0.001$ . It was our belief that the communication of those assessment results to the primary physician, and follow-up intervention by a health professional well known to the older adult, would decrease risk factors to fall. Future research initiatives should focus on evaluating the NORC-SSP setting as a dissemination vehicle for best practice chronic disease management.

## Introduction

Annually, nearly 30% of Americans over the age of 65 (one in three) fall and subsequently require medical treatment. In the population over the age of 80, the rate of falling increases to 50% annually.<sup>4</sup> In 2005, of 433,000 older adults admitted to the hospital, about 16,000 died due to falls. Falls have become the leading cause of injury-related visits to emergency departments in the United States and the sixth leading cause of death.<sup>5</sup> Furthermore, falls are the most common cause given by family members who seek nursing home placement for older adults, and have significant effects on the quality of life.<sup>5, 6</sup>

According to 2008 census estimates, the population over the age of 65 accounted for roughly 36 million or 12% of the population.<sup>7</sup> The population over the age of 65, in the U.S., is expected to be 71 million in the year 2030, accounting for roughly 20% of the U.S. population.<sup>8</sup> Hence, the number of elderly individuals requiring services to meet their changing needs will increase dramatically. Frail older adults often do not qualify for government subsidized long term care but cannot afford private pay assisted living. In addition, a 2008 AARP survey indicates that 89 % of older Americans want to remain at home and in their community for as long as possible.<sup>9</sup> Many, however, have not planned for management in their homes as their health deteriorates. Over the past two decades a new model of care has emerged that has the potential to revolutionize services for older adults living in the community. This new paradigm recognizes the considerable strengths of the older adult, as well as their inevitably changing needs. It recognizes seniors overwhelming preference to remain in the home and in the neighborhoods they have lived in for years, it acknowledges the importance of community for successful aging. This new model is Supportive Service Programs (SSPs) based in Naturally Occurring Retirement Communities (NORC). A NORC-SSP is a partnership that unites housing

entities, health and social service providers, government and philanthropic organizations to locate a range of coordinated health care, social services and group activities, on site, that promote independence and healthy aging. One of the primary features of a NORC-SSP is the multidisciplinary approach to providing care, wherein nursing and social work staff provide the resident with a reliable source of information, referral, and chronic care management. Given the infrastructure of the NORC-SSP as well as the trusting relationship that develops between the NORC resident and the nursing and social work staff, the United Hospital Fund, in collaboration with the New York Community Trust, established the Deepdale CARES (Community Action Reach out to Elder Service) NORC Health Care Linkage Project. The goal of this project was to develop and strengthen effective linkages between NORC-SSPs and key healthcare providers serving their communities. An analysis of NSLIJ emergency room admissions of older adults from the previous year within this community revealed that 80% were due to trauma as a result of falls. Our mission became clear: in our quest to promote healthy aging and promote independence in older adults we would implement and disseminate a fall prevention program to at-risk seniors, and in all aspects of the program we would collaborate with physicians and community healthcare providers.

Despite the growing literature documenting prevention and best practices that have proven successful in well-controlled research, few of these interventions are consistently implemented in applied settings. Recent reviews and meta-analyses have documented this gap.<sup>5, 10, 11, 12</sup> A systematic review and meta-analysis was performed to assess the relative effectiveness of various interventions to prevent falls in older adults.<sup>1</sup> The most effective intervention was found to be a multifactorial fall risk assessment and subsequent management program. Strong evidence exists demonstrating that multifactorial interventions conducted by health professionals

can prevent falls, particularly if they are targeting persons at-risk and include several intervention approaches.<sup>13, 14, 15</sup> Successful falls prevention programs have demonstrated a significant reduction in falls risk.<sup>24, 25, 16</sup>

There is, therefore, a clear need for translation of best practices to “real life” settings in order for them to be effective. Li et al.<sup>17</sup> recently evaluated a Tai Chi falls prevention program for community-based use in six community centers. The program was found to have a 100% adoption rate and an 87 % reach into the targeted older adult population. Baker et al. demonstrated that members of senior centers responded positively to one-on-one counseling delivered by credible senior center-based health care providers.<sup>18</sup>

#### *The NORC Model/Infrastructure*

The growth of Naturally Occurring Retirement Community-Supportive Services Programs (NORC-SSP) is likely to continue and therefore warrants considerable attention as a “real life” setting for disseminating best practices amongst community dwelling elders. Presently, North Shore-Long Island Jewish Health System (NSLIJ) provides nursing services to older adults in six Queens and Nassau, NY communities through the NORC-SSP model. Older adults who live in demographically similar non-NORC communities do not have the organized infrastructure of preventive, social and health programs which promote healthy aging. The benefit is that NORC-SSP’s forge partnerships with public and private sectors to maximize scarce financial resources that fund them (e.g., NORC-SSP staff ensure resident access to medical transportation programs, delivered meals, and medical insurance programs for which the typical senior does not have knowledge/access). The average NORC-SSP program budget is \$150,000 per year and services approximately 650 older adults. The NORC-SSP program nurse plays a central role as a primary health resource and advisor to the residents. Since the NORC

resident is essentially never “discharged,” the NORC nurse and the resident become a team. The goal of the NORC nurse is to assist residents to function at optimal physical and mental capacity, while establishing and maintaining communication and accountability between the health care and social service team.

The objectives of the study were to: 1) implement a multifactorial nursing intervention consisting of fall history, a sensory, mobility, and cognitive assessment, review of medications, orthostatic blood pressure check, incontinence/urgency assessment, and a home environment (internal and external) safety check for at-risk patients living in a NORC-SSP; 2) to communicate the results of this assessment to the at-risk older adults, community physicians, and community based agencies; 3) facilitate referrals and home safety modifications; and 4) determine whether these interventions impacted upon falls risk scores. Our hypothesis is that by implementing a multifactorial falls prevention program which disseminates the results amongst clients/patients, community physicians, and community based agencies a decrease in falls risk factors would result.

## Methods

### *Study Population*

The NORC-SSP targeted for intervention, Deepdale CARES, is a garden apartment cooperative in Northeast Queens, New York, and is home to approximately 1,000 older adults. Deepdale CARES was established as a NORC-SSP in 1999 under the auspices of the Samuel Field Bay Terrace YM and YWHA, in partnership with the North Shore LIJ Health System and the Deepdale Gardens Housing Complex. Staffed by nurses and social workers, this program was ideally situated to develop a comprehensive falls prevention program. The NORC program nurse utilized a modified Hartford Fall Risk Assessment (HFRA) tool to screen residents for falls risk

and to establish baseline measures. For this study, 110 NORC residents deemed high-risk for falls by NORC-SSP staff were targeted. A resident was classified as being high-risk if they had scored 15 or greater on the HFRA tool or if they expressed a fear of falling. An inclusion criterion for this study was being over the age of 60 and demonstrating the cognitive capacity to sign informed consent. Ninety-six out of the 110 NORC residents agreed and consented to participate in this program. Of the 96 residents, 3 died prior to completion of the intervention and/or follow-up assessment.

### *Study Design*

This study utilized a single group pre-post design. A parallel group randomized trial was not feasible and, moreover, the objective was to perform a pilot investigation of whether a falls prevention program held any potential for benefit to this community. Due to the exploratory nature of this study, consent from the Institutional Review Board was not needed. Ninety-three NORC residents received a multi-component nursing intervention including: an assessment of prior fall history, a sensory assessment, a mobility assessment, a cognitive assessment, review of medications, orthostatic blood pressure check, incontinence/urgency assessment, and a home environment (internal and external) safety check.

In response to this assessment, the resident was advised to change factors in the home environment that were unsafe, and were assisted to obtain aids to improve home safety (i.e., grab bars). With consent from the resident, the primary care physician was consulted regarding the need for medication review and subsequent medication changes were made. In addition, orders were obtained for physical therapy and home care as well as for assistive devices. The social work staff worked with the residents to decrease anxiety and improve emotional liability. Six months after initial assessment, the 93 residents were re-assessed with the modified HFRA tool.

In this study, fourteen risk factors identified on the HFRA tool were coded as present or absent pre- and post- intervention. Those risk factors were:

- History of falls
- Confusion
- Sensory deficit
- Decreased level of cooperation
- Medications affecting blood pressure or level of consciousness
- Incontinence/urgency
- Unsafe internal home environment
- Age (over 65)
- Impaired judgment
- Unable to ambulate independently
- Increased anxiety/emotional liability
- Cardiovascular/respiratory disease affecting perfusion & oxygenation
- Postural hypotension with dizziness
- Unsafe external home environment

### *Statistical Methods*

The total number of risk factors present (“composite fall risk score”) was the sum of the present component factors and was computed for pre- and post- intervention. For any component risk factor, McNemar’s test for paired binary data was used to compare the prevalence rates pre- versus post-. Additionally, the Wilcoxon signed rank test was used to compare the composite risk score pre- versus post-.

### Results

The study population consisted of 24% males and 76% females (see Table 1). One-hundred percent of the population was of Caucasian descent. The multifactorial intervention decreased at least one (or more) risks to fall in 65 percent of the residents. Overall, there was a significant decrease in the mean composite falls risk score for residents participating in the study (from 32.9 to 23.9, Wilcoxon signed rank,  $p \leq 0.001$ ). Specifically, we found significant decreases in prevalence post-intervention, via McNemar’s tests, in: 1) poor levels of cooperation, from 20 % to 12%,  $p \leq 0.05$ ; 2) anxiety/emotional liability (55% to 29%,  $p \leq 0.001$ ); 3) incontinence urgency scores (from 27 % to 13%,  $p \leq 0.001$ ); 4) postural hypertension (from 36

% to 21%,  $p \leq 0.001$ ), unsafe internal environment (from 74 % to 29%,  $p \leq 0.001$ ), and unsafe external environment (from 49 % to 8%,  $p \leq 0.001$ ). This study shows that a multifactorial intervention can be successfully implemented and evaluated in a NORC setting. Our hypothesis was supported that by implementing a multifactorial falls prevention program which includes enhanced communication resulted in decreased risk factors to fall.

### Discussion

Falls risk has always been a part of successful health assessment. Given the magnitude of the problem, the involvement of medical and community-based staff are key in identifying and preventing falls risk. This enhanced involvement and communication system leads to increased engagement of frontline healthcare professionals. The use of NORC-SSPs as a dissemination and implementation vehicle is a novel idea which, to the best of our knowledge, has not been explored previously. A Department of Health and Human Services white paper<sup>19</sup> cites the need to study dissemination in NORC-SSPs, particularly as it relates to older adults' trust of information sources. While our study only specifically addresses falls best practice, it demonstrates the potential of NORCs as a vehicle for best practice dissemination.

### Conclusions

This project was initiated as a response to the high percentage of emergency room admissions related to falls in the client population of Deepdale CARES NORC-SSP and the belief that these falls would lead to subsequent decline in functional status. Many community-based falls prevention programs focus on reducing environmental risk factors, leaving the medical community to identify and address contributing health conditions. Our hypothesis that disseminating and implementing a multifactorial falls prevention program in a community with the existing infra-structure of a NORC-SSP utilizing a better system of communication between

clients/patients, community physicians, and community based agencies was confirmed by this intervention. This collaboration was found to have a positive effect on falls risk factor reduction in the older adult population.

The NORC-SSP is an existing public health infrastructure in many U.S. communities. Given the trusting relationship that develops between NORC staff and the resident, and the potential reach of the NORC-SSP model, the NORC-SSP may be a cost-effective, important new resource for the management of various chronic conditions and risks for community-dwelling older adults. Further study of this model and its role in the dissemination of best practice programs that enhance the management of chronic disease is warranted.

## References

- 
- <sup>1</sup> Chang JT, Morton SC, Rubenstein LZ, et al. Interventions for the prevention of falls in older adults: systematic review and meta-analysis of randomised clinical trials. *BMJ* 2004; 328(7441): 680-687.
- <sup>2</sup> Gillespie LD, Gillespie WJ, Robertson MC, et al. Interventions for preventing falls in elderly people. *Cochrane Database Syst Rev* 2003; 4.
- <sup>3</sup> Farmer BC. The Hartford Institute for Geriatric Nursing, Division of Nursing, New York University 2000. Available at: <http://www.hartfordign.org>. Cited March 15, 2009.
- <sup>4</sup> Improving the Lives of Older America. National Council of Aging. Available at <http://www.ncoa.org/improving-health/falls-prevention/falls-prevention-issue-brief.html>. Cited December 20, 2009.
- <sup>5</sup> MacCulloch PA, Gardner T, Bonner A. Comprehensive fall prevention programs across settings: A review of the literature. *Geriatric Nursing* 2007; 28: 306-311.
- <sup>6</sup> Nevitt, MC. Falls in the elderly: Risk factors and prevention. In Masdeu, J. C., Sudarsky, L., Wolfson, L. *Gait Disorders of Aging: Falls and Therapeutic Strategies*, Philadelphia: Lippincott-Raven 1997; 13-36.
- <sup>7</sup> Age data of the United States. U.S. Census Bureau population division. Available at: <http://www.census.gov/population/www/socdemo/age/general-age.html#older>. Accessed on January 6, 2010
- <sup>8</sup> Centers for Disease Control and Prevention. Public health and aging: trends in aging – United States and worldwide. *Morbidity and Mortality Weekly Report* 2003; 52(06): 101-106.
- <sup>9</sup> The AARP Home Fit Guide. 2008. Available at <http://www.aarp.org/housing>. Cited December 29, 2009.

- 
- <sup>10</sup> Briss PA, Zaza S, Papaioanou M, et al. Developing an evidence-based guide to community preventive service - Methods. *Am J Prev Med* 2000; 18: 35–43.
- <sup>11</sup> Centers for Disease Control and Prevention. *The Guide to Community Preventive Services*. 2002. Available at: <http://www.thecommunityguide.org>. Cited May 11, 2009.
- <sup>12</sup> Whitlock EP, Orleans TC, Pender N, et al. Evaluating primary care behavioral counseling interventions: an evidence-based approach. *Am J Prev Med* 2002; 22: 267–284.
- <sup>13</sup> Rosen CJ. Postmenopausal Osteoporosis. *N Engl J Med* 2005; 353: 595-603.
- <sup>14</sup> Gabriel SE, Tosteson ANA, Leibson CL, et al. Direct medical costs attributable to osteoporotic fractures. *Osteoporos Int* 2002; 13: 323-330.
- <sup>15</sup> Banez C et al. Development, implementation, and evaluation of an interprofessional falls prevention program for older adults. *J Am Geriatr Soc* 2008; 56: 1549-1555
- <sup>16</sup> Campbell AJ, Robertson MC, Gardner, MM, et al. Falls prevention over 2 years: a randomized controlled trial in women 80 years and older. *Age Ageing* 1999; 28: 513–518.
- <sup>17</sup> Li F, Harmer P, Glasgow R, et al. Translation of an effective Tai Chi intervention into a community-based falls-prevention program. *Am J Public Health* 2008; 98: 1195-1198.
- <sup>18</sup> Baker DI, Gottschalk M, Bianche LM. Step by step: Integrating evidence-based fall-risk management into senior centers. *The Gerontologist* 2007; 47(4): 548-554.
- <sup>19</sup> Ormond BA, Black KJ, Tilly J, et al. Supportive services programs in naturally occurring retirement communities 2004. Available at: <http://aspe.hhs.gov/daltcp/reports/NORCspes.htm>. Cited April 20, 2009.

---

<b>Table 1: Subject Demographics</b>		
<u>Demographic</u>	<u>N</u>	<u>Percent of Total</u>
<b>Gender</b>		
Male	22	24%
Female	71	76%
<b>Age Distribution</b>		
75-79	16	17%
80-84	52	56%
>85	25	27%