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Intervention study for changes in home fire safety knowledge in urban older adults

Carlee Lehna [a,b,*], Mary-Beth Coty [a], Erin Fahey [a], Joe Williams [c], Drane Scrivener [c], Gracie Wishnia [d], John Myers [b]

[a] University of Louisville School of Nursing, 555 S. Floyd Street, Louisville, KY 40202, United States
[b] University of Louisville School of Medicine, Abell Administration Building, 323 E. Chestnut Street, Louisville, KY 40202, United States
[c] Louisville Fire Department, 1135 W. Jefferson Street, Louisville, KY 40203, United States
[d] Peaceful Families, PLLC, 3013 Bunker Hill Dr., Louisville, KY 40205, United States

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ABSTRACT

Older adults are more likely to experience problems that contribute to an increase in burn-related morbidity and mortality. The purpose of the current study was to determine if the educational home fire safety (HFS) intervention was an effective method of improving HFS knowledge over time in two groups of urban older adults, home bound and community-based. HFS knowledge of 110 urban older adults was assessed at baseline, immediately after watching a HFS DVD (recall), and at 2-week follow-up (retention). The United States Fire Administration Home Safety Checklist which examines HFS practices in the home was also administered. HFS knowledge scores significantly increased over time for both groups ($p < 0.0001$), but no significant differences existed between the two groups over time ($p = 0.183$). In addition, HFS knowledge scores were significantly impacted by the number of chronic illnesses, number of independent activities of daily living, and income. The findings from this study suggest the educational HFS intervention was effective in increasing urban older adults' HFS knowledge over time. Lowering the burns morbidity and mortality in the older adult population is an important public health concern that needs to be addressed through tailored prevention and education strategies.

1. Introduction

The older adult population, those 65 years of age and older, is a quickly growing segment of the United States (US) population. The population of older adults over age 65 increased from 35.5 million in 2002 to 43.1 million in 2012, a 21% increase; this population is expected to reach 79.7 million in 2040 [1]. Not only is this population getting bigger, it is also getting older. The survival gains for those ages 85 and older are impressive. The population of older adults over 85 years old is expected to increase from 5.9 million in 2012 to 14.1 million in 2040 [1].

* *Corresponding author at*: School of Nursing & Associate in Pediatrics, School of Medicine, University of Louisville, 555 S. Floyd Street, Louisville, KY 40202, United States. Tel.: +1 502 852 3913; fax: +1 502 852 0704.
E-mail addresses: c0lehn01@louisville.edu (C. Lehna), m0coty02@louisville.edu (M.-B. Coty), Erin.Fahey@louisville.edu (E. Fahey), Joseph.Williams@louisvilleky.gov (J. Williams), Drane.Scrivener@louisvilleky.gov (D. Scrivener), gwishnia@gmail.com (G. Wishnia), John.Myers@louisville.edu (J. Myers).
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Additionally, older adults are ''aging in place'', or living independently in their own homes. Approximately 28%, or 12.1 million, of non-institutionalized older adults live alone [1].

This growing population of older adults has also been shown to be at higher risk for fire and burn-related injuries and death. The Federal Emergency Management Agency (FEMA) reported that older adults age 65 years and older accounted for 35% of all fire deaths in 2010, while they only account for 13% of the US population [2]. Adults 65 and older have a relative risk of dying in a fire that is 2.7 times higher than that of the general US population [2]. The risk was even higher for older adults age 85 year and older; this group had a relative risk of dying in a fire that is 4.6 times higher than that of the population as a whole [2]. In addition to age, older adults' race and gender were found to influence their risk of fire death. Older African–Americans and American Indians/Alaska Natives had much greater risk than older Caucasians and Asian/Pacific Islanders [2]. Also, older males were 62% more likely to die in a fire than older females [2].

Other factors impacting older adults' risk of fire-related death are physical and mental limitations, increased number of medications, and poverty status [2]. As individuals age, cognitive and sensory function naturally decline, mobility lessens, and the number of chronic illnesses increases. These situations directly increase older adults' risk for fire and burn-related injuries and death. With decreased cognitive and sensory function, older adults may be unable to recognize fire hazards and may unknowingly participate in riskier behaviors [2]. Also, they may not be able to recognize when an injury is severe and treatment is necessary. Decreased mobility can cause fall-related accidents and inhibit a person's ability to escape in the case of a fire. Finally, older adults tend to take more medications as they experience more chronic illnesses. Medications increase fire risk through side effects such as drowsiness, impaired judgment, and hypotension. It is estimated that 88% of older adults over the age of 60 take at least one prescription medication, and 37% take at least five medications a day [3]. FEMA also reported that older adults living in poverty, often due to fixed incomes, are at higher risk of fire death due to substandard living conditions such as compromised building structures and faulty electrical systems [2]. In addition, older adults often feel cold and will rely on temporary sources of heat (e.g., space heaters, fireplaces, cooking ovens) when their central heating source is inadequate [2]. All of these risks factors are compounded when older adults choose to live independently at home where they are solely responsible for their well-being.

The Kentuckiana Regional Planning and Developing Agency (KIPDA), the designated Area Agency on Aging (AAA) in Kentucky (KY), recently conducted a survey with the purpose of a close analysis of their service area [4]. It is noted that KY has the second highest percentage of people with disabilities in the entire nation. In the AAA for Jefferson County 16.6% of individuals are elderly (60 years or older), and 78.9% of them live in the KIPDA service region in Jefferson County. Approximately 19.2% of older persons in the region are low income, and of those 24.4% are minorities. From this total, 23% of them suffer from some form of chronic illness such as arthritis; 24% suffer from high blood pressure, and 12% have diabetes and heart problems. These people (37% of them) stay at home, or serve as caregivers/volunteers to others. In the same survey of 81% respondents, 43% of them mentioned being concerned about falling and losing their balance and difficulty paying their electricity bill as their major areas of concern.

Despite the clear vulnerability of the older adult population, less than 20% of older adults surveyed by KIPDA reported attending fire safety education within the last 5 years [4]. According to the Louisville Fire Department, there were 552 single and multi-family dwelling fires from January 2011 until November 30, 2012 within the Louisville Metro area. In 2011–2012, the University regional trauma center reported treating 116 patients aged 50 years and older from the Louisville Metro area for burn-related injuries. The major causes of injury were ignition-related fumes (22%), hot liquids (21%), house fires (16%), flames burns (4%), motor vehicle-related (4%), and electric (3%).

The goal for nurses and caregivers is modifying the individual's environment to reduce hazards in order to prevent fires, falls, and other accidents and promote function. Another goal is to provide instruction and support to family caregivers as they supervise and care for their loved ones [5]. Educational interventions play an important role in improving home fire safety (HFS) knowledge and practices of the older adult population and decreasing their risks of experiencing fires and burn-related injuries and death. The interdisciplinary collaboration on this project allows for community advocates to share resources and provide much needed educational support to vulnerable older adults so as to increase their safety and prevent unnecessary burns. The purpose of the current study was to determine if the educational HFS intervention was an effective method of improving HFS knowledge over time in a group of urban older adults.

2. Methods

2.1. Design

After institutional review board approval was obtained, data were collected in a longitudinal intervention study assessing HFS knowledge and practices in older adults (over age 50). The study aimed to examine if the intervention improved HFS knowledge over time in a group of urban older adults. In addition, we investigated the impact traditional risk factors (e.g., age, chronic illness, activities of daily living [ADLs], and income had on HFS knowledge scores over time. To achieve this goal we assessed HFS knowledge at baseline (T1), immediately following the intervention (T2; recall measure), and a minimum of 2 weeks after the intervention (T3; retention measure). We hypothesized that scores would significantly increase over time, with recall scores being the highest. Additionally, a HFS checklist was used during home visits with the participants to assess HFS practices.

2.2. Sample

Participants in the study included older adults (over age 50), who lived in central Kentucky. The only inclusion criterion

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