Independently Living Rural Seniors and Emergency Preparedness: A Pilot Study in Southern Illinois

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Abstract

Rural-dwelling older adults often have difficulty obtaining needed medical and social services due to factors such as physician shortages, lack of transportation, and financial limitations. These factors are further exacerbated during an emergency. Understanding these challenges is important to implement successful health promotion interventions and protect human life. Purpose: The purpose of this pilot study was to assess independently dwelling rural senior citizens' knowledge, attitudes, and behaviors regarding emergency preparedness. Methods: A 39-item instrument was administered to 85 independently dwelling seniors throughout a rural county in Illinois. Results: The majority, 56%, indicated not having an emergency plan, and one-third reported not having bottled water or a first aid kit in the home. Discussion: Less than half of the respondents were knowledgeable regarding what types of items, such as food, water, and medications should be included in a 72-hour kit, and many participants did not have these items stored. Most participants felt that local health departments should provide warnings, food, shelter, transportation, help to the injured, and medications during an emergency. This finding is important, as rural health departments are not typically equipped to provide any of these. Rural health departments should clarify what services are provided by which agencies and collaborate with local social service organizations to help seniors be more prepared.

Introduction

In 2005, Hurricane Katrina captured the attention of the world as the media reported on the approximately 275,000 Gulf Coast residents who were displaced by the destructive storm (Federal Emergency Management Agency [FEMA], 2006). The magnitude of damage produced by this hurricane brought to light the importance of emergency preparedness and evacuation planning for disasters. In the six years since Hurricane Katrina, the United States Department of Homeland Security's (DHS) FEMA (2011) has documented 421 major disaster declarations. Disasters can be either naturally-occurring or man-made. Natural disasters may include floods, wildfires, earthquakes, volcanic eruptions, and severe weather, such as hurricanes, tornadoes, tsunamis, and winter storms; man-made disasters typically comprise building collapses, transportation wrecks, fires, or acts of terrorism.

Disasters can strike anyone, anywhere in the world, at any time. No one is immune; however, certain populations, such as the elderly, are more vulnerable than others to the effects of a disaster. For example, 70% of the fatalities resulting from Hurricane Katrina were people aged 60 or older (Benson, 2009a; Rothman & Brown, 2008). Henderson (2005) discussed his experience triaging many of the estimated 15,000 people gathered outside of the New Orleans Convention Center soon after the hurricane. He noted there were many men, women, and children with various medical problems and hundreds of dehydrated elderly individuals in wheelchairs (Henderson, 2005). Most of these elderly people were holding plastic bags full of empty medication bottles and asking for refills; unfortunately, there was no way to refill any of the much-needed medications (Henderson, 2005). The issue of access to medications during a disaster highlights the importance of emergency preparedness planning not only at the individual level, but also at the city, state, and national levels as well.

Rothman and Brown (2008) stated that issues related to disasters can adversely influence health outcomes of elderly individuals. In addition to lack of medications, these issues may include injuries, dangerous evacuations, routines that are altered, and unfamiliar environments. A growing field of research describes the development of disaster plans for hospitals, nursing homes, and assisted living facilities (Administration on Aging [AoA], 2011; Benson, 2009b). Disaster planning is the process of preparing for potential disasters by taking precautions, such as creating an evacuation plan, to minimize the effects of a disaster. Many uncontrollable factors, such as severity and longevity of a disaster, efficiency of warning systems, health status, and access to resources, directly influence an individual's capacity to respond to a disaster (Fernandez, Byard, Lin, Benson, & Barbera, 2002). Individual emergency preparedness should be considered an essential component to mitigate the negative and often devastating effects resulting from a disaster (FEMA, 2004; Illinois Public Health Association [IPHA], 2011).

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The AoA (2011) noted that as of 2009, 11.4 million women (30.1%) and 8.3 million men (18.7%) aged 65 or older lived alone and maintained their own residence. Additionally, 716,000 grandparents aged 65 or older sustained a residence in which grandchildren were present; of these households, approximately 475,000 grandparents aged 65 or older were the primary caretakers for the grandchildren (AoA, 2011). Currently, little information is known about disaster planning and the emergency preparedness of elderly individuals who maintain their own residence, especially in rural areas.

The Elderly

The number of American citizens aged 65 and older is expected to double in the next 50 years; likewise, those aged 85 and older comprise the fastest growing segment within the population (National Institute on Aging, 2006). Although advances in medicine and public health have significantly changed mortality rates and resulted in longer life spans, chronic diseases now pose greater challenges as people age (Guralnik & Branch, 2000). Chronic illnesses, many of which are degenerative and increase exponentially with age, may cause physical disabilities that can include hearing and vision loss, as well as an overall decrease in functional capacity (Guralnik & Branch, 2000; Oriol, 1999). These physical changes not only affect the independence of an elderly individual, but also contribute to difficulties in communicating and disseminating disaster information. Thus, lines of communication (i.e., radio, television, newspaper, etc.) are invaluable aids for increasing rates of disaster survival, particularly in rural areas (Sundet & Mermelstein, 1996).

Decreases in monthly income and reductions in available resources can also be challenges related to the independence of the elderly. Poverty rates rise with age and remain disproportionate among minority populations (Oriol, 1999). For example, one study on the predictors of rural community survival after a natural disaster concluded that poverty rates have a strong association with victim outcomes (Saunders, Naidoo, & Griffiths, 2007; Sundet & Mermelstein, 1996). Additionally, individuals tend to rely on themselves, neighbors, and family for assistance after a disaster. Social support, though, becomes more limited with age—due to a loss of family members, including spouses—and results in isolation and fewer resources (Ritzel, Hanson, Welle, & Kittleson, 1994; Saunders et al., 2007).

Older individuals need more time to make necessary preparations for emergency situations and may be more reluctant than younger populations to leave familiar surroundings in response to an evacuation order (Ostroff, 2002). Furthermore, if a disaster does lead to evacuation, the relocation alone may be equally as stressful to the elderly as the disaster itself (Kuba, Dorian, Kuljian, & Shoaf, 2004). This relocation sometimes results in what is known as *relocation stress syndrome*, which is defined as any physiological and/or psychosocial disturbance as a result of transfer from one location to another (Robinson, 2002). Additionally, limited functioning, including functions necessary for communication, fear of further loss, and reluctance to relinquish independence, are just a few of the factors associated with aging that leave the elderly particularly susceptible during a disaster situation.

Local Needs

Recent disaster events have brought the needs of the most vulnerable populations, including the elderly, to the forefront of service providers and community agencies (Crary, 2005). For example, in the state of Illinois, the Illinois Department of Public Health (IDPH) committed to fostering a coordinated, integrative system of emergency management to help mitigate the negative consequences of disasters (IPHA, 2005). The IPHA, funded by a grant from the IDPH, created a template for local implementation of emergency services to special needs populations (IPHA, 2005). A manual was developed to guide local health departments in their efforts, outlining specific steps to foster a comprehensive, coordinated response to disasters (IPHA, 2005). Coordination of efforts took place through the formation of a Special Needs Advisory Panel (SNAP) (IPHA, 2005). SNAP created partnerships among local agencies, service providers, and individuals to address the needs of vulnerable populations. In an effort to identify these needs, research regarding these populations, such as the elderly, needed to be conducted.

This pilot study was conducted in a small rural county in Southern Illinois as part of a larger SNAP needs assessment. The definition for the term rural used for the study was based upon the Health Resources and Services Administration classifications for rural areas as defined by the Office of Rural Health Policy. A metropolitan or urban area is one in which there is at least 1,000 people per square mile and at least 500 people per square mile in the regions surrounding the main census area. Rural areas are by default all areas not categorized as metropolitan or urban. In 2000, the county under study had 59,612 residents, 80.8% (n = 48, 158) were White/Caucasian and 49% (n = 29,183) were female. Eleven percent (n = 6,575) were at or over 65, and of those 6.6% (n = 3,938) were female (U.S. Census Bureau, 2012). Therefore, the county met the criteria to be classified as rural at the time of the study (U.S. Department of Health and Human Services, 2012). This pilot study sought to assess: (a) surveys as a method of data collection for independently living senior citizens in a rural county, (b) attitudes towards disaster preparedness, (c) preparedness behaviors, and (d) identification of perceived emergency services to be provided by local health departments.

Methods

A 39-item instrument was created to assess attitudes towards disaster preparedness as well as preparedness behaviors. Survey items were created based on a thorough review of preparedness resources, including documents from the DHS and the United States Centers for Disease

Control and Prevention. Preparedness attitudes were assessed using 13 five-point Likert scale type items (possible scores ranging from 13-65) and yielded a Cronbach's (coefficient) alpha of 0.551. All items were coded 1-5, with higher scores indicating more positive attitudes. Those participants who refused to answer one or more of the individual attitude items were not included in the analysis of attitudes as their summated scores could not be computed. Demographic and general preparedness assessment consisted of a series of multiple-choice items. Three open-ended questions were added to determine items desired by participants for disaster preparedness kits and perceived emergency services to be provided by county officials. Upon receiving Institutional Review Board (IRB) approval, the original instrument was pilot tested with nine senior citizens aged 65 years and older from a community center. The participants consisted of eight Whites/Caucasians and one Black/African American. After the survey was administered, the researchers asked the participants to give their input on survey readability and overall difficulty. Based on the input of the pilot participants and a review of the completed surveys, several minor changes were made. They included moving the demographic section to the back of the instrument, deleting the demographic question about having a pet, and adding a yes/no component to the *check all that apply* questions.

Once the changes were made and approved through IRB, the instrument was administered to a convenience sample of senior citizens at five locations that included two local senior centers, one senior retirement village, and two churches that offered free lunches for seniors. A total of 88 surveys were collected; however, 3 were not useable due to incomplete data, resulting in a 90% response rate. No incentives were provided to participants. Data analysis consisted of descriptive statistics as well as parametric analyses used to assess differences in attitudes related to demographic variables. All analyses were conducted using the Statistical Package for the Social Sciences version 17.0.

Results

Demographics

A total of 85 participants, ages ranging from 60-95, were recruited from a rural county in Illinois. The majority of the participants were female (61.2%; n = 52), White/Caucasian (78.8%; n = 67), and had attended college (59.5%; n = 49). A complete summary of all demographic data can be found in Table 1.

Table 1

Description of Demographic Data

Demographic (*n = 85*)	Frequency (*n*)	Percent (%)
Sex		
Male	23	27.1
Female	52	61.2
Missing	10	11.8
Race		
White/Caucasian	67	78.8
Black/African American	9	10.6
Asian	1	1.2
Missing	8	9.4
Age		
60-70 years	19	22.4
71-80 years	27	31.8
81-90 years	30	35.3
91+ years	2	2.4
Missing	7	8.2
Education		
1st-5th grade	1	1.2
6th-11th grade	5	5.9
High school graduate	23	27.1
Some college	22	25.9
College graduate	10	11.8
Graduate school	17	21.8
Missing	7	8.2
Income		
<$10,000	6	7.1
$10,000-$20,000	17	20.0
$21,000-$30,000	10	11.8
$31,000-$40,000	5	5.9
$41,000-$50,000	4	4.7
>$50,000	17	20.0
Missing	26	30.6

Disaster Preparedness Attitudes

Attitude scores ranged from 38.00-63.00 with a mean score of 50.00 (SD = 4.96; n = 66). See Table 2 for responses to individual attitude items. To account for severe inequalities in sample sizes, race was re-coded to White/Caucasian and Other. Further, education was re-coded to combine those who completed grades 1-11 into a single category. It should be noted that while the condensing of demographic categories was necessary to account for unequal cell sizes, it certainly limits the ability to assess individual differences. Two independent sample t-tests failed to yield a significant difference in attitude scores for sex and race. A series of Analyses of Variance was conducted to assess differences in attitudes among education and income variables. A statistically significant difference was found among different income categories ($F(5,45) = 3.214$, $p < .05$). A Tukey's post-hoc analysis confirmed differences in attitudes between those whose income was below $10,000 (M = 47.00; SD =

Table 2

Respondents' Knowledge, Attitudes, and Behaviors Regarding Disasters and Disaster Preparedness

Item		Strongly agree		Agree		Unsure		Disagree		Strongly disagree	
	N	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
1. I believe a major natural disaster could happen in my country.	85	42	49.4	38	44.7	5	5.9	0	0.0	0	0.0
2. I believe a major man-made disaster could happen in my country.	85	22	25.9	42	49.4	17	20.0	4	4.7	0	0.0
3. I believe storing food, water, and medicine would make my family and me safer if an emergency were to arise.	84	25	29.4	51	60.0	8	9.4	0	0.0	0	0.0
4. I have a plan of what to do in case of a major disaster.	81	7	8.2	37	43.5	21	24.7	13	15.3	3	3.5
5. I have spoken with my friends and/or family about my emergency plans.	81	3	3.5	38	44.7	18	21.2	19	22.4	3	3.5
6. In the last 12 months, I have seen information related to personal emergency preparedness.	80	22	25.9	45	52.9	5	5.9	7	8.2	1	1.2
7. I would evacuate my home in case of an evacuation order during a major natural disaster.	81	30	35.3	39	45.9	9	10.6	1	1.2	2	2.4
8. I would evacuate my home in case of an evacuation order during a major man-made disaster.	82	30	35.5	37	43.5	10	11.8	47	4.7	1	1.2
9. If I had to evacuate to a public shelter I could do so unassisted.	79	22	29.9	43	40.0	10	11.8	7	8.2	6	7.1
10. There is someone in my household who would require assistance for evacuation due to medical needs.	75	9	10.6	12	14.1	6	7.1	23	27.1	25	29.4
11. It would not be difficult for me to store 72 hours' worth of food and water in my home without electricity or a refrigerator/freezer.	82	20	23.5	39	45.9	11	12.9	8	9.4	4	4.7
12. It would not be difficult for me to store 72 hours' worth of medication in my home.	81	24	29.1	41	48.2	7	8.2	6	7.1	3	3.5
13. I can quickly access my emergency supplies and/or medications in an emergency.	80	32	37.6	39	45.9	6	7.1	0	0.0	3	3.5

Note. Totals not equaling 100% indicate missing data.

3.94) and those who earned between $31,000 – $40,000 (M = 57.33; SD = 6.03). In addition, those who earned between $10,000 - $20,000 (M = 48.07; SD = 3.01) had statistically different attitudes than those who earned $31,000 - $40,000 (M = 57.33; SD = 6.03). No statistically significant differences in attitudes were found among different educational levels. The categories for income were based upon demographic data provided by local health department.

Disaster Preparedness Behaviors

Few of the participants (17.6%; n = 15) self-reported having hearing, visual, or other physical conditions that would inhibit their ability to receive emergency information. Approximately 74% (n = 63) of participants indicated they currently were able to operate their own motor vehicle, while others reported relying on public transportation or a friend to drive them around. When asked how many gallons of water were stored in the home, 35.3% (n = 30) of the sample indicated they kept no bottled water in the home, while 7.1% (n = 6) kept five or more gallons in the home. Participants were much more prepared with food stores, as almost 73% (n = 62) of the population kept three or more days' worth of ready-to-eat foods in the home. In addition, 68.2% (n = 58) indicated that they kept a first aid kit in the home. When asked about what they would do with their pets in a disaster situation, 12.9% (n = 11) indicated that they would take their pet with them in an evacuation, while 2.4% (n = 2) indicated that they would leave their pet behind. Others indicated that they did not own a pet or were unsure of what they would do. Understanding that community agencies such as, the local hospital, health department, police department, senior center, or American Red Cross are often relied upon to provide disaster information, participants were asked about their contact with such agencies. Approximately, 65% (n = 55) of the population indicated that they had weekly contact with community agencies.

Themes Related to Perceived Disaster Preparedness

Content analysis was utilized to describe the textual data collected from the three open-ended questions on the survey. Content analysis is a research tool that allows investigators explore themes or trends found in textual data by coding specific words and phrases. An experienced qualitative researcher coded each of the open-ended questions. To ensure conformability (i.e., establish that the researcher's interpretations are objective and accurate), the data were given to two other researchers to code. Both researchers agreed that the coding was accurate. Some minor suggestions were made for the titles of the themes.

Assessment of personal 72-hour kits.

The first open-ended question assessed participants understanding of what to include in a personal 72-hour emergency kit. Using content analysis, four themes emerged: (a) essential necessities, (b) personal hygiene/comfort, (c) safety items, and (d) nonessential items. Approximately 40% (n = 43) of seniors listed essential necessities, such as water, food, and prescription medications. Twenty-one percent listed personal hygiene/comfort items, such as razors, wipes, soap, clothing, and blankets. Eighteen percent included safety items, such as a first aid kit, flashlights/candles, batteries, and radios. Twenty-seven percent listed nonessential items, such as family pictures, a Bible, crocheting materials, and magazines. Approximately 13% (n = 11) were unsure about the contents of their 72-hour kit, evidenced by responses such as "Exactly what should be included," "I don't know," and "Unsure."

Perceived emergency services provided by county officials.

The second open-ended question assessed participants' understanding of the services provided by the local health department in the case of an emergency. Using content analysis, three themes emerged: (a) services, (b) information, and (c) supplies. Forty percent of respondents indicated the local health department should provide transportation, shelter, first aid, and rescue efforts in a disaster situation. The majority of respondents (82.4%; n = 70) felt that they had no perceived barriers that would prevent them from receiving emergency information. Most participants (49.4%; n = 42) stated they would rely most upon on their family members or friends to supply them with emergency information. Additionally, 21% (n = 18) of the participants expected the health department to communicate warnings and ongoing emergency information to local television and radio stations and to residents residing in rural areas of the county. Finally, 8% (n = 7) listed supplies, such as food and water, while 11% (n = 9) stated they were unsure of what the local health department should do in the case of an emergency.

Survey feedback.

The final open-ended question assessed the usability of the survey through written comments, suggestions, and questions. Many participants responded positively, with 38% (n = 32) indicating they had no issues regarding the questionnaire or indicated that the survey was a good idea and hoped that it would be useful in helping other senior citizens prepare for disasters. Others offered suggestions on how to improve the survey including shortening it and removing questions they felt did not apply.

Discussion

While the content analysis revealed that the majority of respondents were positive towards the survey and its purpose, data collection in the form of surveys proved to be challenging. A limited number of respondents reported they had no issues such as poor vision or hearing; however, the researchers noted that most of the participants had vision

or hearing problems making it difficult for the individual to fill out the survey. For example, on several occasions–upon request–the researchers read the survey aloud to the participant. In addition to problems associated with filling out the survey, having the researcher in such close proximity while taking the survey may have biased the attitude of the respondent.

Most of the respondents indicated that they believed a survey to determine emergency preparedness needs was a good idea and they hoped their participation would prove to help others become more prepared. One respondent in particular, though, indicated not believing that the survey was applicable. The reason for this was unclear, but could have been due to above average knowledge regarding emergency preparedness procedures.

The majority of the respondents stated they perceived no barriers to receiving emergency disaster information, indicating that they would be able to get information via landline telephones, from family and friends, or from the television. However, respondents did not appear to take into account where they would receive information from if the cable, power, or telephone lines were down during the disaster. Less than half of the respondents were knowledgeable regarding what types of items, such as food, water, and medications should be included in a 72-hour kit, and many participants did not have these items stored. In addition, the written comments suggest that some respondents are uncertain about the amounts of food and water that should be stored for different size households or for how long the items could remain in storage.

One finding of note was the perception of the local health department's responsibility during times of disaster. Most participants felt that local health departments should provide warnings and other emergency communications, especially to those persons residing in rural areas of the county. Additionally, respondents believe the health department should provide food, shelter, transportation, help to the injured, and medications during an emergency. This finding is important, as health departments are not typically equipped to provide these services or medications despite respondents indicating they believed they should.

Limitations

There are several limitations to this study that should be noted. First, the sample size for the study was quite small. The small sample size led to the condensing of the study's demographics, which potentially limited the identification of individual differences amongst the categories. The Cronbach's alpha was low indicating the survey did not have high internal consistency reliability. Additionally, a convenience sample was used. This convenience sample was comprised of mostly White/Caucasian women; therefore, our findings may exclude the thoughts, opinions, and experiences of individuals from other races as well as men. The small sample size and homogeneity of the group may not make the results of this study generalizable to other groups of independently living senior citizens living in rural areas. Future studies should seek to explore more diverse communities. Finally, this study was conducted during the severe weather and tornado season. The timing of the survey as well as some individual needing assistance from one of the researchers to complete the survey may have influenced the participants self-reporting on the survey.

Recommendations

Although this study had substantial limitations, important information regarding the use of surveys as a tool to gather information and emergency preparedness needs of independently living seniors was garnered. Future research studies regarding the emergency preparedness status and perceptions of independently living seniors need to be conducted utilizing various qualitative and quantitative methods of data collection. Future studies should seek to identify factors that influence senior citizens to evacuate and to examine the relationships between income and emergency preparedness levels.

Additionally, programs need to be created to help teach independently living senior citizens about how to prepare emergency kits, create a food storage pantry, and stock up on extra medications. For example, local health departments could work with community organizations such as faith-based institutions, local hospitals, and senior centers to develop skill-building and educational interventions that focus on emergency preparedness planning for independently living seniors. A suggested strategy for this type of programming would be creation of a first aid kit as a social activity at the local senior center or helping seniors devise an evacuation plan after church services. Having the local health department collaborate with community-based and faith-based organizations would provide a more comprehensive information and resource-sharing network, thus building sustainability for the programs as well as the community capacity and social capital of the local area. Additionally, local health departments should strive to clarify what services are provided by which agency in the case of an emergency.

Finally, policy or protocol changes regarding communication are needed to delineate which parties are responsible for the various aspects of emergency response. For example, during mandatory evacuations in an emergency specific policies or protocol requiring the police department, health department, or some other agency to be responsible for contacting elders in rural areas may lessen confusion and potential fatalities. It is also recommended that local health departments and other local agencies continue to focus efforts on collaborating to form comprehensive emergency planning networks. Results of this study should encourage more research regarding the emergency preparedness levels of independently living senior citizens and be used to advocate for policy changes both locally and nationally for this vulnerable population.

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