

DESCRIPTION OF A MODEL RURAL, OLDER ADULT INJURY PREVENTION PROGRAM FOR THE HOME

Janet Valente, Timothy Dignam, Kara Marchman, and Mary C. (Betty) Goddard

Abstract

Unintentional injury is the seventh leading cause of death among adults aged 65 and above. Falls are a serious health problem among older adults, the costs of fall-related injuries are significant. In 1994, the average direct cost for a fall injury was \$1,400 for a person over age 65. In the United States the total direct cost of fall injuries in 1994 among people 65 and older was \$20.2 billion (Englander et al., 1996). This sum does not include the costs of the long-term consequences of these injuries, such as disability and reduced quality of life. The purpose of this paper is to share characteristics and findings of a model program designed to prevent injuries from occurring in the home. Two trained injury-prevention counselors conducted environmental assessments to identify hazards, make safety recommendations and corrections, and encourage behavioral changes. Additionally, a community-based consortium served as a resource for referrals and promotion of injury-prevention awareness in the targeted areas. The sample consisted of 853 households. The assessment of these households revealed that the most unsafe environmental issues related to emergency items (i.e., smoke detectors, night lights, bath tub strips). The most unsafe locations in the homes were the bedroom and the bathroom. Porches and steps were often found to be in need of repair. The most prevalent personal risks for injury were due to wearing glasses and taking medications. Making the home environment and the resident safe, in many cases, was not costly. By identifying hazardous situations, educators can play an integral role in designing educational materials in order to reduce the risks of injury in the home environment.

Janet Valente is an Educational Program Specialist, and Timothy Dignam and Kara Marchman are Evaluation Consultants at The University of Georgia.

Mary C. (Betty) Goddard, is a Nurse Consultant at the Georgia Department of Human Resources.

Unintentional injury is among the leading causes of death among older adults. Yet little effort has been made to develop intervention strategies to prevent unintentional injuries in the home environment. The purpose of this paper is to discuss a comprehensive programmatic approach for injury prevention that integrates an array of services, including environmental hazard identification and reduction, educational information and motivation, community education, and citizen participation. The findings of this study are from information collected from adults aged 65 years and above living independently in their own homes.

Program Rationale

Injuries do not happen accidentally. They follow a pattern. By identifying that pattern—learning what, when, where, why, and how injuries occur, it is possible to predict and prevent them (U.S. Department of Health and Human Services, 1990). The groundwork for injury prevention in the home begins with surveillance of the environment. Once the risks in the environment are identified, interventions can be designed to interrupt the pattern of injury before any harm is done. Furthermore, before injuries can be prevented among older adults, we need to identify those at highest risk of injury the types of injuries that are occurring, and when, where, and under what circumstances they occur (Stevens & Thomas, 1996). Unintentional injury is the seventh leading cause of preventable death among older adults (Stevens & Thomas), and the most common of these injuries is falls; burn scalds pose an additional threat. Falls are also the most *serious* injury and are the leading cause of fatal and non-fatal injuries among people aged 65 years and over in the United States. In 1995, more than 7,700 people age 65 years or more died as a result of falls (NCIPC, National Summary of Injury Mortality Data, 1996). For people aged 68-84 years, falls are the second leading cause of injury-related death; for those 85 years or older, falls are the leading cause of injury-related death (NCIPC National Summary of Injury Mortality Data).

Among the elderly, falls account for 87% of all fractures and are a contributing factor in 40% of nursing home admissions (Sumner & Simpson, 1992). One of every three people over the age of 65 years who live independently, in their own homes, fall each year (Campbell, Borrie, & Spears, 1989; Tinetti, Speechley, & Ginter, 1988). This fact is of particular importance since 95% of those over 65 years of age currently live in the community (Nickens, 1985). Reinsch, MacRae, Lachenbruch, and Tobis (1992) found that nearly 39% of 230 healthy community-residing elderly fell at least once during one year and, of those who fell, 38% fell several times. Rural elders living alone are more likely to have had a fall than are their suburban counterparts (Coward, Lee, Dwyer, & Seccombe, 1993).

Twenty to 30% of those who fall will suffer moderate to severe injuries causing reduced mobility and independence and a greater risk of death (Alexander, Rivara, & Wolf, 1992). Falls are also associated with a decreased quality of life such as: loss of self confidence or fear of falling, restriction of social and physical activities, increased dependence on others, and the need for long-term care (U.S. Department of Health and Human Services, Public Health Services, 1990).

The costs of fall-related injuries are significant. In 1994, the average direct cost for a fall injury was \$1,400 for a person over age 65. The total direct cost of fall injuries in the United States in 1994 among people 65 and older was \$20.2 billion (Englander, Hodson, & Terregrossa, 1996).

“Direct costs” are out-of-pocket expenses such as costs for hospital and nursing home care, physician and other professional services, rehabilitation, community-based services, drugs, medical equipment insurance, administration, vocal rehabilitation, and home modification (Englander et al., 1996). This cost does not include the long-term consequences of these injuries, such as disability and reduced quality of life.

Like other unintentional injuries, unintentional fire-related injuries and deaths are preventable among older citizens. Operational smoke detectors and fire extinguishers are a simple way to reduce fire-related death and disability. Unintentional fire-related fatality rates among Georgia residents 65 years and older increased from 6.3 deaths per 100,000 Georgia population in 1990 to 8.9 deaths per 100,000 Georgia population in 1995 (Georgia Department of Human Resources, 1990-1995). Unintentional fire-related deaths among individuals 65 years and older have decreased in the United States during the same years (U.S. Consumer Product Safety Commission, 1995). In 1990 there were 4.1 deaths per 100,000 population due to unintentional fire-related accidents, which decreased to 3.6 deaths per 100,000 U.S. population during 1995. Death rates due to fire-related accidents increase with increasing age among Georgia residents (Georgia Department of Human Resources, 1990-1996). Another trend among unintentional fire-related fatalities is that blacks and males are more likely to be killed, as shown by their higher death rates. These shocking statistics for blacks may be related to housing quality. Table 1 shows fire statistics.

As the individual grows older, the body experiences changes in vision, hearing, mobility, agility, strength, endurance, and dexterity. The prevalence of disability also increases with age. Musculoskeletal disorders caused by lack of physical activity and injuries are prevalent among individuals with disabilities. Because of these physiological changes, individuals may respond unpredictably. Consequently, there is a real need for creating an environment in and around the home that is safe and free of hazards.

Surveillance of the Living Environment

The adequacy of home safety features—such as nonskid mats for showers, bathtubs, and bathroom floors, secured rugs, handrails on stairs, smoke detectors, grab bars over tubs and toilets, and electrical outlets—are often limited or non-existent. A study of 2,776 rural Southern residences revealed that 75% of black males and 79% of black females resided in homes void of an adequate level of safety features (1890 Regional Research Project, 1990). The same study also found that 46% of white females and 56% of white males had an inadequate level of safety features in their homes. Another study (Northridge, Nevitt, Kelsey, & Link, 1995) revealed that people aged 65 years and older who were defined as “vigorous” older adults, as opposed to “frail” older adults, were more likely to fall if more hazards were present in the home.

Table 1. Unintentional Fire-Related Fatality Rates (n=per 100,000) by Race, Gender, and Age Group.

Aged	Georgia, 1990-1996				
	65-69	70-74	75-79	80-84	>85
White Female	1.78	2.01	4.05	3.01	6.29
White Male	3.28	3.02	4.50	3.19	8.03
Black Male	12.98	17.09	16.09	35.72	47.53
Black Female	6.60	7.26	12.11	23.54	32.38

Sources: Georgia Department of Human Resources (1990-1996).

Location and Time of Injuries

The U.S. Department of Health and Human Services (1991) found in their study of falls among persons aged 65 and older that 74% of all falls occurred during daylight hours, and 54% took place in and around the home. Of those falls in the home, 42% occurred in the bedroom, 34% in the bathroom, 9% in the kitchen, 5% on the stairs, and 4% in the living room. In a study conducted by Tideiksaar (1992), data showed that 95% of the reported injuries occurred in and around the home, primarily in the bedroom and bathroom. For active healthy elders, 51% of their falls occurred outdoors and in transitional areas such as the street, sidewalk, other persons homes, and in public buildings (Reinsch et al., 1992).

Reducing the risks of injury in older populations requires more than just simply removing hazards. Tinetti et al., (1994) reported that a multiple-risk-factor intervention strategy may result in a significant reduction in the risk of falls among elderly persons in the community. Risk-reduction strategies mentioned in this study included: making adjustments in medications, behavioral instructions, exercise, and counseling.

In a randomized controlled trial conducted in seven pairs of nursing homes, investigators found that simple interventions such as repairing wheelchairs, properly fitting shoes, removing clutter, psychotropic drug monitoring, more frequent patient assists, and patient reminders helped reduce by 19% the number of recurrent falls in the elderly. In addition, these interventions resulted in 50% fewer injurious falls by elderly residents who previously had had three or more falls (Ray et al., 1997).

Designing a Model Program to Prevent Home Injuries

Developing an intervention to address the home environment required consideration of several factors. These included: 1) developing assessment instruments, 2) identifying potential clients, 3) training injury prevention counselors, and 4) identifying and developing community alliances.

Environmental assessment forms were designed in an 87-item check list format to allow the user to systematically evaluate the living environment for potential hazards. Additionally, a 60-item personal assessment checklist was designed to provide an evaluation of items related to health issues that might contribute to the risk of injury. Both instruments were field tested and revised to assure accurate identification of safety problems.

The environmental assessment forms were utilized during initial and repeat visits. The personal assessment forms were completed only during initial home visits. Identified personal health problems were referred to the appropriate health care services for follow-up, since the primary focus of this project was related to environmental safety issues.

Initially clients were referred into the program by the injury prevention consortium. Additionally, potential clients were identified by reviewing records of persons who had participated in the weatherization program and other community-based programs, and through senior center, health departments, and social service agencies. Consortium members were identified and brought together to address injury prevention community-wide, through public awareness and outreach. The facilitation of this process allowed for interagency networking and provided a vehicle for ongoing prevention efforts within the community.

Two injury prevention counselors were trained to assess the homes of persons aged 65 years and older. The counselors conducted home and personal assessments, made recommendations for correcting hazards, and if necessary, referred problems to the appropriate resource within the community. The educational preparation of the counselors was the key to the success of the program.

A 40-hour educational training workshop designed to prepare the counselors for the rigors and complexity of working in the home was conducted by a housing program specialist and a nurse consultant. The training topics were: 1) the nature and magnitude of injury, 2) the aging process and injury, 3) communicating with older adults to promote behavior change, 4) making home and personal assessments, 5) availability of community resources, and 6) making referrals when at-risk individuals are identified. Ongoing consultation and training were available upon request, and follow-up sessions were adapted to meet the needs of the counselors.

Additionally, critical to the support of the injury-prevention program was the development of community alliances. The injury prevention consortium was developed with the philosophy that individuals participating in the consortium would receive mutual benefits from sharing responsibilities aimed at maintaining independence for older adults by helping to facilitate prevention efforts in the community.

The consortium was comprised of key representatives from community agencies and volunteer groups. These agencies/organizations provided ongoing assistance to the program counselor by making referrals, participating in injury-prevention training sessions, participating in health festivals, and providing support services for home safety repairs.

Findings from Environmental and Personal Assessment

The data collected from the assessment process provided insight into the issues affecting older adults in their home environments and allowed the counselor to provide the appropriate information and referrals to remove or correct safety hazards. Repeat visits to the home, approximately two to six months after the initial visit, helped to reinforce safety behaviors and determine if safety recommendations made by the counselor had been implemented and maintained.

Procedures

Two trained injury-prevention counselors collected environmental and personal assessment information between December 1994 and August 1997 in 13 rural northeastern Georgia counties. The sample of homes and individuals accessed were secured from the Community Action Incorporated Weatherization records and by referral from social service agencies within the community.

Counselors conducted 1,365 environmental assessments and 601 personal assessments. Of the 1,365 environmental assessments, 853 (62.5%) were initial assessments and 512 (37.5%) were follow-up assessments. An environmental safety questionnaire was completed with each assessment. Injury-prevention counselors conducted personal assessments during both initial and follow-up assessments, but not during all visits.

Environmental assessment forms collected the following information about the resident and the home environment: resident demographic information, injury-history information, health provider information, referrals made by the counselor, suggestions made by the counselor, safety items provided by the counselor (e.g., night lights, bath mats, tub strips), and an 87-item environmental safety checklist concerning seven areas of the home (e.g., kitchen area, living room, stairways). Personal assessment forms collected Medicare and Medicaid status information, a 60-item personal safety checklist, the agencies providing services to the resident, and suggestions made by the counselor.

To determine if the difference between the percentage of unsafe items was statistically significant when the initial and follow-up environmental assessment forms were compared, a Student's t-test was performed. All data were entered and analyzed using EpiInfo, Version 6.02.

Results

Demographic Characteristics

Eight hundred and fifty-three (853) households were affected by all environmental assessments. Most of the residents affected by the program were white, female, lived by themselves, owned their own homes, and were over the age of 65 years. Most residents (75.4%) listed their occupation as retired. The average household monthly income of the residents was more than \$600, although this question was not completed in 225 (26.0%) instances. Table 2 reports characteristics of residents.

Table 2. Characteristics of Residents (n=853).

Age		
Average Age		74.3 years
Age Range		35 - 99 years
Average Monthly Household Income		\$618
	n	%
Gender		
Female	722	84.6
Male	130	15.2
Missing	1	0.2
Race		
White	799	91.3
Black	64	7.5
Other	2	0.2
Missing	8	0.9
Occupations		
Retired	643	75.4
Disabled	30	3.5
Homemaker	16	1.9
All other	164	19.2

Home Characteristics

Most of the assessments were among residents who owned their homes (594 homes or 69.6%). Two hundred and twenty-five (225), or 26.4% of all homes assessed, were rented; 34 homes (4.0%) did not have this question documented. The average age of the home was 38.7 years, ranging from one to 200 years of age. Residents who were targeted by this program were largely (65.3%) living by themselves. Of the number of residents who lived in the homes assessed, one resident was the most frequent response (557 homes or 65.3%), followed by two residents (216 homes or 25.3%). The number of residents living in the homes assessed is illustrated in Table 3.

Previous Injury Information

About a quarter of the residents whose homes were environmentally assessed had been injured in the last two years. The number of residents who had been injured within the last two years reveals that 234 (27%) were injured, 601 (71%) were not injured, and 18 (2%) did not know or had this question undocumented. Of those re-

Table 3. Number of Residents Living in Homes Assessed (n=853).

Number of Residents	No. of Homes Assessed	% of Homes Assessed
One	557	65.3
Two	216	25.3
Three	39	4.6
Four	23	2.7
Five or More	18	2.1

porting injury, almost half had been injured inside the home. The average age of the resident with an injury was 74.7 years. These residents were mostly female (87.6%). Since 75.2% of the overall residents were women, the incidence of injury was only slightly greater than even. The average age of the home of the resident with a previous injury was 39.6 years. The location and cause of injury of those injured is reported in Table 4.

Environmental Assessment

The safety of the home was examined by looking at the 82 safety questions that constituted the eight areas of the home. Responses to 82 questions were analyzed by assigning the numeral one for an unsafe rating and the numeral zero for a safe rating. Each responses was given a score (a number between zero and one), and then all the responses were grouped into the eight areas of the home. Each area of the home thus received a rating of safe or unsafe based on responses to the questions. The results are based on a comparison of the 853 initial environmental assessments with the 512 follow-up environmental assessments. The rankings are shown in Table 5.

In "other areas of the home" nine safety issues were evaluated. These included hot water temperature, lighting levels, power cords or extension cords, locks on windows, doors free from pets, electrical outlets not overloaded, and windows and doors not nailed or boarded shut. Of the 7,677 data points resulting from the initial surveys in 853 homes, 5% were rated as unsafe.

The area of the home dealing with emergency items (i.e., fire extinguishers present and up-to-date, smoke detectors present, and operational emergency numbers displayed or within reach) was deemed the most unsafe in both initial and follow-up visits by the safety counselors. On initial visits, this area had, on average, 34% of all safety responses rated unsafe. This area clearly has higher unsafe ratings, than any of the other seven areas. The safest areas of the home are the "other" areas (5% unsafe) and the living room/family room areas (7% unsafe). However, each area of the home became safer after the initial assessment. The biggest improvements occurred in the areas of the home that deal with emergency items (10% improvement) and in the bathroom (8%

Table 4. Location and Cause of Injury Among the Residents Reporting an Injury During the Last Two Years (n=234).

Location	No. of Residents	% of Total
Inside the Home	111	47.4
Around the Home (e.g., yard)	95	40.6
Automobile	13	5.6
All Other Locations	5	2.1
Recreation Area	3	1.3
Shopping Area	3	1.3
Hospital	2	0.9
Senior/Community Center	2	0.9

Table 5. Magnitude of Safeness in the Eight Areas of the Home, Comparing Initial and Follow-Up Environmental Assessments (n=853).

Area of the Home (Number of Questions)	Average % of areas Marked Unsafe	
	Initial Environmental Assessment	Follow-Up Environmental Assessment
Other Areas of the Home (9)	5%	3%
Living/Family Room (12)	7%	5%
Kitchen (14)	9%	7%
Outdoor Area (3)	10%	4%
Stairs, Steps and Porches (8)	11%	6%
Bathroom(s) (17)	17%	9%
Bedroom(s) (14)	18%	12%
Emergency Issues (5)	34%	24%

improvement). A t-test was performed to see if there was a significant difference in overall home safety between initial and follow-up visits. The results showed that there was a statistically significant difference ($t=12.44, p<0.05$) in overall home safety when initial and follow-up assessments were compared.

Counselor Activity

The injury-prevention counselor played a key role not only in providing the expertise to identify and make referrals but also to encourage the residents to make changes. The counselor reinforced resident safety behaviors by praising them for their actions on the follow-up visits.

Safety counselors documented both 1) who referred the resident into a program, and 2) to what program the resident was referred for additional assistance. There were 390 documented referrals into the program. Referrals into the program came from a program coordinator (199), from the Energy Assistance Program (35), from a phone call (32), from the Hand in Hand Program that provided transportation to community services (28), and from a health-providing agency (20) such as a local medical center, home care agency, or senior center. Caution should be used in making generalizations because the question about referrals into the program is not included on the assessment form. Four hundred and sixty-three (463), or 54% of all initial environmental assessments, do not have this information listed.

Six hundred and fifty-nine (659) referrals were made out of the program. The most frequent were to a weatherization program, which accounted for 267 referrals or 35% of all documented referrals. The weatherization program personnel were trained to make safety repairs in the homes identified through the injury program. Repairs included: construction of access ramps, installation of hand rails near steps, grab bars, and porch repairs. Other selected referrals included: 69 (10%) to repair companies, 59 (9%) to the Department of Family and Children Services and the Lion's Club, 49 (8%) to the Energy Assistance Program (EAP), 46 (7%) to the Indigent Pharmacy Program (IRP), and the remaining to miscellaneous community agencies or churches.

Safety counselors documented the safety items they provided to residents. After examining the 853 initial assessments counselors most frequently posted, or recommended to be posted, emergency numbers. 189 emergency numbers were posted or recommended to be posted. Provided were 181 tub strips/bath mats, 180 smoke detectors, 173 grab bars, 151 night lights, 147 flashlights, 91 rug strips, 57 jar openers, and 45 batteries. The most frequent suggestions given by the counselors was to adjust the hot water temperature (55), not sit so close to the space heater (42 times), have the fire extinguisher inspected or installed (41 times), rearrange and remove exposed electrical cords (31 times), use a step stool instead of other objects to reach high places (27 times), and clean up trash and clutter (25 times).

Personal Safety

Injury-prevention counselors conducted 601 personal safety assessments with the primary resident. Of these 601 individuals, 88.1% received Medicare benefits and 47.4% received Medicaid benefits. The 60-item personal safety checklist was divided into three areas: need for assistance with daily activities, risk factors for injury, and prevalence of self-reported disease. The most frequent occurrences in these three areas are listed in Table 6.

Table 6. Most Frequent Characteristics Among Three Areas from the Personal Safety Checklist (n=601).

Characteristic	No.	%
Need for Assistance with Daily Activities		
Assistance With Shopping	321	53.4
Assistance With Housework	234	38.9
Assistance With Cooking	174	29.0
Assistance With Bathing	135	22.5
Most Prevalent Risk Factors for Injury		
Wears glasses	526	87.5
Takes Medication	519	86.3
Frequently Feels Tired	414	68.8
Experiences Dizziness	346	57.6
Uses a Cane, Wheelchair or Walker	340	56.5
Prevalence of Self-Reported Disease		
Arthritis	477	79.4
Hypertension	304	50.6
Diabetes	142	23.6
Heart Disease	103	17.1

Discussion

Tideiksaar (1992) stated that injury in older people involves an interaction of several factors: environmental hazards (e.g., inadequate lighting, slippery or uneven floor surfaces) and medical conditions (e.g., acute and chronic diseases, medication effects). To be effective, prevention requires a mixture of countermeasures or interventions. This study reinforces earlier research on injury prevention and documents the need for identifying hazards as a means of reducing the risks of home injuries. The counselor approach, sharing information one-on-one with the resident, improved the safety of the home environment. This finding is based on comparison of first and final counselor visits. The counselor was able to identify safety issues through observation and to provide suggestions for removal of hazards during the first visit. When the counselor made a repeat visit, the initial safety hazards were checked and information was shared to reinforce the importance of their removal. Clients were encouraged to continue practicing safety habits throughout their environment. If hazards were not removed, the client was reminded and encouraged to make the safety changes. Sweaney and Meeks (1993) and Grogan, Valente, and Chapman (1991) also found the counselor approach effective in encouraging behavioral changes.

Making the environment safe, in many cases, was not costly. During the assessment, the counselor identified ways to remove hazards by simply rearranging and/or replacing furniture, or by removing obstacles such as rugs or extension cords from traffic flow areas. A counselor entered the home with a safety bag that included: 1) smoke detectors, 2) a bathtub mat or strips 3) batteries, 4) night lights, 5) flashlights, and 6) safety strips for throw rugs. If all items in the safety bag were utilized in the home, the average cost would be approximately \$30.00.

Providing a personal safety assessment offered the counselor insight into medical conditions that could potentially contribute to an injury. More important, the problems identified through personal assessment were referred to the appropriate services and service providers in the area, thus mobilizing existing services in the community to address injury prevention issues.

The community based approach used during this program also helped to increase injury awareness of all individuals living in the region. Injury prevention activities such as vision and hearing screenings, foot care, fire prevention, and injury-prevention information were made available at local health festivals. An increased awareness by individuals representing business, service agencies, and health care providers within the community helped to facilitate ongoing injury-prevention activities and provided a foundation for continuation of these activities.

Conclusions

Physical limitations of aging individuals living in aging housing stock, a lack of income for maintenance, and a lack of injury-prevention information contribute to hazardous home conditions. By identifying these situations, educators and family members play an integral role in providing educational opportunities to make the home environment safer. Northridge, Nevitt, Kelsey and Link (1995) suggested that preventive strategies to reduce injury in older persons may be more effectively designed and targeted if consideration is given to living environments and the ability of individuals to function in their homes. Further, Reinsch et al., (1992) stated, it is important that active elders be educated to be vigilant in detecting environmental hazards in the home, in acting preventively, and in considering the risks that they may be taking. Often these individuals are concerned with just being able to remain independent. They get used to their surroundings and do not make changes easily. The extensive personal safety issues that counselors reviewed with individuals as they collected information reinforced important ways to prevent injuries in the home.

The findings from this community-based injury prevention project in Northeast Georgia reinforce the need for home safety assessment programs as an alternative to treating injuries after they occur and paying for the costs associated with medical care and rehabilitation. The findings also suggest that building prevention awareness among health care providers, service agencies, businesses, and citizens in the community is cost effective and can help to facilitate development of prevention-oriented activities, thus continuing the longevity of a preventive program.

Without exception, preventing injuries costs less than does treating them. In 1994 in the United States the average direct cost for a fall injury was \$1,400 for a person age 65 and over. The total direct cost of fall injuries in 1994 among people 65 and older was \$20.2 billion (Englander et al., 1996). Add to that the cost of rehabilitation and the long-term consequences of disability, and the savings are dramatic. We know that for every residential smoke detector that is purchased including batteries and maintenance, the estimated cost saving \$210 to \$636 (Miller & Levy, 1997). However, the actual dollar amount saved by preventing a home-based injury has not been documented. Future programs need to include a cost benefit study to determine the amount saved by preventing home injuries.

References

- Alexander, B.H.J., Rivara, F.P., & Wolf, M.E. (1992). The cost and frequency of hospitalization for fall-related injuries in older adults. *American Journal of Public Health*, 82 (7): 1020-1023.
- 1890 Research Program Directors (1990). *Quality of well being of the rural Southern elderly*. Technical Report, 1890-1990 Home Economics Regional Research Project (RR-4), Council of Home Economics Administrators, Association of Research Directors, and The United States Department of Agriculture.
- Campbell, A.J., Borrie, M. J., & Spears, G. F. (1989). Risk factors for falls in a community-based prospective study of people 70 years and older. *Journal of Gerontology*, 44 107-111.
- Centers for Disease Control and Prevention (1990-1995). Georgia Vital Statistics, (ICD -9 codes 890-899).
- Coward, R.T., Lee, G.R., Dwyer, J.W., & Seccombe, K. (1993). *Old and alone in rural America*. Washington, DC: American Association of Retired Persons, Public Policy Institute.
- Englander, F., Hodson, T.J. & Terregrossa, R.A. (1996). Economic dimensions of slip and fall injuries. *Journal of Forensic Sciences*, 41 (5), 733-746.
- Georgia Department of Human Resources (1990-1995). Georgia Division of Public Health, Georgia Vital Statistics (ICD-9 codes 890-899).
- Georgia Department of Human Resources, (1990-1996). Georgia Division of Public Health, Georgia Vital Statistics (ICD-9 codes 890-899).
- Grogan, W.J., Valente, J.S., & Chapman, S.F. (1991). In-home energy education for elderly and limited income households. *Housing and Society*, 18, (1), 1-12.
- Miller, R.T., & Levy, D.T. (1997). Cost outcome analysis in injury prevention and control: A primer on methods. *Injury Prevention*, 3, 288-293.
- NCIPC. National Summary on Injury Mortality Data, 1988-1994. (1996). Centers for Disease Control and Prevention. Atlanta, GA.
- Nickens, H. (1985). Intrinsic factors in falling among the elderly. *Archives of Internal Medicine*, 145, 1089-1093.

Northridge, M.E., Nevitt, M.C., Kelsey, J.L. & Link, B. (1995). Home hazards and falls in the elderly: The role of health and functional status. *American Journal of Public Health, 84* (4), 509-515.

Ray, W.A., Taylor, J.A., Meador, K.G., Thapa, P.B., Brown, A.K., Kajiham, H., Davis, C., Giddeon, P., & Griffin, R., (1997). A randomized trial of a consultation service to reduce falls in nursing homes. *The Journal of the American Medical Association, 278* (7), 557-562.

Reinsch, S., MacRae, P., Lachenbruch, P.A., & Tobis, J.S. (1992). Why do healthy older people fall? Behavioral and environmental risks. *Physical and Occupational Therapy in Geriatrics, 11* (1), 1-15.

Stevens, J.A., & Thomas, T.A. (1996). *Major Causes of Unintentional Injuries Among Older Persons, An Annotated Bibliography*. National Center for Injury Prevention and Control. Atlanta, GA.

Summer, E.D. & Simpson, W.W., Jr. (1990). Intervention in falls among the elderly. *Journal of Practical Nursing, 42* (2), p. 24-34.

Sweaney, A.L., & Meeks, C.B. (1993). *An Assessment of Changes of Energy Behavior*. Georgia Office of Energy Resources.

Tideiksaar, R. (1992). Falls among the elderly: A community prevention program. *American Journal of Public Health, 82*, 892-893.

Tinetti, M.E., Speechly, M. & Ginter, S.F. (1988). Risk factors for fall among the elderly persons living in the community. *The New England Journal of Medicine, 319*, (26), 1701-1707.

Tinetti, M., Baker, D.I., McAvay, G., Claus, E.B., Garrett, P., Gottschalk, M., Koch, M.L., Trainor, K., & Horwitz, R.I. (1994). A multifactorial intervention to reduce the risk of falling among elderly people living in the community. *The New England Journal of Medicine 331*, 821-827.

U.S. Consumer Product Safety Commission (1995). Fire incidence study: National Smoke Detector Project. Washington, DC: U.S. Consumer Safety Commission.

U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, U.S. Department of Transportation. (1991). *Injury Control, the Third National Conference, Setting the National Agenda for Injury Control in the 1990s*, Washington, DC.

U.S. Department of Health and Human Services, Public Health Services. (1990). *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*, Washington, DC.