

Peer-Mentored Preparedness (PM-Prep): A New Disaster Preparedness Program for Adults Living Independently in the Community

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Abstract

The authors studied a health promotion program called PM-Prep (Peer-Mentored Prep), which was designed to improve disaster preparedness among adults living independently in the community. PM-Prep consists of four 2-hour classes co-taught by a health educator and peer-mentors. Adults were randomly assigned to an experimental arm or a wait-list control arm. Earthquake safety knowledge and preparedness supplies were assessed prior to the intervention and at 1 month after the intervention ($N = 82$). Adults in the experimental arm significantly increased preparedness by 19 percentage points, from 56% to 75% completed ($p < .0001$), and improved their knowledge by 8 percentage points, from 79% to 87% correct ($p = .001$). This is the first peer-mentored, targeted, and tailored disaster preparedness program tested with this population.

Key Words: *disaster; resilience; preparedness*

National policy recognizes that disaster preparedness maximizes the potential for resilience when vulnerable communities are struck by disaster (U.S. Department of Health and Human Services, 2006) and that “resilient communities begin with prepared individuals” (U.S. Department of Homeland Security, 2008, p. 5). Public health defines disaster preparedness as, at minimum, maintaining a recommended list of emergency supplies (e.g., nonperishable food, water, prescription medicines, etc.) and developing a family communication plan to respond to contingencies. In the days after a disaster, electricity, gas, water, and telephones may not be working and public safety services such as police and fire departments will be busy handling serious crises. Households and individuals, including adults who have intellectual and developmental disabilities (IDD) and are living independently in the community, are advised to be prepared to live without running water, electricity, gas, and telephones for three days following a major disaster and to have the supplies to be self-sufficient (e.g., Kailes, 2002; U.S. Federal Emergency Management Agency & American Red Cross Society, 2004). Still, a minority of all adults are disaster prepared,

even in the aftermath of highly publicized disasters and after decades of national and local preparedness campaigns (Bethel, Foreman, & Burke, 2011; Eisenman, Zhou, et al., 2009; Fox, 2007; Harris Interactive, 2005). New approaches are needed to improve disaster preparedness (Howard, 2011; Redlener & Berman, 2006).

Compared to persons without a disability, persons with a disability experience disproportionate risks from disasters and encounter greater obstacles at all phases of disasters, including preparedness, response, and recovery (Bloodworth, Kevorkian, Rumbaut, & Chiou-Tan, 2007; Brodie, Weltzien, Altman, Blendon, & Benson, 2006; Chou et al., 2004; Osaki & Minowa, 1999; Rahimi, 1993). For instance, some studies report that compared to individuals without disabilities, persons with a disability are less likely to have home or workplace evacuation plans. Adults who have IDD are likely to be particularly vulnerable to disasters (Chou et al., 2004). Their overall reduced inclusion in society—characterized by social isolation, low employment rates, high poverty rates, and impaired access to health care—may amplify their susceptibilities (Tymchuk, Lakin, & Luckasson, 2001;

Hemingway & Priestly, 2006; Krahn, Hammond, & Turner, 2006; Lollar & Crews, 2003; U.S. Department of Homeland Security, 2005). Despite their vulnerability, scant research has been conducted on disaster preparedness among adults who have IDD, and no interventions to improve preparedness have been studied (National Council on Disability, 2005; U.S. Department of Education, 2008).

Adults who have IDD are increasingly living independently in the community instead of in congregate care settings, which may increase their risks as they lose the safety and security networks provided by families and specialized facilities (Krahn et al., 2006). This shift creates added challenges in promoting preparedness in the IDD community because no longer can public health and emergency services rely upon administrators of congregate care facilities to prepare and protect their clients with developmental disabilities in a disaster. Knowing about and practicing disaster preparedness is a health promotion behavior that becomes vital for adults who have IDD as they relocate into the community and manage their lives more independently.

Additionally, few materials address disaster preparedness for adults who have IDD and few are designed specifically for persons with low cognitive capacities. A notable exception is the "Feeling Safe, Being Safe" materials from the California Department of Developmental Services. Still, this exception highlights an important gap: no empirical research has been published on *how* to promote disaster preparedness among persons who have IDD. Simply improving the suitability and accessibility of preparedness programs does not guarantee participation in these programs. Social environmental features such as social supports and "lay" or peer mentors can improve participation in health promotion programs (Webel, Okonsky, Trompeta, & Holzemer, 2010). Peer mentors can be adults who have IDD and who share similar life situations and experiences with the target audience. Research shows that support from a peer can facilitate change, encourage self-advocacy, and increase community participation, which are vital to community disaster preparedness (Hammel et al., 2008). Prior research demonstrates that using targeted, interactive, and participatory community-based approaches from the public health field of health promotion may be more effective in improving preparedness (Eisenman, Zhou, et al., 2009).

The overall goal of this study was to implement and test a disaster preparedness intervention targeting adults who have IDD living independently in the community, i.e., they reside in their own or family home and receive either independent living services (ILS) or supportive living services (SLS), as opposed to living in a group home or a nursing facility. Our aim was to determine whether or not disaster preparedness knowledge and behaviors increased 1 month after completion of the intervention among the adults who participated in the experimental intervention compared to wait-list controls and the degree to which knowledge and behaviors increased. We hypothesized that adults in the experimental group would report significantly increased disaster preparedness knowledge and behaviors 1 month after completion of the intervention compared to adults in the wait-list control group.

Methods

Participants

California has 21 Regional Centers that provide services for people with developmental disabilities. Westside Regional Center (WRC) is a state and federally funded nonprofit agency providing care coordination, health education, and resources to approximately 7,000 people with developmental disabilities living in Los Angeles. Over 800 of WRC's adult clients live independently with the assistance of independent or supportive living services.

We recruited a convenience sample of adult clients from Westside Regional Center with staff announcements at the center's regularly scheduled activities and with posted flyers. Participants were eligible if they were (a) regional center clients, (b) age 18 or older, (c) living with family or independently with supported services in the community and not living in congregate housing, and (d) able to speak and understand English well enough to provide informed consent. Persons interested in participating were invited to attend one of several orientations held at the regional center during which the center's health education staff introduced the program, provided information about the study, and invited enrollment. All of the adult clients of the center who attended the orientations were eligible and enrolled in the program. The participants were given a developmentally appropriate informed consent. Health

educators reviewed the informed consent with the participants line by line. Ninety-one persons attended an orientation session, enrolled in the study, and were randomly assigned to the intervention group (46 persons) or the control group (45 persons). The study was approved by the Institutional Review Board at UCLA and the California Health and Human Services Agency Committee for the Protection of Human Subjects.

Research Design

We performed a two-group pretest-posttest study using a randomized control design with a wait-list control group, also known as a delayed-intervention comparison group design. The decision to employ a wait-list control design was chosen because it allows participants in the delayed, wait-list group to serve as controls while they are waiting to receive the intervention. This design was favored as a way to ensure that all participants eventually received the training, regardless of their initial randomized group assignment. A delayed intervention implemented with the comparison group maintains a robust evaluation structure and the internal validity of the study, satisfies community members' desires for everyone to receive the intervention, improves acceptance of the intervention in the community, and is aligned with the principles of community-participatory research that guided this work.

Procedure

The disaster preparedness program was developed, fielded, and tested in a community-based, participatory research program entitled Peer-Mentored Prep (PM-Prep). The study PM-Prep methods and materials were developed collaboratively amongst the academic researchers, WRC staff members, WRC clients with developmental disabilities, and the WRC consumer advisory board.

Participants completed the preintervention assessment (pretest) after obtaining consent at the program orientation. The assessment was a pen and paper questionnaire filled out by the participants. To facilitate understanding, a health educator read the questions aloud while projecting them on a screen for all to follow visually. Participants responded alone or with the assistance of an accompanying caregiver by filling in their response to each question. Each participant was provided with his or her random group assignment after he or

she completed the preintervention assessment. The experimental group participants completed the posttest assessment 1 month following the PM-Prep course. This was done in the same way as the preintervention assessment. Control group members completed their posttest assessment at the beginning of their first (delayed-intervention) class. Since control group members began their course following completion of the experimental group's program, their posttest assessment was contemporaneous with the experimental group's posttest assessment. The participants received a \$10 gift card for each assessment. The study was conducted from September 2010 to January 2011.

Intervention

The goal of the PM-Prep intervention is to provide to adults with developmental disabilities living independently in the community knowledge, skills, and tools to be safe, self-reliant, and able to communicate with family and other social supports in the event of a disaster. PM-Prep was designed so that by its conclusion, participants would have (1) personal emergency plans, (2) portable and home emergency supply kits, and (3) knowledge to protect themselves from hazards in a disaster. The usual focus on individual and household self-sufficiency was enhanced with an emphasis on working with participants' in-place social networks to be resilient in an emergency. In practice, this entailed involving peer mentors as co-teachers and inviting participants' primary supports, such as ILS/SLS workers or family members, to attend the course.

The peer mentors were adult clients of the regional center. The peer mentors completed extensive training to learn about emergency preparedness, peer mentoring, leadership, and motivational strategies. In PM-Prep, mentors made sure that all class participants actively participated in the class activities. Mentors led the small-group exercises, facilitated class activities, assisted the participants during hands-on learning activities, performed in-class demonstrations, and served as role models to class participants providing support, motivation, and encouragement to program participants.

The core of the PM-Prep program is a manualized training for the peer-mentors and a series of four classes for the students. Each class is two hours long, and class was held twice a week for two weeks. Participants were co-taught by a health educator and the trained peer mentors. Each class

had a primary theme. The first class was earthquake, fire, and related home hazard safety. The second class was home emergency supplies. The third class was personal disaster planning, including evacuation plans and communication in an emergency. The fourth class was a review followed by an earthquake scenario exercise that allowed discussion and skills practice.

The curriculum was designed for the learning needs of adults who have a developmental disability. Visual and auditory lessons predominated and were combined with interactive, hands-on activities led by peer mentors. Written material was kept to a minimum. For example, when learning about how to reduce the risk of injury from earthquake and fire hazards, the instructor first talked to the class about what hazards are and gave examples, then showed pictures of various hazards. Next, participants had to find hazards in the classroom and, as homework, listed hazards in their own homes. The following class day, participants shared the home hazards they had found and suggested ways to reduce the hazards. In the fourth class, the disaster scenarios included a large earthquake leading to complete loss of utility services, and family and caregivers were specifically asked to attend. The class split into groups and a peer mentor, equipped with guided questions and prompts that drew from the three previous classes, led them through a discussion of each step they would take during and after the earthquake. Class attendance rates were excellent with 71% attending all four classes, 24% attending three out of the four classes, and only 5% attending two out of the four classes.

Measures

Our pen and paper questionnaire collected self-reported data on disaster preparedness and earthquake safety knowledge (Table 1). For the former, we adapted a standard checklist of disaster preparedness items widely used in disaster studies (e.g., Bourque, Shoaf, & Nguyen, 1997; Eisenman, Glik, et al., 2009). This checklist included 17 home preparedness indicators such as “Do you have extra prescription medicines stored away to use after an emergency?” The checklist was modified for our study with simpler words and sentence construction, and pictures were added next to each item to aid participants in understanding the questions. The regional center staff and peer mentors adapted

it with the investigators to ensure its appropriateness, ease of administration, and acceptability. Yes/no responses were allowed. Cronbach’s alpha for the checklist was adequate at 0.75. This is similar to the internal consistency reported by Baker and Cormier (2013) in their study with families of children with special health care needs. We also developed a seven-item set of earthquake safety knowledge questions. These questions asked participants to choose between two alternatives that were pictured with an accompanying photo or illustration. For example, one question asked “What should you do if you are in a room during an earthquake?” Two pictures were provided and participants were asked to circle the one correct answer. The choices were a picture of a person standing in a doorway and a picture of a person in the drop, cover, and hold position below a table. The reliability of this question set as measured by Cronbach’s alpha was 0.66. We also collected data on age, gender, ethnicity, who the participant lived with, and who provided the participant’s primary support (e.g., “Do you have someone who helps you or supports you, like an ILS/SLS worker, family member, or friend?”).

Data Analysis

Eighty-two of the 91 enrolled and randomized participants completed the study by performing both the baseline and the follow-up assessment at 1 month (42 in the experimental group and 40 in the control group) and these 82 participants comprised the analytic sample. Summary statistics were generated to characterize the participants’ baseline socio-demographic information. Participants in the two groups were compared using the two-sample *t* test for continuous variables and Fisher’s exact test for categorical variables. The main outcomes in this study were the improvement in the reported proportion of disaster preparedness supplies participants obtained and the improvement in the total correct answers on the earthquake safety knowledge questionnaire. Separate summary scores for reported preparedness items and correct answers on the knowledge questionnaire were calculated. Wilcoxon signed rank test and exact McNemar test were used to evaluate the improvement between pre- and postassessments for each summary score and for specific preparedness items for each group. The intention to treat analysis used generalized estimating equations (GEE) to test if

Table 1
Earthquake Knowledge and Preparedness Questions and Responses

Knowledge questions and response choices

- Which of these items is okay to put in your emergency backpack? Circle only one picture: crackers (picture provided) or bread (picture provided).
- Which of these items is okay to put in your emergency backpack? Circle only one picture: box of rice (picture provided) or can of SpaghettiOs (picture provided).
- Where should you go if you are in a room during an earthquake? Circle only one picture: in a doorway (picture provided) or under a table (picture provided).
- Which bed is safer during an earthquake? Circle only one picture: a bed with a shelf above it (picture provided) or a bed without anything above it (picture provided).
- Who should you contact after an earthquake? Circle only one picture: the police (picture provided) or family, friend, helper, or neighbor (picture provided).
- If you are in bed during an earthquake, what should you do? Choose answer A or B and circle the correct answer: A) stand by a window to see what is happening or B) stay in bed and cover your head with a pillow.
- If you are outdoors during an earthquake what should you do? Choose answer A or B and circle the correct answer: A) run into the nearest building or B) stay outside in an open space.

Preparedness questions and response choices

- If you are separated from your family or service provider after an emergency, do you have a planned meeting place where you will meet them? (*yes or no*)
- Does each person in your home have 3 gallons of water stored for emergencies? (*yes or no*)
- Do you have a first aid kit at home? (*yes or no*)
- Do you have a flashlight and batteries at home? (*yes or no*)
- Do you have a packed bag at home with water, food, radio, flashlight, and batteries that you can take with you if you have to leave your home in an emergency? (*yes or no*)
- Do you have a list of emergency contact phone numbers written down in your home? (*yes or no*)
- Do you have a phone number written down in your home for an emergency contact who does not live in Southern California? (*yes or no*)
- Do you have a three day supply of food that does not need refrigeration or cooking (such as canned food) stored for each person in your home for emergencies? (*yes or no*)
- Do you have cash stored at home that you can use in an emergency? (*yes or no*)
- Do you have a pair of shoes next to or under your bed every night? (*yes or no*)
- Do you have a framed picture or a shelf above your bed? (*yes or no*)
- Is your television strapped to the wall in your home? (*yes or no*)
- Have you strapped or fastened tall or heavy furniture to the wall in your home, like a tall shelf or bookcase? (*yes or no*)
- Is your bed next to a window? (*yes or no*)
- Do you have an evacuation plan to get out of your home if there is an emergency? (*yes or no*)
- Have you signed up for Alert LA to receive emergency announcements? (*yes or no*)
- Do you have extra prescription medicines stored in your home for you to use after an emergency? (*yes or no*)

the changes in the intervention group were greater than the changes in the control group for the summary scores in preparedness and knowledge. In an exploratory analysis we examined the impact of the type of primary support giver on the treatment effect; type of primary support was not a covariate in our intention to treat analysis. Results were

considered significant if $p \leq .05$. All analyses were conducted using SAS.

Results

The mean age of the analytic sample was 40 years old and 58.4% were female. Most participants lived with an adult roommate, friend, or family member

(70%) and most described their primary source of help as a family member (33%) or an ILS/SLS worker (61%). Aside from the greater proportion of women in the experimental group compared to the control group, there were no significant differences in the participant characteristics between the two study arms (Table 2). There was no difference at baseline between the two study arms on the proportion of participants who reported having each specific item or the proportion with a correct response to each knowledge question.

Comparing pretest to posttest scores, participants in the experimental intervention group significantly improved their preparedness knowledge by 8 percentage points, from 79% to 87% correct, ($p = .001$) and increased their preparedness activities by 19 percentage points, from 56% to 75% completed, ($p < .0001$). At the posttest, the preparedness activities that increased significantly more in the experimental group were having a communication plan, three gallons of extra water, a first aid kit, a flashlight with batteries, a three day supply of food, a list of emergency contact phone numbers written down, and shoes by the bedside. There was no improvement in knowledge from

pretest to posttest among the control group. There was a small improvement in preparedness activities among the control group participants from pretest to posttest (49% to 54%; $p = .01$). The effect of the intervention was significantly greater on the experimental group than on the control group ($p = .0003$), as shown in Table 3. There were no differences in the effect of the intervention by age, gender, race/ethnicity, or living alone or with a roommate or family (Table 4).

In our exploratory analysis we found a significant interaction between the intervention and who the participants reported as their primary source of support. Participants in the experimental group who reported an ILS/SLS worker as their primary source of support increased their knowledge more than those who said a family member or friend was their primary source of support (Figure 1, Figure 2 and Table 5). Control group members who identified an ILS/SLS worker as their primary source of support had a 12% increase in preparedness activities, while control group participants who identified family or a friend as their primary source of support had no increase in preparedness activities (Table 5). Thus, the improved prepared-

Table 2.
Sample Characteristics Overall and by Study Group, PM-Prep Study

	Overall ($n = 82$), n (%)	Control ($n = 40$), n (%)	Experimental ($n = 42$), n (%)	p
Mean age (range)	40 (20–68)	38.4 (20–62)	41.5 (21–68)	.22
Female	48 (58.5%)	28 (70%)	20 (47.6%)	.046
Race/ethnicity				.99
Hispanic/Latino	7 (8.5%)	3 (7.5%)	4 (9.5%)	
White	24 (29.3%)	12 (30%)	12 (28.6%)	
African American	35 (42.7%)	18 (45%)	17 (40.5%)	
American Indian	3 (3.7%)	1 (2.5%)	2 (4.8%)	
Asian/Pacific Islander	8 (9.8%)	4 (10%)	4 (9.5%)	
	5 (6.1%)	2 (5%)	3 (7.1%)	
Household				.75
Lives alone	24 (29.3%)	11 (27.5%)	13 (31%)	
Lives with roommate	38 (46.3%)	17 (42.5%)	21 (50%)	
Lives with family	18 (22%)	11 (27.5%)	7 (16.7%)	
Lives with other	2 (2.4%)	1 (2.5%)	1 (2.4%)	
Primary support				.67
Family member	27 (32.9%)	13 (32.5%)	14 (33.3%)	
ISL/SLS staff	50 (61%)	24 (60%)	26 (61.9%)	
Friend	3 (3.7%)	1 (2.5%)	2 (4.8%)	
Other	2 (2.4%)	2 (5%)	0 (0%)	

Table 3
Mean Knowledge Score and Mean Behavior Score at Pre- and Postintervention by Study Group

	Control group		<i>p</i>	Experimental group		<i>p</i>	Interaction <i>p</i> *
	Pre mean score (range)	Post mean score (range)		Pre mean score (range)	Post mean score (range)		
Knowledge	0.74 (0.38-1.0)	0.75 (0.38-1.0)	.74	0.79 (0.33-1.0)	0.87 (0.5-1.0)	.001	.052
Behavior	0.49 (0.17-0.89)	0.54 (0.06-0.94)	.01	0.56 (0.06-0.94)	0.75 (0-1.0)	< .0001	.0003

*GEE method comparing change in mean knowledge score and mean behavior score between study groups.

ness score reported in our intention to treat results was limited to those control group participants who identified an ILS/SLS worker as their primary source of support.

Discussion

This experimental testing of a targeted and tailored disaster preparedness program provides an evidence-based method for improving disaster preparedness among adults who are living with a developmental disability. PM-Prep significantly increased disaster preparedness in this at-risk population.

National and local policy on improving individual ability to withstand emergencies and disasters has evolved to a focus on resilience. In a resilience framework, preparedness focuses generally on improving access to the in-place supports of daily life including improving ties to social networks and supportive services. Emphasis shifts from a focus on readying individuals to readying the social networks, supports, and individuals therein—a shift of focus

from independent to interdependent, from “me” to “we and me.” In this project specifically, the usual focus on individual and household self-sufficiency was enhanced with an emphasis on working with participants’ in-place social networks (e.g., ILS/SLS workers, family members, and peers) to be resilient in an emergency. It is interesting that the participants in the experimental group who identified an ILS/SLS worker as their primary source of support increased their knowledge more than did participants in the experimental group who identified a family member or friend as their primary source of support. The experimental group participants who had ILS/SLS primary support improved their knowledge more than any other subgroup. It is possible that ILS/SLS workers, who sometimes accompanied participants to the classes, reinforced the knowledge gained during the classes. However, this interaction was not seen for improvements in behavior; experimental group participants improved their behavior, regardless of who was identified as the

Table 4
GEE Parameter Estimates for Mean Knowledge Score and Mean Behavior Score

Parameter	Estimate	Standard error	95% confidence limits	<i>p</i>
Mean knowledge score				
Intercept	0.7381	0.0285	0.6822 to 0.7939	< .0001
Postintervention vs. preintervention	0.0087	0.0297	-0.0496 to 0.0670	.7700
Intervention	0.0536	0.0368	-0.0186 to 0.1257	.1456
Treatment vs. control condition	0.0717	0.0369	-0.0006 to 0.1439	.0520
Mean behavior score				
Intercept	0.4778	0.0318	0.4155 to 0.5402	< .0001
Postintervention vs. preintervention	0.0606	0.0249	0.0118 to 0.1095	.0150
Intervention	0.0790	0.0465	-0.0120 to 0.1701	.0888
Treatment vs. control condition	0.1365	0.0375	0.0629 to 0.2100	.0003

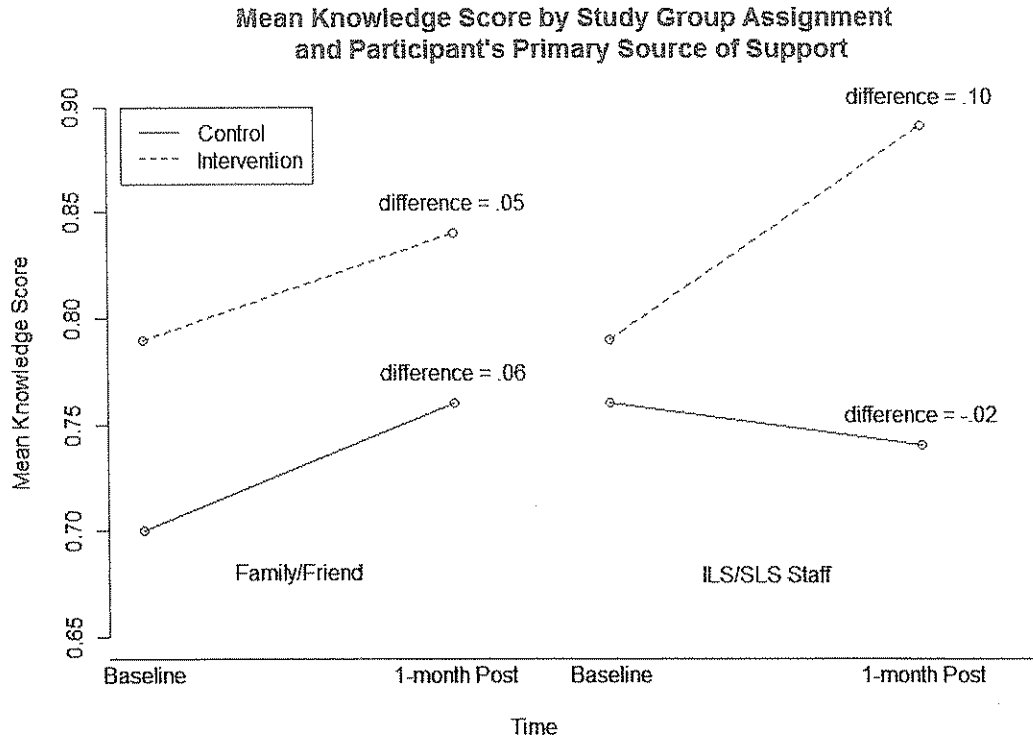


Figure 1. Mean knowledge score by study group assignment and participant's primary source of support.

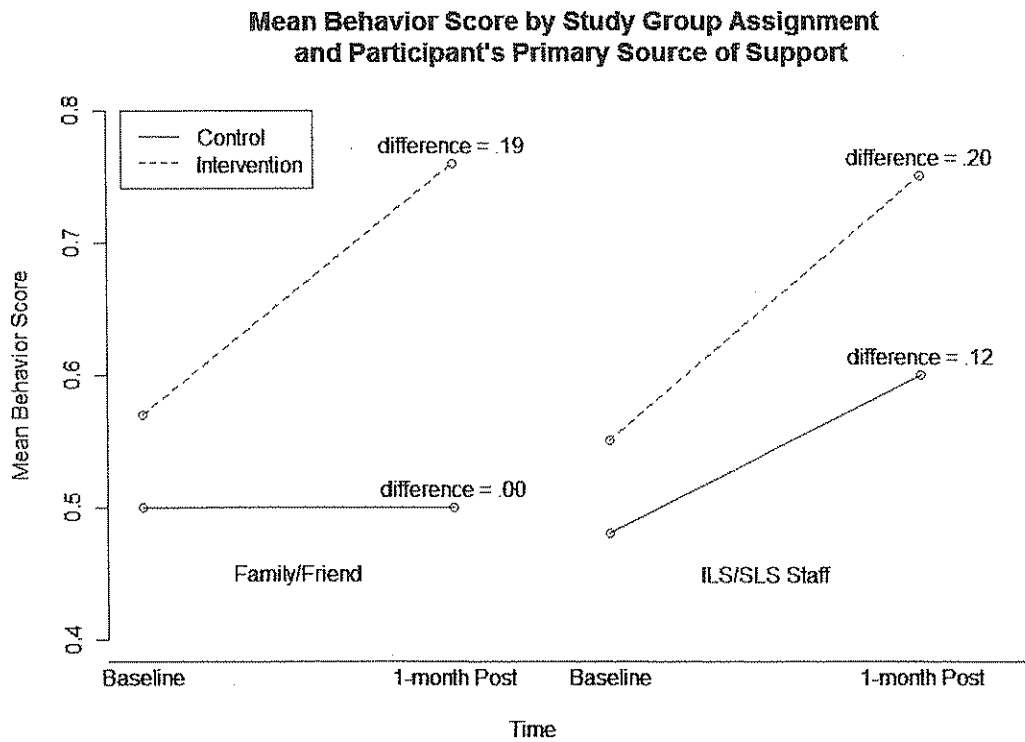


Figure 2. Mean behavior score by study group assignment and participant's primary source of support.

Table 5
Change in Mean Knowledge Score and Mean Behavior Score by Study Group Assignment and by Participant's Primary Source of Support

	Control group			Experimental group			Interaction <i>p</i> *
	Score change if ILS worker is primary support	Score change if family/friend is primary support	<i>p</i>	Score change if ILS worker is primary support	Score change if family/friend is primary support	<i>p</i>	
Knowledge	-2%	+6%	.22	+10%	+5%	.24	.049
Behavior	+12%	0%	.02	+20%	+19%	.87	.11

*GEE method comparing change in mean knowledge score and mean behavior score between study groups.

primary support. So, it is unclear how much benefit the ILS/SLS workers added above the value of the classes.

Preparedness behaviors increased in the control group. This occurred mainly among control participants with an ILS/SLS worker as their primary support. Could ILS/SLS workers have been conduits of preparedness information to participants in the control arm? ILS/SLS workers could have had more than one client in the study or could have spoken to other workers about the course. Perhaps workers' attention to preparing their clients for a disaster was heightened by their proximity to the study. PM-Prep aligns with the regulatory mandates that service providers face (all SLS/ILS agencies are required to come up with individual support plans for each client, which include an individual emergency plan). Unfortunately, we did not record which participants had an ILS/SLS worker in the classroom or which participants shared an ILS/SLS worker. The statements above are therefore simply conjectures, and future research should examine how PM-Prep can better incorporate primary caregivers to better prepare adults living with IDD. A manualized version allows for study replication.

This study starts to fill gaps in our knowledge. First, we know of no general empirical studies published on disasters and adults who have IDD. Instead, most research on disasters and disabilities focuses on persons with sensory or mobility impairments (U.S. Department of Education, 2008). Second, we know of no published research on how to promote preparedness among adults who have IDD. The U.S. Department of Homeland Security (2005) concluded that, "there is a plethora of guides, checklists, tip sheets and plans related to disaster preparedness and disability, but a noticeable lack of

empirical research to back up those guides, plans and practices." Finally, despite health promotion programs for adults who have IDD on the one hand (e.g., Ewing, McDermott, Thomas-Koger, Whitner, & Pierce, 2004; Heller, Hsieh, & Rimmer, 2004; Rimmer, Heller, Wang, & Valerio, 2004) and the emerging availability of disaster preparedness materials on the other hand, there are no empirically based programs published that integrate these two streams of efforts.

Our study has several limitations. Selection bias may have occurred since those who were motivated to participate also may be more motivated to adopt disaster preparedness. But, this is not a threat to the internal validity of the study, which was the focus of this round of testing. Our next set of studies will assess effectiveness in the larger community, which will also address another limitation of this study, the small sample size. This study relied on self-reported data that may be subject to misunderstanding, recall bias, and social desirability bias. Validated measures of disaster preparedness are not available for adults with IDD. Participants may have reported increased behaviors to satisfy the researchers, leading to a social desirability bias. However, participants increased their activity in the most basic and important areas (e.g., water, food, communication plan) and not in the more difficult areas (e.g., money), mitigating concerns about these biases. This pattern is consistent with previously published studies (Eisenman, Glik, et al., 2009). The earthquake knowledge questions had only acceptable reliability, 0.66. Also, contamination may have occurred since there was opportunity for interaction among clients and caregivers outside of the classes. As noted, ILS/SLS workers may have had clients in both the experimental and control groups. This may explain

the increase in the behavior score among control group members with an ILS/SLS worker as their primary support. ILS/SLS staff may have improved the preparedness of their clients in the control group if they also had clients in the experimental group. The possible contamination may have led to a smaller difference between the experimental and control groups, and therefore our results may underestimate the true intervention effect.

We chose to conduct the follow-up assessment within 1 month after the completion of the course for three reasons. Conducting the postcourse assessment at 1 month after course completion allowed enough time to detect change. Conducting the follow-up assessment at a longer interval risked losing participants to attrition. Cost concerns were also a major factor in the follow-up; a longer follow-up incurs greater study costs. Future studies should assess outcomes at longer periods from the intervention and the sustainability of the improved preparedness. Finally, peer mentoring was used to improve participation in the classes, but we did not study the independent effect of the peer mentors in improving preparedness. Future studies should assess the impact of peer mentors on preparedness.

Conclusions

This study shows that it is possible to utilize a community-based approach to teach disaster preparedness to adults who have IDD and achieve short-term outcomes. It also shows that it is possible to involve social networks and supports to participate in the intervention, an important aspect of a community-based resilience approach. The challenges that remain include replicating the results in a large trial with a longer follow-up.

References

- Baker, L. R., Cormier, L. A. (2013). Disaster preparedness and families of children with special needs: A geographic comparison. *Journal of Community Health, 38*, 106–112.
- Bethel, J. W., Foreman, A. N., & Burke, S. C. (2011). Disaster preparedness among medically vulnerable populations. *American Journal of Preventive Medicine, 40*, 139–143.
- Bloodworth, D. M., Kevorkian, C. G., Rumbaut, E., & Chiou-Tan, F. Y. (2007). Impairment and disability in the Astrodome after Hurricane Katrina: Lessons learned about the needs of the disabled after large population movements. *American Journal of Physical and Medical Rehabilitation, 86*, 770–775.
- Bourque, L. B., Shoaf, K. I., & Nguyen, L. H. (1997). Survey research. *International Journal of Mass Emergencies and Disasters, 15*, 71–101.
- Brodie, M., Weltzien, E., Altman, D., Blendon, R. J., & Benson, J. M. (2006). Experiences of Hurricane Katrina evacuees in Houston shelters: Implications for future planning. *American Journal of Public Health, 96*, 1402–1408.
- Chou, Y. J., Huang, N., Lee, C. H., Tsai, S. L., Chen, L. S., & Chang, H. J. (2004). Who is at risk of death in an earthquake? *American Journal of Epidemiology, 160*, 688–695.
- Eisenman, D. P., Glik, D., Gonzalez, L., Maranon, R., Zhou, Q., Tseng, C. H., & Asch, S. (2009). Improving Latino disaster preparedness using social networks. *American Journal of Preventive Medicine, 37*, 512–517.
- Eisenman, D. P., Zhou, Q., Ong, M., Asch, S., Glik, D., & Long, A. (2009). Variations in disaster preparedness by mental health, perceived general health, and disability status. *Disaster Medicine and Public Health Preparedness, 3*(1), 33–41.
- Ewing, G., McDermott, S., Thomas-Koger, M., Whitner, W., & Pierce, K. (2004). Evaluation of a cardiovascular health program for participants with mental retardation and normal learners. *Health Education and Behavior, 31*, 77–87.
- Fox, M., Glen, W., Rooney, C., & Rowland, J. (2007). Disaster preparedness and response for persons with mobility impairments. *Journal of Disability Policy Studies, 17*, 196–205.
- Hammel, J., Jones, R., Smith, J., Sanford, J., Bodine, C., & Johnson, M. (2008). Environmental barriers and supports to the health, function, and participation of people with developmental and intellectual disabilities: Report from the State of the Science in Aging with Developmental Disabilities Conference. *Disability and Health Journal, 1*, 143–149.
- Harris Interactive. (2005). National Organization on Disability emergency preparedness: Topline results. Available at <http://www.nod.org/Resources/PDFs/episurvey05.pdf>
- Heller, T., Hsieh, K., & Rimmer, J. H. (2004). Attitudinal and psychosocial outcomes of a fitness and health education program on adults

- with Down syndrome. *American Journal on Mental Retardation*, 109, 175–185.
- Hemingway, L., & Priestly, M. (2006). Natural hazards, human vulnerability and disabling societies: A disaster for disabled people? *The Review of Disability Studies: An International Journal*, 2, 57–68.
- Howard, F. (2011). Bumps on the road to preparedness. *American Journal of Preventive Medicine*, 40(2), 272–273.
- Kailes, J. I. (2002). Evacuation preparedness: Taking responsibility for your safety: A guide for people with disabilities and other activity limitations. Pomona, CA: Center for Disability Issues and the Health Profession, Western University of Health Sciences.
- Krahn, G. L., Hammond, L., & Turner, A. (2006). A cascade of disparities: Health and health care access for people with intellectual disabilities. *Mental Retardation Dev Disabil Res Rev*, 12, 70–82.
- Lollar, D. J., & Crews, J. E. (2003). Redefining the role of public health in disability. *Annual Review of Public Health*, 24, 195–208.
- National Council on Disability. (2005). Saving lives: including people with disabilities in emergency planning. Available at <http://www.ncd.gov/publications/2005/04152005>
- Osaki, Y., & Minowa, M. (1999). Factors associated with earthquake deaths in the Great Hanshin-Awaji Earthquake, 1995. *Nippon Koshu Eisei Zasshi*, 46, 175–183.
- Rahimi, M. (1993). An examination of behaviour and hazards faced by physically disabled people during the Loma Prieta earthquake. *Natural Hazards*, 7, 59–82.
- Redlener, L., & Berman, D. (2006). National preparedness planning: The historical context and current state of the U.S. public's readiness. *Journal of International Affairs*, 59, 87–103.
- Rimmer, J. H., Heller, T., Wang, E., & Valerio, I. (2004). Improvements in physical fitness in adults with Down syndrome. *American Journal on Mental Retardation*, 109, 165–174.
- Tymchuk, A. J., Lakin, K. C., & Luckasson, R. (Eds.). (2001). *The forgotten generation: The status and challenges of adults with mild cognitive limitations in American society*. Baltimore, MD: Paul H. Brookes.
- U.S. Department of Education. (2008). *Emergency management research and people with disabilities: A resource guide*. Washington, DC: Author.
- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2006). *Advancing the nation's health: A guide to public health research needs, 2006–2015*. Washington, DC: Author.
- U.S. Department of Homeland Security. (2005). *Individuals with disabilities in emergency preparedness, Executive Order 13347: Annual Report*. Washington, DC: Author.
- U.S. Department of Homeland Security. (2008). *What's new in the National Response Framework*. Washington, DC: Author.
- U.S. Federal Emergency Management Agency & American Red Cross Society. (2004). *Preparing for disaster for people with disabilities and other special needs*. Washington, DC: Author.
- Webel, A. R., Okonsky, J., Trompeta, J., & Holzemer, W. L. (2010). A systematic review of the effectiveness of peer-based interventions on health-related behaviors in adults. *American Journal of Public Health*, 100, 247–253.

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