

Factors that Influence Disaster Preparedness

by

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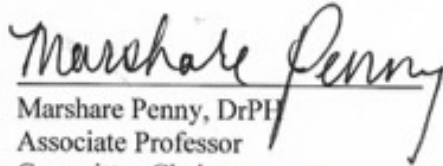
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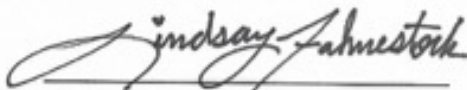
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## Abstract

This research examined the factors that influence individuals' level of disaster preparedness. The focus was on an individual's level of disaster preparedness and how it is influenced by the individual's demographic and residential geography. Data was collected through a survey that was handed out by Riverside County Emergency Management Department (EMD) throughout various cities in Riverside County from December 2016 to February 2017. The survey had a total of 349 respondents. Respondents were asked demographic questions that included age, zip code, and level of education. The findings of this study showed that age and education level were not significantly associated to the level of confidence in respondents' ability to prepare for a disaster ( $t(334) = -1.436, p > .05$ ). A Pearson correlation was performed and found that respondents' age was not significantly related to their ability to prepare for a disaster ( $r(306) = .128, p > .05$ ). Lastly, a Chi-Square Test of Independence was performed to see if an individual's residential geography was associated with whether or not a person prepared for a disaster. No significant association was found ( $X^2(1) = .451, p > .05$ ).

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## **Review of Literature**

### **Introduction**

Each year thousands of people in the United States are affected by both natural and human-caused disasters (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019). From California wildfires to the attack on September 11, 2001, disasters are events that cause disorder during times of peace. Disasters can be described as the “sum of vulnerability and hazard divided by capacity” (International Federation Red Cross [IFRC], 2019). When a disaster strikes, it could take many years and resources for a community to recover. The individuals who are affected by a disaster and survive have to cope with both emotional and physical losses. There are, however, various organizations that aid with disaster preparedness and recovery. These organizations are available to the U.S public to provide them with information on how to prepare for a disaster as individuals and as communities. There is no one set response solution for disasters, which is why it is so important for individuals to learn how to take action and how to become their own “emergency manager” (Roth, 2017).

Survey data collected on a poll of 1,000 adults found that fewer than one in four Americans were concerned about being prepared for an emergency (Zogby, 2013). Of these participants, 55% responded that they were “confident in (their) knowledge of proper safety procedures” (Zogby, 2013). In 2017 the U.S. Census Bureau surveyed how prepared residents were for disasters. The survey showed that only 52.9% of U.S. citizens had a prepared emergency evacuation kit and only 26.8% had a communication plan. President Trump (2017) stated that “it is incumbent upon



every American to be prepared” (p. 1). With numerous amounts of resources and organizations that assist with emergency disaster planning, being prepared for a disaster is becoming easier. Further preparedness decreases stress and uncertainty during times of disaster, which in turn leads to increased community resilience (SAMHSA, 2019).

### **Public Health Emergencies and Disasters**

The World Health Organization ([WHO], 2019) defined a public health emergency as an event of imminent threat towards a large number of humans or human facilities that may result in permanent or long-term disabilities. These threats may be caused by, but are not limited to, bio-terrorism, epidemics, pandemics, fatal infectious agents, or biological toxins (WHO, 2019). During these times of imminent threat, the government may declare a state of emergency where it permits state agencies to change certain functions in order to combat the aftermath of the emergency or disaster (WHO, 2019).

Disasters, on the other hand are defined as a sudden event that disrupts the functioning of a society or community and causes human, material, and economic or environmental loss (IFRC, 2019). The International Federation of Red Cross (2019) described disasters as the “sum of vulnerability plus hazard divided by capacity.” Public health disasters in public health situations are usually events where the affected communities are overwhelmed by the events that occurred (Jamison, 2006).

During disasters, public health emergencies are likely to rise due to the fact that these events displace people and make maintaining basic living standards difficult. Natural disasters usually cause medical or health infrastructures to become

eliminated or severely damaged. For days or possibly even weeks, resources such as food, clean water, and shelter are nowhere to be found (University of Southern California [USC], 2019). An example of such a disaster is the 2011 earthquake in Haiti where many of the emergency supplies were held at the airport, and unable to be distributed to the people. Roads were impassable and blocked by debris. It took transport vehicles 12-18 hours to get aid and supplies delivered (Sawer, 2010). When it comes to emergency response, times like these show the significance and effectiveness of preparedness training and educating the public about preparedness. Communities that have adopted prevention and mitigation into their emergency disaster planning decrease their vulnerability when it comes to risk management during public health disasters and emergencies. Community populations are getting larger and natural disasters are increasing in scale; therefore, training, planning, and preparation will help public health managers create skill-training programs for disaster management response (USC, 2019).

### **Disaster Preparedness**

When a community has not experienced a large-scale disaster, the community's interest in disaster preparedness can be low (Shannon, 2019). Without proper education on disaster preparedness and response, individuals and communities increase their risk of harm. Disaster preparedness is essential in every community. No matter the geographic location or population demographic, when a community is unprepared, its at-risk population's susceptibility increases and its community resilience decreases (Shannon, 2019). Ideally, the importance of a disaster plan and

practicing the plan is introduced in childhood as schools are required to run routine disaster drills in order to be stay prepared (Russell, 2019).

With community preparedness, it is important to begin with building resiliency and preparedness at the individual level. Individuals are the building blocks of a community, and ensuring that individuals are healthy, socially connected, and disaster prepared can amount to a strong, resilient community that is able to withstand the unexpected (Assistance Secretary for Preparedness and Response [ASPR], 2015). Individuals are able to strengthen their resilience in many ways. After a major disaster, such as hurricanes or earthquakes, occurs, it may take hours or even days for first responders to arrive on scene. Having a disaster kit with prepared emergency plans can help take away the guessing game for individuals and their families. The Federal Emergency Management Agency ([FEMA], 2014) recommends individuals to have their disaster kits and plans ready and have the ability to remain sheltered for at least 72 hours after a disaster occurs. These disaster kits and plans should be readily accessible, and any last-minute additions should be able to be gathered in no more than 15 minutes (FEMA, 2014).

Other ways individuals can strengthen their resilience levels are by participating in preparedness activities or programs within their communities. There are various organizations at local and federal levels that offer trainings such as cardiopulmonary resuscitation (CPR), first aid, and being part of Community Emergency Response Teams (CERT). These skills are not only useful during emergency and disaster situations but could be beneficial in everyday life. By participating in community programs, such as CERT, individuals are able to develop

and enhance their skills in order to be prepared for disasters and assist with response and recovery.

For instance, in 2004 when Hurricane Isabel struck Virginia, civilians who were part of CERT took initiative and informed neighbors on the upcoming dangers and assisted with immediate tasks (Franke & Simpson, 2004). Volunteers who participated in CERT were able to relieve first responders from basic first aid, allowing first responders to be available for jobs that required a higher level of training. After Hurricane Isabel was over, interviews were conducted to determine if having CERT trained individuals was useful. The result of the interviews showed that teamwork between the CERT team and firefighters allowed for faster paperwork turn around which resulted in faster funding from FEMA (Franke & Simpson, 2004). During these disasters, it takes time for emergency response personnel to arrive on scene, so it is up to the citizens to not only help themselves, but also their communities (US Census Bureau, 2018).

### **Preparedness Influences**

Despite the efforts of many organizations that offer disaster preparedness education programs, 41% of Americans that reported they are not prepared for a natural disaster (Ballard, 2018). Depending on the region of the U.S., there are different concerns when it comes to natural disasters. Individuals on the West Coast are more likely to be hit with an earthquake, whereas individuals residing in the South are more concerned with hurricanes. There are also concerns among Midwesterners about tornados, however, concern does not equate to preparedness. Only 51% of individuals reported being prepared for a natural disasters and 37% of individuals

reported being prepared for an act of terrorism (Ballard, 2018). Even when people have made an effort to make a disaster preparedness kit, only about 15 to 20% of them have evacuation plans.

In a country where 80% of Americans live in areas that are affected by weather related disasters, only 39% have an emergency plan that has been discussed with their household (FEMA, 2015). Sixty percent of those with a plan have not practiced their plan (FEMA, 2015). Regardless of age, education, or geographical location, individuals are still not preparing for disaster. Robert Meyer (2018), a professor from the University of Pennsylvania, argues that those who experience the realities of a disaster promise to be prepared for the next time. Then months will pass by and although memories of the event will still be there, the feelings that influence preparedness are forgotten. A list of rules and items that are important to have during a disaster can be given to people in order to help them prepare, but at the end of the day, it is still up to the individual to take action towards preparedness. A way an individual prepares for a disaster, whether it is natural or human-made, can often be influenced by where an individual resides or the experiences he or she has had in the past.

### **Age and Preparedness**

Disaster preparedness at any age is important, but as individuals gets older, they may need more assistance it. Brown (2019) stated that by the year 2050, 20% of Americans will be 65 years old or older. Age does not, however, define a person's vulnerabilities. A man who is 80 years old and lives on his own will need different resources when compared to someone who is 65 years old living in a nursing facility.

Those who live in nursing homes are already taken care of by nursing staff. Nursing facilities are required to maintain emergency kits and plans (Shih, 2018). Individuals who live independently face the risk of being overlooked in the event of a disaster.

Many public health departments and disaster programs are not tailored towards the elderly. For this reason, it is important that public health departments start incorporating more preparedness activities in age-friendly manners and senior communities (Shih, 2018). The number of older adults in the U.S. has been steadily increasing. Incorporating preparedness programs into senior communities could help reduce disaster-associated morbidity and mortality (Shih, 2018). As individuals get older, communication becomes more difficult and their disaster preparedness becomes a low priority. Older adults are more at risk for vulnerabilities and have needs that are more specific when it comes to emergencies (Keim, 2008). In the U.S., older adults are more socially isolated and technologically deficient, making it more difficult for them to receive notifications and warnings (Keim, 2008).

Preparedness kits for older adults may need to include extra medications. It is important for individuals to be knowledgeable about what is expected when certain disasters occur and where to go. Providing older adults with disaster preparedness activities and educating them on prioritization could help increase general resilience among this population. Participating in preparedness activities helps improve day-to-day quality of life for older adults because it encourages them to become more engaged with their community, which in turn reduces their social isolation (Shih, 2018).

## **Education and Preparedness**

When it comes to disaster preparedness, some assume that an individual's education level plays a role in his or her level of preparedness. In many studies an individual's education level is a determinant of his or her socio-economic status (SES) (Muttarak, 2013). A person with a higher level of education is usually assumed to have a higher SES, which in turn means that they have access to more resources when it comes to preparedness (Muttarak, 2013). It could be argued that individuals who have attained a higher level of education would be advocates for preparedness behaviors. How individuals perceive and assess risks is based on their cognitive functions, which tend to be associated with the level of their formal education (Muttarak, 2013).

Educated individuals may have more access to information and understanding when it comes to risk factors associated with disasters and preparedness behaviors. Education allows individuals to develop skills, such as problem solving and future planning that could be useful during emergency disasters (Muttarak, 2013). Formal education is important; however, when it comes to disaster preparedness behaviors there have been few studies that demonstrate a relationship between the two. A study done by Menard et al. (2011) showed that individuals who have pursued a college degree were more likely to report their knowledge on how to obtain preparedness information and have emergency plans in place (cited in Mettarak, 2013). This may be because universities in the U.S. have emergency systems in place where individuals have the chance to practice emergency evacuation plans. These practices

may help influence their future actions towards minimizing risks when it comes to emergencies or disasters (Menard et al, 2011 as cited in Mettarak, 2013).

Studies that have been conducted point towards education on disaster preparedness as having a direct impact on individuals who want to increase their preparedness level (Muttarak, 2013). The relationship between formal education and disaster preparedness should be further studied in order to improve preparedness at all levels.

### **Residential Geography and Preparedness**

Disasters, whether it being natural or human-made, can occur at any time and any place. From coast to coast individuals residing in different areas must deal with various types of disasters. FEMA has region mapping, analysis, and planning (MAP), which allows the public to search online to see if their home is located in a disaster risk area (Nonko, 2017). Individuals living on the West Coast mostly deal with earthquakes, wildfires, and drought; whereas, individuals on the East Coast tend to deal with hurricanes, tornados, and thunderstorms. The way individuals prepare on the West Coast versus the East Coast differs due to differential risks. Some assumptions are that those individuals living in high-risk areas are more likely to prepare for disasters than those who live in low-risk areas. However, those assumptions are related to the fact that individuals living in high-risk areas have experienced certain disaster events and are better prepared in order to avoid the losses that were felt during the last disaster occurrence. Individuals living in high-risk areas have to worry about “when” their homes will be damaged and not “if” their homes will be affected by a disaster.



When it comes to being prepared for disasters only about 50% of Americans are prepared (Ballard, 2018). Individuals will rank preparation for natural disasters lower on a priority list in connection to their frequency and the damage caused (Achenbach & Berman, 2017). Since natural disasters are not planned, unlike terrorist attacks, people feel less threatened when it comes to natural disasters (Achenbach & Berman, 2017). With the uncertainty that comes with natural disasters, some may expect that individuals residing in high-risk areas would be more prepared. High-risk areas, however, tend to have a higher percentage of people who are of low SES. Individuals who are of low SES place disaster preparedness actions lower on their priorities (Fothergill, 2004).

### **Conclusion**

Disaster preparedness is a year-round activity (Roth, 2017). With disaster occurrences increasing each year and the unpredictability of disasters both natural and human-made, it is important for individuals to get involved in disaster preparedness activities. When a major disaster strikes, it displaces individuals from their homes, leaving them with no place to go. Depending on an individual's age, education, or residential geography, many factors determine how he or she may prepare themselves for a disaster. Some people may live in areas where floods are more likely to happen and have to prepare their homes differently than those who reside in more earthquake prone areas. There are also those who are older adults who need more assistance when it comes to disaster preparedness. An individual's education level could reflect his or her SES, which in turn could influence his or her knowledge on how to prepare

for a disaster. It is important that all risk and protective factors be explored for disaster preparedness.

### **Purpose of the Study**

The purpose of this study was to examine factors that influence an individual's level of disaster preparedness.

### **Research Questions**

1. Is there an association between education and an individual's confidence in his or her ability to prepare for a disaster?
2. Is there an association between age and an individual's confidence in his or her ability to prepare for a disaster?
3. How does an individual's residential geography affect how he or she prepares for a disaster?

### **Hypotheses**

It is hypothesized that an individual's confidence in his or her ability to prepare for a disaster is influenced by his or her age and educational level. It is further hypothesized that how an individual prepares for a disaster is affected by his or her place of residence.

## **Method**

### **Design**

This study used a cross-sectional study design to explore the factors that influence an individual's level of disaster preparedness. The data used for this study was secondary data from Riverside County Emergency Management Department. The Institutional Review Board at California Baptist University approved this research study under exempt status on April 17, 2019 (see Appendix D).

### **Procedures**

The Emergency Preparedness Survey was distributed to patrons at 21 various events (see Table 1 for complete list of events) in a select Southern California county between December 2016 to February 2017. Event patrons were asked if they would like to participate in an Emergency Preparedness Survey administered by the County's Emergency Management Department. Through the consent process, participants were informed that the survey was 100% voluntary and that no incentives would be provided for the completion of the survey. The paper Emergency Preparedness Survey consisted of 14 questions that took about 10 minutes to complete (see Appendix C). A total of 349 people agreed to the informed consent and completed the survey. After surveys were completed, data collected from the paper surveys were entered into Microsoft Excel and later uploaded into the Statistical Package for Social Sciences (SPSS) version 24 for analysis. Using the G\*Power Software, Version 3.1.9.4, with a moderate effect size, an alpha level of .05, and a power of 80% was acquired. The minimum required sample size to perform the Pearson correlation was 82, to perform the independent sample t-test was 128 and to

perform the Chi-Square was 88. The study sample size of 349 surpasses the estimated minimums required to perform all statistical analyses.

### **Participants**

The participants in this study included residents of a local Southern California county. The participants answered a number of demographic questions on the survey questionnaire. Demographic questions included birth year, zip code, level of education, children under the age of 18 years old living in the residence, and if they were currently living with or caring for someone with a disability, including elderly persons requiring assistance. A total of 349 participants completed the county's Emergency Preparedness Survey between December 2016 to February 2017. Recruitment of participants was done during various city events throughout the county. Participants were asked if they wanted to voluntarily complete a paper survey to assist the county's emergency managers in understanding the community's level of disaster preparedness. No incentives were given to participants who voluntarily completed the survey. Participants were provided with a paper survey and writing materials in order to complete the survey. All participants in the study were ages 18 years or older.

### **Independent Variable**

In this study there were three independent variables. The first independent variable was age. Participants' age was determined using the demographic question "*In what year were you born?*", and participants responded with their birth year. The data were then used to calculate age in years.

The second independent variable was education level. Education level was measured based on the level of education the participant had completed at the time of the survey. Participants education level was determined by asking, “*What is the Highest Level of Education that YOU attained? Would it be...?*” Response options included “1 = less than 12<sup>th</sup> grade (no diploma),” “2 = high school diploma or GED,” “3 = some college but no degree,” “4 = associate’s degree in college,” “5 = bachelor’s degree,” “6 = master’s degree,” “7 = doctorate degree,” “8 = don’t know,” and “9 = refuse.” Responses were then recoded and separated into two categories, “1 - High School and below” and “2 = College and above.” Responses one through two were categorized into high school and below, responses three through seven were categorized into college and above. Responses seven and eight were coded as missing data.

The third independent variable was residential geography. Residential geography was identified by the zip codes of residence for the participants. The zip codes were then recoded into one of two county regions, east or west. The zip codes for 23 cities were designated as “east” and 16 cities were designated as “west” (see Table 2 for complete listing of cities, corresponding zip codes, and assigned regions).

### **Dependent Variable**

In this study there were two dependent variables. The first dependent variable was the participants’ confidence in their abilities to prepare when it comes to disasters. Participants were asked, “*How confident are you about your ability to prepare for a disaster?*” Participants were to respond by choosing a number from one

through five on the Likert Scale. Data from respondents were then treated as raw scores with “1 = not confident” and “5 = very confident”.

The second dependent variable for this study was if a person prepared for a disaster. Participants were asked, “*Do you have supplies set aside in your home to be used only in the case of a disaster?*” Participants had the response options of “Yes”, “No”, “I don’t know”, and “Refused”. The answers to the question were recoded with “1 = No” and “2 = Yes.” Any answer that was “I don’t know” or “Refused” was treated as missing.

### **Data Analysis**

To answer the first research question, “*Is there an association between education and an individual’s level of disaster preparedness?*”, an independent samples t-test was performed to compare the mean of the two variables education and confidence in ability to prepare. The results of an independent samples t-test will be able to tell if the two means have a statistical association. To answer the second research question, “*Is there an association between age and an individual’s level of disaster preparedness?*” a Pearson correlation was performed. This will determine whether age is positively or negatively correlated with an individual’s confidence in his or her ability to prepare for a disaster. To answer the third research question, “*How does an individual’s residential geography affect how they prepare for a disaster?*” a Chi-Square Test of Independence was performed to determine if there is a relationship between an individual’s residential geography and whether or not he or she is prepared for a disaster.

## Results

A total of 349 respondents completed the 2016 Emergency Preparedness Survey. Survey respondents were residents of a local Southern California county who answered demographic questions that were used for data analysis. The average age of respondents was 42 years old. The majority of respondents had a college education or above (85.5%) with 14.5% reporting a high school education or below. Most of the respondents resided in Riverside County (71.9%) with 28.8% residing in the City of Riverside. Out of all the respondents, 40.87% rated themselves a 3 out of 5 when asked about their confidence in their ability to prepare for a disaster. In addition, 52% of respondents indicated that they had supplies set aside at home for disasters.

An independent-samples *t*-test was performed to compare the mean scores of respondents with a high school education or below to those respondents with a college education or above to assess the respondents' confidence in their ability to prepare for a disaster. No significant difference was found between the two educational groups ( $t(334) = -1.436, p > .05$ ). The mean confidence among the respondents with a high school education or below ( $M = 3.32, sd = 1.13$ ) was not significantly different from the mean of respondents with a college education or above ( $M = 3.49, sd = .990$ ) (see Figure 1).

A Pearson correlation was performed to examine the relationship between respondents' age and confidence in their ability to prepare for a disaster. The correlation was not significant ( $r(306) = .128, p > .05$ ). Respondents' age was not related to confidence in their ability to prepare for a disaster (see Figure 2).

A Chi-Square Test of Independence was performed to explore the association between an individual's regional residential geography and their preparation for a disaster. While it was hypothesized that respondents' residential geography would be associated with whether or not the respondents were prepared for a disaster, no significant association was

found ( $\chi^2 (1) = .451, p > .05$ ). An individual's residential geography was not associated with if he or she was prepared for a disaster (see Figure 3 and Table 3).

The purpose of this study was to determine if respondents' confidence in their ability to prepare was associated with age, education level, or residential geography. It was hypothesized that an individual's confidence in their ability to prepare for a disaster is influenced by his or her age and/or educational level. After data analysis, however, it was observed that neither age nor educational level were significantly associated with an individual's confidence in his or her ability to prepare for a disaster. It was further hypothesized that whether or not an individual was prepared for a disaster is associated with his or her residential geography. Through further data analysis, it was determined that respondents' residential geography was not associated with whether or not they were prepared for a disaster.



## Discussion

### Summary of Major Findings

There was an absence of a significant association between respondents' confidence in their ability to prepare for a disaster and their level of education. The results from this study contradict Muttarak's (2013) findings. In a study conducted by Muttarak (2013), it was found that education had a positive influence on disaster preparedness due to the fact that individuals with higher education levels tend to understand the importance of disaster preparedness and have more access to information about risk factors associated with disaster preparedness. A study done by Menard (2011) also contradicts the results from this study. Menard's (2011) findings showed that individuals who have a college degree were more likely to seek out preparedness information and have preparedness plans.

Results from the second research question found that an individual's age was not associated with ones' confidence in his or her ability to prepare for a disaster. In a study done in 2018, older adults were found to be more vulnerable during emergencies, natural disasters, and disease outbreaks because of their declining health status (Cox & Kim, 2018). Cox's and Kim's (2018) study further found that older adults, with the additional factor of low SES, had lower levels of preparedness, which contradicts the findings of this study. The findings from Cox's and Kim's (2018) study showed that older adults were less likely to prepare for disasters because their employment status may have changed, and that experience affected their income.

Results from the third research question found no association between preparedness and residential geography. Fothergill (2004) found that individuals

living in high-risk, disaster-prone areas tend to be individuals who are of low SES, which in turn results in their lack of prioritization of disaster preparedness. This current research study agrees with Fothergrill's findings in that an individual's geographical location is not associated levels of with disaster preparedness.

### **Public Health Implications**

Through the findings of this study, it could be implied that demographic factors such as age, education level and residential geography are not associated with an individual's confidence in his or her ability to prepare for a disaster or whether an individual is prepared for a disaster. Each year, communities are affected by disasters that have lasting effects both physically and mentally (FEMA, 2019). When people are educated on the risk factors, it can reduce the stressors that accompany the occurrence of disasters (FEMA, 2019). Individuals who are educated and trained for disaster response are able to increase the efficiency of disaster response and decrease the impact of disasters (Aguirre, Christian, & Kadihasanoglu, 2019).

Since disasters are unpredictable it is important for individuals to prepare for an event that could displace an entire community. Community preparedness results in community resilience and the building blocks of community resilience start at the individual level. Strengthening preparedness at the individual level gives individuals and communities self-efficacy to be their own disaster preparedness manager. Individuals can participate in various preparedness activities. One preparedness activity that is available in most communities is the CERT program, which educate and train individuals on basic disaster preparedness response and recovery (Franke & Simpson, 2004). A study done in 2004 after Hurricane Isabel showed the many benefits of being CERT trained (Franke & Simpson, 2004). Having individuals who are CERT trained allowed professional first responders to be more available for high-risk tasks (Franke & Simpson, 2004).

## **Limitations**

One limitation of this study was the creation of categories of residential geography. In this study, respondents' zip codes were recoded into two regions: east and west. This limited geographic diversity and variability. Including four regions, such as north, south, east, and west, may allow for better understanding of geographic associations. Additionally, survey respondents reported residing in four of 28 cities across the County. The limited number of cities did not allow for geographic representation of the County.

Another limitation was the cross-sectional design of the study. Cross-sectional studies are able to examine the differences between groups; however, exposure and outcome of study are measured at the same time. Taking data from the same frequency limits the temporal relationship between exposure and outcome (Crosby, 2015). For this study, the data does not show what is causing communities to prepare for disasters.

A third limitation that factors into this study is the sample size. Eighty-five percent of this study's respondents reported having a college education or higher. A 2018 census survey showed that 21.5% of the individuals in Riverside County had a bachelor's degree or higher while 81% had an education level of high school or below between 2013 to 2017 (U.S. Census Bureau, 2018). The sampling of a single county also limits this study due to the lack of local major disasters compared to other areas that are more likely to experience disasters.

## **Future Directions**

Future research on disaster preparedness should survey the communities annually in order to assess preparedness trends. Annual surveys may provide an opportunity to better understand community preparedness levels and may help identify disaster preparedness resource needs. Another suggestion would be to survey a population before and after a local disaster. Pre- and post-disaster data would show how the occurrence of a disaster can affect

how residents prepare for future disaster and how communities prepare for and respond to disasters, emergencies, and disease outbreaks.

## References

- Achenbach, J. & Berman, M. (2017, October 15). People love to live in places that are at risk for disasters, 'and this is what happens'. *The Washington Post*. Retrieved from [https://www.washingtonpost.com/national/people-love-to-live-in-places-that-are-at-risk-for-disasters-and-this-is-what-happens/2017/10/15/ba50ed38-b03f-11e7-be94-fabb0f1e9ffb\\_story.html?noredirect=on&utm\\_term=.8c96a7bbbca7](https://www.washingtonpost.com/national/people-love-to-live-in-places-that-are-at-risk-for-disasters-and-this-is-what-happens/2017/10/15/ba50ed38-b03f-11e7-be94-fabb0f1e9ffb_story.html?noredirect=on&utm_term=.8c96a7bbbca7)
- Aguirre, M., Christian, E., & Kadihasanoglu, A. (2019). Disaster Preparedness. Retrieved from <https://www.preparecenter.org/topics/disaster-preparedness>
- Assistant Secretary for Preparedness and Response (ASPR). (2015, June 9). Community resilience. Retrieved from <https://www.phe.gov/Preparedness/planning/abc/Pages/community-resilience.aspx>
- Assistant Secretary for Preparedness and Response (ASPR). (2018, January 29). Individual resilience. Retrieved from <https://www.phe.gov/Preparedness/planning/abc/pages/individual-resilience.aspx>
- Ballard, Jamie. (2018, July 17). 41% of Americans say they're not prepared for a natural disaster. *YouGov*. Retrieved from <https://today.yougov.com/topics/lifestyle/articles-reports/2018/07/17/americans-disaster-preparedness-2018>

- Brown, L. M. (2019). Older adults and disasters –how to be prepared and assist others. Retrieved from <https://www.apa.org/pi/aging/resources/older-adults-disasters.pdf>
- Cox, K. & Kim, B. (2018 July 6). Race and income disparities in disaster preparedness in old age. *Journal of Gerontological Social Work*. Retrieved from <http://bc8vs6ds4b.search.serialssolutions.com.Libproxy.calbaptist.edu/?sid=EBSCO:Scopus%C2%AE&genre=article&title=Journal%20of%20Gerontological%20Social%20Work&atitle=Race%20and%20income%20disparities%20in%20disaster%20preparedness%20in%20old%20age&author=Cox%2C%20K.&authors=Cox%2C%20K.%3BKim%2C%20B.&date=20181003&volume=61&issue=7&spage=719&issn=15404048&doi=10.1080/1634372.2018.1489929>
- Crosby, R., DiClemente, R., and Salazar, L. (Eds.) (2015). *Research Methods in Health Promotion*. San Francisco: Wiley.
- Dambroski, S. (2018, September 22). *The importance of community networks to disaster resilience*. Retrieved from [https://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=296558&org=NSF&from=news](https://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=296558&org=NSF&from=news)
- Department of Homeland Security (a). (2019). Build a kit. Retrieved from <https://www.ready.gov/build-a-kit>
- Department of Homeland Security (b). (2019). Community emergency response team. Retrieved from <https://www.ready.gov/community-emergency-response-team>

- Envista Forensics. (2018, April 23). Most high risk areas for natural disasters and serve weather. Retrieved from <https://www.envistaforensics.com/resources/news/envista-natural-disaster-risk-areas-2015-infographic/>
- Federal Emergency Management Agency (FEMA). (2014, May 1). Emergency supply list. Retrieved from [https://www.fema.gov/media-library-data/1390846764394-dc08e309debe561d866b05ac84daf1ee/checklist\\_2014.pdf](https://www.fema.gov/media-library-data/1390846764394-dc08e309debe561d866b05ac84daf1ee/checklist_2014.pdf)
- Federal Emergency Management Agency (FEMA). (2015, April 28). Sixty percent of Americans not practicing for disaster: FEMA urges everyone to prepare by participating in National PrepareAthon! Day on April 30. Retrieved from <https://www.fema.gov/news-release/2015/04/28/sixty-percent-americans-not-practicing-disaster-fema-urges-everyone-prepare>
- Federal Emergency Management Agency (FEMA). (2019, January 30). Risk MAP Region VI. Retrieved from <https://www.fema.gov/risk-map-region-vi>
- Fothergill, A., & Peek, L. A. (2004). Poverty and disasters in the United States: A review of recent sociological findings. *Natural Hazards*, 32, 89–110.
- Franke, M. E. and Simpson, D. M. (2004). Community response to Hurricane Isabel: An examination of community emergency response team (CERT) organizations in Virginia. Center for Hazards Research and Policy Development University of Louisville. Retrieved from [https://www.researchgate.net/profile/David\\_Simpson23/publication/267220857\\_Community\\_Response\\_to\\_Hurricane\\_Isabel\\_An\\_Examination\\_of\\_Community](https://www.researchgate.net/profile/David_Simpson23/publication/267220857_Community_Response_to_Hurricane_Isabel_An_Examination_of_Community)

nity\_Emergency\_Response\_Team\_CERT\_Organizations\_in\_Virginia\_Executive\_Summary/links/55353f7a0cf268fd0015d5ef.pdf

International Federation of Red Cross and Red Crescent Societies (IFRC). (2019).

What is a disaster? Retrieved from <https://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/what-is-a-disaster/>

Jamison, Dean T. (2006). *Disease control priorities in developing countries*.

Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK11792/>

Keim M. E. (2008). Building human resilience: The role of public health

preparedness and response as an adaptation to climate change. *American Journal of Preventive Medicine*. 35(5). 508–516.

McCarthy, C. (2019, August 24). Disasters and your family: Why to be

prepared. Retrieved from <https://www.healthychildren.org/English/safety-prevention/at-home/Pages/Getting-Your-Family-Disaster-Ready.aspx>

Meyer, R. (2018, July 13). USA: ‘It won’t happen to me’: Why people don’t prepare

for disasters. Retrieved from

<https://www.preventionweb.net/news/view/59595>

Muttarak, R, & Pothisiri, W. (2013). The role of education on disaster

preparedness. Retrieved from <https://paa2013.princeton.edu/papers/131027>

Nonko, Emily. (2017, October 27). Curbed. *The basics of living in a risk zone*.

Retrieved from <https://www.curbed.com/2017/10/27/16557018/risk-zone-home-insurance-protection>



- Roth, M. (2017, June 2). Everyone must be prepared for emergencies. Retrieved from <https://www.fema.gov/blog/2015-04-29/everyone-must-be-prepared-emergencies>
- Russell, J. (2019). Emergency Preparedness in School. Retrieved from <https://www.accreditedschoolsonline.org/resources/emergency-preparedness-in-school/>
- Substance Abuse Mental Health Services Administration (SAMHSA). (2019 February 4). Types of disasters. Retrieved from <https://www.samhsa.gov/find-help/disaster-distress-helpline/disaster-types>
- Sawer, P. (2010, January 16). Haiti earthquake: Rescuers still struggling without working airport, port, or roads. *The Telegraph*. Retrieved from <https://www.telegraph.co.uk/news/worldnews/centralamericaandthecaribbean/haiti/7005646/Haiti-earthquake-rescuers-still-struggling-without-working-airport-port-or-roads.html>
- Shih, R., Acosta, J. D., Chen, E. K. (2018, August 8). Improving disaster resilience among older adults. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6075802/>
- Trump, D. J. (2017, August 30). Proclamation 9632 –National Preparedness Month, 2017. Retrieved from <https://www.presidency.ucsb.edu/documents/proclamation-9632-national-preparedness-month-2017>
- United States Census Bureau. (2018, July 1). Quick facts Riverside County,

California. Retrieved from <https://www.census.gov/quickfacts/riversidecountycalifornia>

University of Southern California. (USC). (2019). The public health implications of natural disasters. Retrieved from <https://mphdegree.usc.edu/blog/the-public-health-implications-of-natural-disasters/>

World Health Organization (WHO). (2019). *Glossary of humanitarian terms*. Retrieved from <https://www.who.int/hac/about/definitions/en/>

Zogby, John. (2013, May 16). Americans neither worried nor prepared in case of a disaster: SUNYIT – Zogby Analytics Poll. *Forbes*. Retrieved from <https://www.forbes.com/sites/johnzogby/2013/05/16/americans-neither-worried-nor-prepared-in-case-of-a-disaster-sunyit-zogby-analytics-poll/#ee6502220e06>

## Appendix A: Tables

Table 1

*Event details of where surveys were distributed and collected*

	<b>Event</b>	<b>Date</b>	<b>Time</b>
<b>Hemet, CA</b>	Community Resource Network Meeting	December 1, 2016	4:00pm – 5:00pm
	Tree Lighting Event	December 2, 2016	5:30pm – 7:30pm
	Tinsel Fundraiser Triathlon	December 11, 2016	7:00am – 5:00pm
	City Council Meeting	December 13, 2016	7:00pm – 9:00pm
	Hispanic Network Meeting	December 14, 2016	5:30pm – 7:00pm
	Community Resource Network Meeting	January 5, 2017	4:00pm – 5:00pm
	City Council Meeting	January 10, 2017	7:00pm – 9:00pm
	Hispanic Network Meeting	January 11, 2017	5:30pm – 7:00pm
<b>Indio, CA</b>	City Council Meeting	December 7, 2016	5:00pm
	10 <sup>th</sup> Annual Arbor Day Celebration and Tree Planting Event	December 8, 2016	9:00am
	Free Waste Collection Event	December 9, 2016 & December 10, 2016	9:00am – 2:00pm
	Indio Winterfest	December 16, 2016	5:00pm
	Annual Health Fair Community Event	February 7, 2016	9:00am – 12:30pm
<b>Menifee, CA</b>	Christmas Tree Lighting Ceremony	December 10, 2016	4:00pm – 9:00pm
	Community Emergency Response Team (CERT)	January 13, 2017 January 15, 2017	5:30pm 5:00pm
	Menifee Family Campout	TBD	TBD
<b>Temecula, CA</b>	Holiday Vendor Fair	December 1, 2016	4:00pm
	Temecula Valley Learning Forum	December 6, 2016	8:00am – 10:00am

	Vail Headquarters Certified Farmers Market	Every Tuesday	9:00am – 1:00pm
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Table 2

*Recoded city and zip codes*

<b>Zone</b>	<b>City</b>	<b>Zip Code</b>
West	Corona	92877
		92878
		92879
		92880
		92881
		92882
	Eastvale	91752
		92860
		92880
	Jurupa Valley	91752
		92337
		92505
		92509
	Mira Loma	92519
		91752
		92551
	Moreno Valley	92552
		92553
		92554
		92555
		92556
		92557
		91752
	Norco	92860
		92880
		92551
		92570
	Perris	92571
		92572
		92585
		92587
		92599
92501		
Riverside	92502	
	92503	
	92504	
	92505	
	92506	
	92507	
	92508	

		92513
		92514
		92515
		92516
West		92517
		92521
		92522
	Sun City/Romoland	92585
	Canyon Lake	92587
	Lake Elsinore	92530
		92531
		92532
		92570
		92584
		92587
	Menifee	92584
		92585
		92586
		92587
		92596
	Murrieta	92562
		92563
		92564
	Temecula	92589
		92590
		92591
		92592
		92593
	Wildomar	92530
		92584
		92595
East	Aguanga	92536
	Anza	92539
	Banning	92220
		92223
	Calimesa	92223
		92320
		92373
	Hemet	92543
		92544
		92545
		92546
	Homeland	92545
		92548
	Idyllwild	92549
	San Jacinto	92545
		92581
		92582
92583		

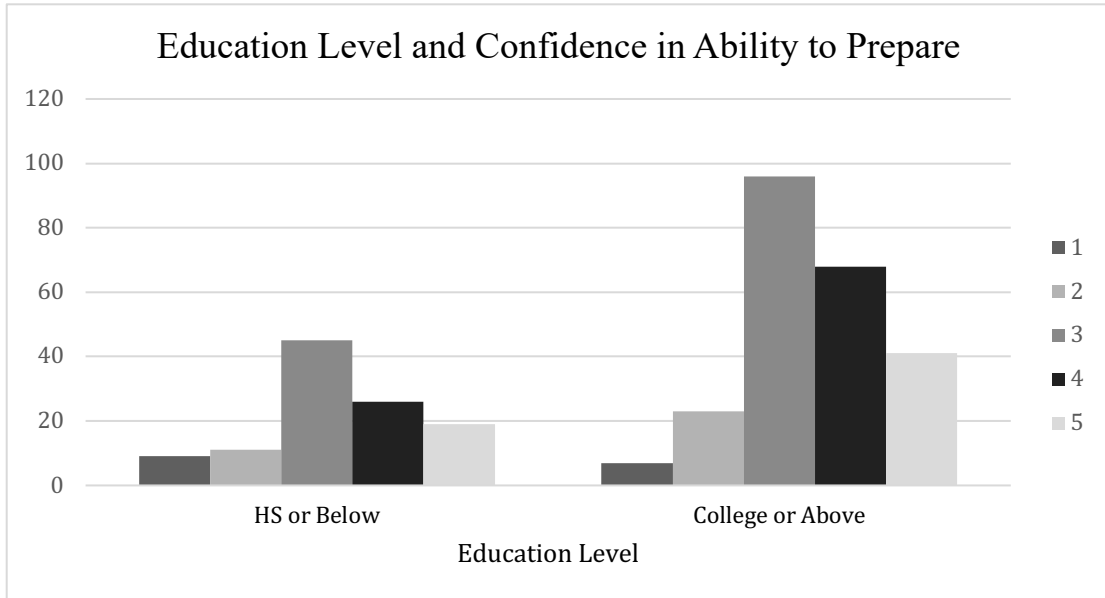
East	Winchester	92545
		92596
	Blythe	92225
		92226
	Cathedral City	92234
		92235
		92240
		92241
	Coachella	92203
		92236
	Desert Hot Springs	92240
		92282
	Indian Wells	92210
		92211
	Indio	92201
		92202
		92203
	La Quinta	92210
		92247
		92248
		92253
	Mecca	92254
	Palm Desert	92211
		92255
		92260
		92261
	Palm Springs	92240
		92258
		92262
		92263
92264		
92282		
Rancho Mirage	92270	
Thermal	92274	
Thousand Palms	92276	

Table 3.

*Whether or not respondents had supplies set aside at home*

	Zip Codes		
	West	East	Total
Yes	105 (74.2%)	40 (23.4%)	145
No	85 (76.6%)	26 (25.8%)	111
Total (within zip codes)	190	66	256

## Appendix B: Figures

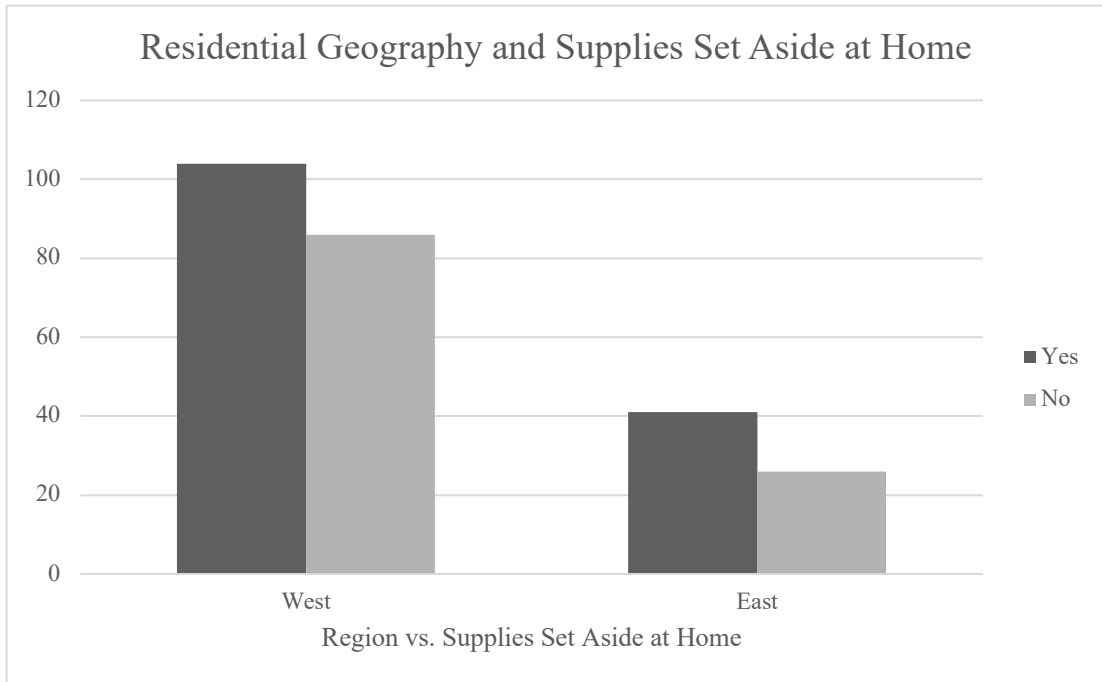


**Figure 1.** Comparing education level and confidence in ability to prepare for a disaster





**Figure 2.** Comparing age and confidence in ability to prepare for a disaster



**Figure 3.** Comparing residential geography and supplies set aside for disasters

## Appendix C: Emergency Preparedness Survey

**1. Are there children under the age of 18 living in your residence?**

- Yes
- No
- Don't Know
- Refuse

**2. In a natural disaster, such as an earthquake, a hurricane, a flood, a tornado, or wildfires, which of the following statements best represents your belief?**

- I can handle the situation without any preparation
- Preparation, planning, and emergency supplies will help me handle the situation.
- Nothing I do to prepare will help me handle the situation
- Don't Know
- Refused

**3. How confident are you about your ability to prepare for a disaster? Please use a scale of 1 to 5, with 5 being "very confident" and 1 being "not confident."**

1	2	3	4	5
Not Confident			Very Confident	

**4. In thinking about preparing yourself for a major disaster, which best represents your preparedness?**

- I have not yet prepared, but I intend to within 6 months
- I have not yet prepared, but I intend to within 1 month
- I just recently began preparing
- I have been prepared for at least the past 6 months (Skip next question)
- I am not planning to do anything about preparing

**5. In what year were you born?**

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- Don't Know
- Refuse

6. For each of the following statements, please tell me whether it is “The Primary reason,” “Somewhat of a reason,” or “Not a reason at all” why you have not taken any disaster preparedness steps

Statement	Primary Reason	Somewhat of a reason	Not a reason at all
I don't know what I'm supposed to do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I just haven't had the time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I just don't want to think about it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It costs too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't think it will make a difference	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't think I'd be able to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that emergency responders, such as fire, police, or emergency personnel, will help me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Do you have supplies set aside in your home to be used only in the case of a disaster?

- Yes
- No (Skip next question)
- Don't Know
- Refused

8. Could you tell me the disaster supplies you have in your home? (if YES to previous question)

- A supply of bottled water
- A supply of packaged food
- A flashlight
- A portable, battery-powered radio
- Batteries
- A first aid kit
- Eyeglasses

- Medications
- Photocopies of personal identification
- Financial documents
- Cash
- Don't Know
- Refused

**9. Does your household have an emergency plan that includes instructions for household members about where to go and what to do in the event of a disaster?**

- Yes
- No
- Don't Know
- Refused

**10. What is the Highest Level of Education that YOU attained? Would it be...?**

- Less than 12<sup>th</sup> grade (no diploma)
- Bachelor's Degree
- High School Diploma or GED
- Master's Degree
- Some College but No Degree
- Doctorate Degree
- Associates Degree in College
- Don't Know
- Refuse

**11. Do you currently live with or care for someone with a disability, including someone elderly who requires assistance?**

- Yes
- No
- Don't Know
- Refuse

**12. Zip Code:** \_\_\_\_\_

**13. Would you like ongoing disaster preparedness information?**

- No
- Yes, please provide email below

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**14. Any comments?**

## Appendix D: IRB Approval

**RE:** IRB Review  
**IRB No.:** 091-1819-EXM

**Project:** Factors that Influence Disaster Preparedness

**Date Complete Application Received:** 4/4/19

**Date Final Revision Received:** 4/16/19

**Principle Investigator:** Darlene Hua Yao

**Faculty Advisor:** Marshare Penny

**College/Department:** CHS

**IRB Determination:** Exempt Application Approved – Student research using secondary data collected by Riverside EMS; access to data by approval. Data analysis may begin, in accordance with the final submitted documents and approved protocol.

**Future Correspondence:** All future correspondence about this project must include all PIs, Co-PIs, and Faculty Advisors (as relevant) and reference the assigned IRB number.

**Approval Information:** In the case of an unforeseen risk/adverse experience, please report this to the IRB immediately using the appropriate forms. Requests for a change to protocol must be submitted for IRB review and approved prior to implementation. At the completion of the project, you are to submit a Research Closure Form.

**Researcher Responsibilities:** The researcher is responsible for ensuring that the research is conducted in the manner outlined in the IRB application and that all reporting requirements are met. Please refer to this approval and to the IRB handbook for more information.

**Date:** April 17, 2019