

Disaster preparedness and well-being among Cambodian- and Laotian-Americans

Disaster
preparedness
and well-being

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Abstract

Purpose – Using two main research questions, the purpose of this paper is to examine well-being and preparedness among Cambodian and Laotian immigrants living near the Gulf Coast of the USA, and the ways in which indicators such as sense of community and risk perception are related to these constructs.

Design/methodology/approach – This study employed a cross-sectional prospective design to examine disaster preparedness and well-being among Laotian and Cambodian immigrant communities. Quantitative survey data using purposive snowball sampling were collected throughout several months in Alabama, Mississippi, Florida and Louisiana.

Findings – Results from two multiple regressions revealed that sense of community and age contributed to well-being and were significant in the model, but with a negative relationship between age and well-being. Risk perception, confidence in government, confidence in engaging household preparedness and ability to cope with a financial crisis were significant predictors and positively related to disaster preparedness.

Practical implications – Well-being and disaster preparedness can be bolstered through community-based planning that seeks to address urgent needs of the people residing in vulnerable coastal locations. Specifically, immigrants who speak English as a second language, elder individuals and households in the lowest income brackets should be supported in disaster planning and outreach.

Originality/value – Cambodian and Laotian American immigrants rely upon the Gulf Coast's waters for fishing, crab and shrimp income. Despite on-going hazard and disasters, few studies address preparedness among immigrant populations in the USA. This study fills a gap in preparedness research as well as factors associated with well-being, an important aspect of long-term resilience.

Keywords Well-being, Refugees, Sense of community, Disaster preparedness

Paper type Research paper

Introduction

As human activity continues to adversely impact marine ecosystems, fishing industries and coastal communities may experience long-term loss associated with environmental degradation (Cinner *et al.*, 2013; Colburn *et al.*, 2016; Graham *et al.*, 2013). Factors associated with climate change such as weather fluctuations, tropical storms and sea level rise can also affect marine life and the ability of the marine ecosystem to thrive. This can have negative implications for marine-based industry, food security and coastal employment (Ding *et al.*, 2017; Grafton, 2010; Widener, 2018). Communities that depend on fishing as a main industry may

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experience losses associated with changes to ocean or marine-related resources. These risks may manifest in a variety of ways, from resource degradation to psychosocial impacts on the people who depend on the ocean. Living near the coast also increases the physical vulnerability of people to natural hazards, especially hurricanes (National Research Council, 2014).

Along the Mississippi Sound in the USA, Cambodian and Laotian refugees' economic well-being is rooted in strong cultural and occupational trends of working in fishing, crab industry, shrimps and oysters (Gaillard *et al.*, 2008). Having fled as refugees from genocide and political persecution in their home countries, these communities face environmental threats such as environmental and technological hazards like oil spills and coastal flooding (Gaillard *et al.*, 2008; Mortland, 2017; Zong and Batalova, 2016).

In disasters, physical and social vulnerabilities, such as poverty, racial segregation, gender and socioeconomic status, exacerbate the impacts of exposure to hazards (Blaikie *et al.*, 2004; Verchick, 2010). For example, minority communities – African–American, Native American, Latinx and Asian descent experienced the greatest ramifications of the splintering of New Orleans' levees during Hurricane Katrina. While language barriers and deportation fears prevented Latinx immigrants from accessing resources, these poor communities received inadequate funds to rebuild since pre-Katrina home values were lower than the cost to rebuild (Verchick, 2010). It is unclear if the Cambodian– and Laotian–American communities experienced similar barriers to recovery in the Gulf Coast region after Katrina. It is also unclear if Cambodian– and Laotian–American people living in the Gulf region were more likely to stay near the coast after Katrina because of their reliance on fisheries, crab and shrimping, and what impact these stressors have on well-being.

This research focuses on Cambodian– and Laotian–Americans living in and near the Gulf Coast and examines factors that contribute to well-being and disaster preparedness. This paper begins with a brief literature review of theoretical concepts of vulnerability, dependency of natural resources in the Gulf Coast, concepts of well-being and sense of community and preparedness. We also describe the community in context including the social and historical landscape of Asian immigrants in the Bayou La Batre area. These sections are followed by the methodology, results and implications of the research findings.

Literature review

Theoretical concepts of vulnerability

The extent to which a community is vulnerable to hazards can be understood through several key theoretical concepts. The two concepts that inform our research in the Cambodian and Laotian Gulf Coast communities are Cutter's concept of social vulnerability (Cutter, 1996; Cutter and Finch, 2008) and the Pressure and Release (PAR) model by Blaikie *et al.* (2004). The social vulnerability index (SoVI) was developed as a means for hazard planners and other officials to use community-level data to indicate susceptibility to adverse outcomes to hazards exposure. While the SoVI is meant to be a quantifiable index based on census and other "mappable" data, the concept of social vulnerability is a foundation for identifying factors that make communities more resilient to hazards. For example, communities that are in flood zones, with majority low-income households will have higher levels of social vulnerability than communities that are not prone to flooding and whose income and resource capacities are greater. The SoVI index is also pragmatic in terms of gauging community capacity, which is important for community resilience. Resilience is defined as the degree to which a community has the capacity to respond to and recover from extreme environmental hazards and other adverse events (e.g. Norris *et al.*, 2008). For example, communities with less access to physical resources and lower social capital are also more likely to face daily challenges and structural violence that makes it more difficult for communities to prepare for and respond to disasters (Blake *et al.*, 2017).

The PAR model (Blaikie *et al.*, 2004) describes how disasters can be understood by considering the root causes of vulnerability in tandem with physical hazards. Root causes include poverty, structural violence, long-term deterioration of the natural land and resources, health disparities and other inequities in the social landscape. When vulnerability is combined with hazards (such as earthquakes, hurricanes or other hazards), the probability of hazard impacts will change depending on levels of pre-existing social vulnerability. Through this lens, communities without access to resources are not only less able to withstand extreme events and experience greater physical losses, but they are also more likely to experience protracted and difficult recovery processes after disasters. Additionally, this also bolsters the rationale for including well-being as a measure in disaster research, because higher levels of well-being should be associated with higher levels of preparedness, and yet there is little research that links these two variables. Research in New Zealand indicates that there is a positive relationship between well-being and evacuation preparedness (Gowan *et al.*, 2014).

Disaster preparedness and hazard vulnerability

Preparedness is a growing area of disaster research and a part of the hazard cycle. Disaster preparedness includes tasks, activities or actions that may reduce loss of life or property in a hazard or disaster event (Phillips *et al.*, 2016). Disaster preparedness remains low in the general population (Appleby-Arnold *et al.*, 2018; Becker *et al.*, 2017; Paton and Johnston, 2001). In the USA, the Federal Emergency Management Agency recommends that families and households have enough supplies to get them through a crisis for up to 72 h, because this is the time span in which it may take for disaster responders to reach households in severe disasters or catastrophic events. Individual and household characteristics, such as risk perception (Perry *et al.*, 2001; Shapira *et al.*, 2018), income (Donner and Lavariega-Montforti, 2018; Phillips *et al.*, 2005), confidence in government (Basolo *et al.*, 2009; DeYoung and Peters, 2016), previous hazard experience (Kohn *et al.*, 2012) and other demographic factors such as knowledge about preparedness (Kapucu, 2008) affect levels of disaster preparedness. Communities that do not speak English as a primary language may experience unique challenges throughout the hazard cycle, especially in receiving warnings and preparedness information (Nepal *et al.*, 2012).

People who are heavily dependent on fishing industries for livelihood are more susceptible to the hazards associated with climate change and sea level rise (Colburn *et al.*, 2016; Graham *et al.*, 2013). Millions of people around the world depend on fishing for their livelihood since fish is a secure, protein-rich food source (Allison and Ellis, 2001; Allison *et al.*, 2009). In the USA, coastal regions are important economic sources (National Oceanic and Atmospheric Administration, n.d.), as 40 percent of the population resides along the US coasts, with approximately 56m Americans working in these regions. Marine ecosystems provide resources and income for fishing communities in coastal areas (Allison *et al.*, 2009; Cheung *et al.*, 2010). For example, fishing communities in West Africa are vulnerable to climate change due to high dependence on fish for income and food security. Also, these communities have limited social abilities for their national economies to handle the effects of climate change (Allison *et al.*, 2009; Lam *et al.*, 2012).

Moreover, extreme events, such as storm floods may reduce the quality and availability of resources for fishing communities (Bridges and McClatchey, 2009). Severe weather conditions and storms can not only damage essential tools for trade productivity such as boats, equipment and landing sites (Jallow *et al.*, 1999), but also crucial daily life assets such as homes, hospitals and schools (Westlund, 2007). As a result, communities in small coastal and riverside rural areas experience lack of water, damage to health systems, drainage and sewage systems (Iwasaki *et al.*, 2009; Olago *et al.*, 2007). Fisher folk are a typically more impoverished population because of weak organization among fishers and lack of political voice. As a result, fishers are stuck in the fishing business because of limited other employment options (Bene, 2003).

Well-being

The Centers for Disease Control and Prevention (2016) defines well-being as the self-perception of one's physical, mental, social and emotional health. Deci and Ryan (2008) define positive well-being as being satisfied with life circumstances including a person's character, environment and culture. Well-being can be measured at the individual or community level (Nelson and Prilleltensky, 2010). Often these two levels influence each other, especially when examined through the lens of ecological frameworks in community research (Atilola, 2017; Bronfenbrenner, 1994). In the ecological model, individual well-being is connected to community activities, community cohesion and social systems. Additionally, understanding how individual well-being is related to social ties, lived experience and access to resources can lead to the development of interventions that improve disaster resilience (Norris *et al.*, 2008).

Immigrant and refugee well-being

Findings from refugee well-being research have emphasized the importance of mental health and the potential vulnerability of new refugee arrivals (Hodes *et al.*, 2018; Thela *et al.*, 2017). According to Dinh (2016), both the push (war, genocide or poverty) and pull factors can create stress and trauma for refugees. Pre-migration stress is correlated with lower well-being, (Keller *et al.*, 2017; Schweitzer *et al.*, 2011) as well as stress and trauma associated with post-migration (Li *et al.*, 2016; Schweitzer *et al.*, 2011). Specifically, difficulties adjusting to a new culture may cause some mental health symptoms such as anxiety, depression, anger and guilt (Lai *et al.*, 2017).

While some studies focus on refugee communities living in the USA (Mazumdar *et al.*, 2000), few studies have explored the relationship between refugees' beliefs related to climate change and sea level rise, sense of community and well-being. Research on Vietnamese, African-American and other communities in the Louisiana region shows community recovery and resilience is an on-going process (Li *et al.*, 2010). However, there is a scarcity of research on Cambodia and Laotian communities in the Gulf Coast. Findings from a qualitative study by Nguyen and Salvesen (2014) suggest that language barriers and navigating complex bureaucracies made recovery more difficult for Southeast Asians in the Gulf Coast region. Additionally, their research suggests that relief services did not include comprehensive planning in terms of providing tailored services to the different Southeast Asian communities.

Sense of community

As a construct, sense of community is different from place attachment. Place attachment is derived more from the ways in which individuals perceive a place as comforting or associate a physical space with positive memories (Gosling and Williams, 2010; Morgan, 2010; Ram *et al.*, 2016), while sense of community corresponds more with a sense of connection with the human and social environment (Chipuer and Pretty, 1999; Perkins and Long, 2002; Talò *et al.*, 2014). However, a place can conceptually be a source of elements of sense of community, such as a park or green space (Gómez *et al.*, 2015). While broader sense of community research is burgeoning, there is less research that clarifies the relationship between sense of community and disaster preparedness. In the hurricane prone area of North Carolina, sense of community was found to be positively related with disaster preparedness (DeYoung and Peters, 2016).

Research on sense of community and refugees do not include variables on disaster preparedness. However, refugees may have unique transnational and "hybrid" identities that are influenced by sense of place and place attachment; for these individuals, it is important that to have a sense of interpersonal connection rather than to the physical land (Williams, 2009). Furthermore, having ties to the places left behind through familiar rituals,

ceremonies and visual cues serves to maintain the notion of being connected to the original culture while traversing new social and physical landscapes, which may also moderate trauma related to the process of relocation (Mazumdar *et al.*, 2000).

Risk perception in the Gulf Coast of the USA

Hurricanes in the Gulf Coast cause displacement (Wright and Bullard, 2009), economic challenges for people and businesses (Coughlan, 2012) and long-term psychosocial impacts (Gill *et al.*, 2014). Risk perception is the way that people gauge their level of exposure and likelihood of adverse impacts caused by hazards (Lindell and Perry, 2012). In the Gulf Coast, perceptions of hurricane risk are associated with storm surge flooding experience and levels of risk are higher in communities with higher social capital (Shao *et al.*, 2018). Over time, people living on the Gulf Coast may fluctuate in terms of risk perception depending on recency of events and other factors such as the belief that hurricanes will impact others more than the self (Trumbo *et al.*, 2014). Less is known about the ways in which immigrant communities perceive hurricane and other risks in the Gulf Coast of the USA. Research on immigrant communities after Katrina and more recently Hurricane Harvey focuses more on recovery and phases after the disaster than on risk perception. For example, findings suggest that recovery is more difficult for immigrants because of fears that seeking disaster recovery assistance will draw attention to immigration status (Wu *et al.*, 2018).

Gulf Coast communities are vulnerable because of their physical proximity to tropical storms and hurricanes. Graham *et al.* (2013) theorize that as sea levels rise, vital social connections and networks will deteriorate as communities succumb to encroaching water. However, social networks continue to be important sources of disaster recovery (Norris *et al.*, 2008; Verchick, 2010).

Study context

Placing the Gulf Coast immigrant communities in context

Cambodian– and Laotian–American refugee families living along coastal Alabama have endured multiple traumas as refugees and as community members dealing with environmental challenges. Pre-migration challenges include Cambodian refugees' flight during the Pol Pot genocide that led to approximately two million deaths and an exodus from Laos as a result of communist takeover of the Lao government. Families from those nations witnessed deaths of loved ones and continue to experience separations caused by resettlement and adjustment to life as immigrants/refugees. More recent, post-migration traumas include the massive destruction caused by Hurricane Katrina and the Deepwater Horizon oil spill. These traumatic experiences can create social pain that is felt across the entire group (Browne, 2015) and mental anguish (Adeola and Picou, 2012; Picou and Hudson, 2010; Picou *et al.*, 2015) that negatively affects well-being. However, these experiences can also increase community resilience because social groups within the communities may come together to facilitate community response and recovery (Bradbury and Reason, 2008; Norris *et al.*, 2008).

Approximately 47 percent of all Southeast Asian refugees continue to speak their native language (Southeast Asia Resource Action Center, 2011). Refugees who have limited English proficiency typically have less access to information, do not have a regular physician, are less likely to be referred to other health services, and underutilize social service agencies (Derose *et al.*, 2009; Lewis, 2007). The language barrier is also a significant vulnerability factor in accessing emergency services, including the local emergency management agency, emergency medical service providers, fire department, law enforcement agencies or faith-based organizations (Gaillard *et al.*, 2008).

There are approximately 1,400,000 Southeast Asian immigrants from Cambodia, Laos and Vietnam in the USA; approximately 10 percent of those live in Alabama, Florida,

Mississippi and Louisiana (Office of Refugee Resettlement, United States Department of Health and Human Services, 2016). Of those, nearly 80,000 live along coastal regions (US Census Bureau, 2016a, b). Approximately 9,000 (about 4.5 percent of the overall population of Mobile County) live in coastal areas near Mobile Bay and the Mississippi Sound. The approximately 4,000 Cambodian and Laotian individuals included in this project are located within geographic boundaries defined by the coastline that includes Mobile Bay and the Mississippi Sound.

The coastal community has transitioned from a predominantly mono-ethnic seafaring settlement to a multicultural region. The area has maintained its commonly shared identity as a home for seafarers who are self-sufficient hard workers. Beginning in the late 1970s, the influx of refugees from war-torn Southeast Asia shifted the area to its current ethnic makeup white (40.2 percent), Southeast Asian (30.4 percent) and African–America (17.3 percent). The median household income for the community is \$31,156 but 33.7 percent of the population lives in poverty (Alabama Demographics, 2014). Most families living along Mobile Bay and the Mississippi Sound rely on and are threatened by the warm gulf waters. Many of the 4,000 residents included in this study live in unincorporated, rural areas, are reliant upon the seafood industry for their livelihood and are surrounded by a decaying physical infrastructure that is severely susceptible to environmental disasters.

Post-Katrina focus groups in 2006 revealed that older community members were gravely concerned that young people may leave for better economic opportunities rather than remain in the badly damaged area. Since 2006, however, emergent young leaders are dedicated to strengthening their community. Members of the Cambodian– and Laotian–American communities acknowledged struggles in overcoming lingering devastation to the area’s physical infrastructure, such as roads severely damaged by the hurricane that had not yet been repaired and buildings with damaged roofs, and changes in the seafood industry after the Deepwater Horizon oil spill (Gill *et al.*, 2012). The community faces on-going uncertainty about the severity of future hurricanes, oil spills and other environmental hazards. The research team partnered with a cultural advisory board from the community to understand the key areas of concern for building resilience. Through these partnerships and the literature, the researchers identified several key research questions. The research questions are as follows:

- RQ1. How do sense of community and demographic characteristics relate to well-being in the coastal Gulf Coast Cambodian–American and Laotian–American communities?
- RQ2. What factors are related to disaster preparedness? Specifically, how does risk perception, the ability to cope with a financial crisis, confidence in local government and confidence in taking disaster preparedness steps (preparedness efficacy) relate to disaster preparedness?

Methods

Participant recruitment

Participants came to community meetings and were offered a \$10-retail gift card for participation in the survey data collection. Data were also collected in homes, businesses and recreational locations. Most of the data were collected in the Mobile County (73 percent, $n = 326$) and the remaining responses came from a combination of Mississippi ($n = 58$), Florida ($n = 34$) and Louisiana ($n = 27$) in October of 2017 through March of 2018. Responses were recruited through purposive snowball sampling of the key community partners working with the researchers. Specifically, there are four cultural advisory board members embedded in the community working closely with the researchers for data

collection (two Cambodian community members and two Lao community members). Nearly all responses were collected face to face on iPad devices. The survey was available in English, Khmer and Lao. Institutional review board requirement and human subject approval were obtained by the (University of Georgia) and subjects indicated their consent to participate in the project. Including demographic information, the survey contained 67 questions and took approximately 15 min to complete.

Well-being

Questions for well-being included items such as “I feel good about my future,” “I feel safe and secure where I currently live” and “I am actively engaged in learning new things,” and was adapted from the Subjective Well-Being Assessment Scale (Veronese *et al.*, 2017) and the Personal Well-being Index (Sulaiman-Hill and Thompson, 2010).

Sense of community

Sense of community was assessed using the theoretical components developed by McMillan and Chavis (1986) and validated by Peterson *et al.* (2008). The scale contains items such as “I can recognize most members of this community” and “I put a lot of time and effort into being part of this community.” Both the well-being scale and sense of community scale had items of agreement on a Likert measure of 1–7 (strongly disagree to strongly agree).

Disaster preparedness

The disaster preparedness scale was adapted from preparedness research by DeYoung and Peters (2016), whose scales were adapted from Mishra and Suar (2012). Items in the survey ask questions about storing batteries, flashlights and other essential items. Items also ask if the respondent has taken a basic CPR course and has a designated family meeting place in case of a disaster. Items were totaled using a sum score, and each item had “yes” or “no” response.

Risk perception

The risk perception scale was adapted from the scale also used in the DeYoung and Peters (2016) study on preparedness and included items such as “How obvious of a threat are disasters to you?” and “How concerned are you about an impending disaster?” Items were totaled using a sum score. Each item had a Likert-type response of strongly disagree (1) to strongly agree (7).

Additional items

The instrument also asked several “yes/no” questions including: ability to cope with a sudden financial crisis (such as a car accident or health emergency), confidence in the local governments’ capacity to respond to a disaster, confidence about one’s ability to engage in hazard preparedness and perceptions about major hazards (including proposed evacuation planning).

Analyses

Reliability analyses on the scales of well-being, sense of community, risk perception and preparedness were conducted and yielded scores of $\alpha = 0.95$, $\alpha = 0.97$, $\alpha = 0.94$, $\alpha = 0.86$, respectively. The data were screened for multivariate outliers using Mahalanobis distance (with Mahalanobis distance ≥ 8.5) and examination of stem-and-leaf plots. There were 11 cases that were extreme and therefore were selected to not be included in the regression analyses ($n = 445$). Collinearity diagnostics were also examined for the predictor variables and tolerance and VIF scores were acceptable. The researchers then conducted two separate multiple regressions, the first with well-being as a dependent variable and the second with preparedness as a dependent variable.

Results

Descriptive results

The respondents were 49 percent Cambodian–American ($n = 211$) and 42 percent Laotian–American ($n = 186$), and 9 percent ($n = 36$) reported to be of mixed or another ethnicity. Alabama’s population is 4.78m people with average median age of 39 and a median household income of \$44,758 (US Census Bureau, 2016a, b). The average age of participants was 40.43 years. Income for the overall participants was lower than the national household average, \$77,866 (US Census Bureau, 2016a, b), with 45 percent of participants having an income of \$20,000 or less per household (see Figures 1 and 2 for occupation type and income breakdown). For education, 77.7 percent of the respondents indicated their highest education level to be high school or lower. Mean scores for sense of community were 87.62 (SD = 23.50) and well-being were 71.79 (SD = 16.69). Means scores for preparedness and risk were $M = 8.39$ (SD = 4.46) and $M = 37.61$ (SD = 9.306), respectively. Gender for this sample was heavily skewed toward male participants ($n = 318$) and less toward females ($n = 60$) and some data were missing for gender ($n = 99$). Bivariate correlations were conducted on all variables (Table I). Many of the respondents (69.4 percent, $n = 197$) indicated that they had experienced a hazard in the past, and 73 percent of respondents ($n = 323$) indicated that hurricanes were the most dangerous threat to their community. Only 1.1 percent ($n = 5$) indicated oil spills as a major threat to their community. When asked about plans for evacuation, 31.4 percent ($n = 139$) of respondents indicated that they would evacuate to

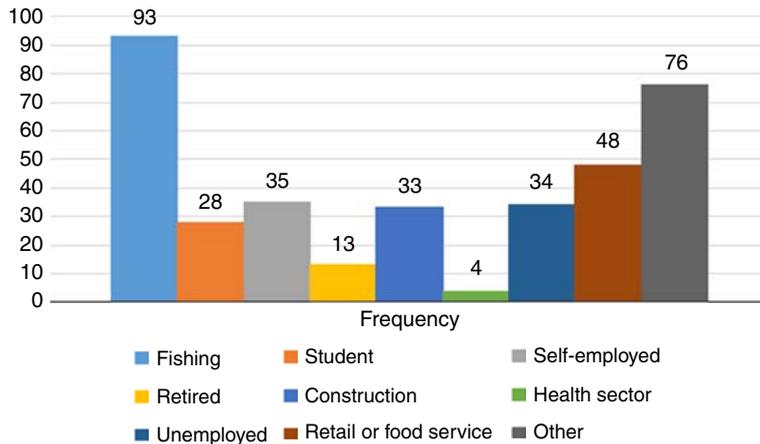


Figure 1.
Occupation

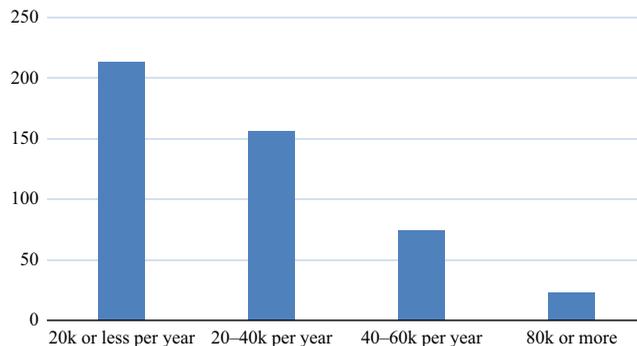


Figure 2.
Income

family and friends living in the same state, 35.4 percent ($n = 157$) indicated they would evacuate to family and friends out of state, 17.2 percent ($n = 76$) indicated plans to seek shelter at a hotel and 15.5 percent ($n = 59$) indicated plans to seek shelter at a public shelter in the event of a mandatory evacuation.

Regression results: well-being as outcome/dependent variable

The model summary indicates that the overall model is significant and accounts for 46 percent of variance in the dependent variable of well-being, $R^2 = 0.464$, $R^2_{adj} = 0.460$, $F(3, 377) = 108.961$, $p < 0.001$. Two variables were significant, sense of community $\beta = 0.712$,

	Age	Num household	Risk	Prep	SOC	Well-being	Prep confidence	Local govt confidence	Financial coping
<i>Age</i>									
<i>r</i>	1	-0.376**	0.083	0.129**	0.374**	0.148**	0.049	0.260**	0.112*
<i>p</i>		0.000	0.087	0.008	0.000	0.002	0.316	0.000	0.020
<i>n</i>	426	386	426	426	426	426	426	425	426
<i>Num household</i>									
<i>r</i>	-0.376**	1	-0.123*	-0.128*	-0.186**	-0.153**	-0.032	-0.198**	-0.116*
<i>p</i>	0.000		0.015	0.011	0.000	0.002	0.521	0.000	0.021
<i>n</i>	386	395	395	395	395	395	395	394	395
<i>Risk</i>									
<i>r</i>	0.083	-0.123*	1	0.294**	0.576**	0.623**	0.169**	0.155**	0.168**
<i>p</i>	0.087	0.015		0.000	0.000	0.000	0.000	0.001	0.000
<i>n</i>	426	395	475	475	475	475	470	469	470
<i>Prep</i>									
<i>r</i>	0.129**	-0.128*	0.294**	1	0.238**	0.304**	0.473**	0.455**	0.449**
<i>p</i>	0.008	0.011	0.000		0.000	0.000	0.000	0.000	0.000
<i>n</i>	426	395	475	475	475	475	470	469	470
<i>SOC</i>									
<i>r</i>	0.374**	-0.186**	0.576**	0.238**	1	0.769**	0.147**	0.224**	0.261**
<i>p</i>	0.000	0.000	0.000	0.000		0.000	0.001	0.000	0.000
<i>n</i>	426	395	475	475	475	475	470	469	470
<i>Well-being</i>									
<i>r</i>	0.148**	-0.153**	0.623**	0.304**	0.769**	1	0.219**	0.197**	0.185**
<i>p</i>	0.002	0.002	0.000	0.000	0.000		0.000	0.000	0.000
<i>n</i>	426	395	475	475	475	475	470	469	470
<i>Prep confidence</i>									
<i>r</i>	0.049	-0.032	0.169**	0.473**	0.147**	0.219**	1	0.513**	0.441**
<i>p</i>	0.316	0.521	0.000	0.000	0.001	0.000		0.000	0.000
<i>n</i>	426	395	470	470	470	470	470	469	469
<i>Local govt confidence</i>									
<i>r</i>	0.260**	-0.198**	0.155**	0.455**	0.224**	0.197**	0.513**	1	0.415**
<i>p</i>	0.000	0.000	0.001	0.000	0.000	0.000	0.000		0.000
<i>n</i>	425	394	469	469	469	469	469	469	468
<i>Financial coping</i>									
<i>r</i>	0.112*	-0.116*	0.168**	0.449**	0.261**	0.185**	0.441**	0.415**	1
<i>p</i>	0.020	0.021	0.000	0.000	0.000	0.000	0.000	0.000	
<i>n</i>	426	395	470	470	470	470	469	468	470

Note: *, **Significance at 0.01 and 0.05

Table I.
Bivariate correlations

$t(377) = 16.86, p < 0.001$ and age $\beta = -0.100, t(377) = -2.205, p = 0.028$ (negative relationship). Number of people in the household $\beta = 0.86, t(377) = 2.101, p = 0.036$ did not significantly contribute to the model. There is a negative relationship between age and well-being; the older a person is for this sample, the lower their well-being score.

Regression results: preparedness as outcome/dependent variable

The model summary indicates that the overall model is significant and accounts for 46 percent of variance in the dependent variable of preparedness $R^2 = 0.461, R^2_{adj} = 0.457, F(4, 456) = 97.698, p < 0.001$. All four variables were significant, risk $\beta = 0.195, t(456) = 5.54, p < 0.001$; financial coping, $\beta = 0.244, t(456) = 6.153, p < 0.001$; trust in local government to respond to a disaster, $\beta = 0.293, t(456) = 7.065, p < 0.001$; and confidence for engaging in preparedness, $\beta = 0.223, t(456) = 5.29, p < 0.001$.

Discussion

Although the research questions were informed by past literature, this is the first study to specifically measure the constructs of well-being and disaster preparedness among these immigrant communities. For the first model of well-being, sense of community was a positive and significant predictor, age was a negative and significant predictor and number of people in the household was non-significant. For the model of preparedness, ability to cope with a financial crisis, trust in local government's ability to respond to a disaster and confidence for taking steps to engage in preparedness actions were all significant and positive contributors to the model. Most of the respondents had a lower median household income. Furthermore, lack of ability to deal with a financial was associated with lower scores of preparedness. These findings expand work on Cutter's social vulnerability (1996), Cutter and Finch (2008) as well as the more recent work by Blake *et al.* (2017) that emphasizes the ways in which preparedness is linked with privilege.

While some studies suggest that subjective well-being and sense of community are not related (Davidson and Cotter, 1991), most of the research assessing these measures indicate a positive relationship (Chipuer and Pretty, 1999; Francis *et al.*, 2012; Young *et al.*, 2004). While that finding may not be surprising, sense of community has not been previously measured in Cambodian- and Laotian-American communities living along the USA Gulf Coast. Family ties and religious gatherings are an integral part of these communities. Increased familiarity with members of the community, feeling a sense of belonging with the community and a sense of reliance on others – in this study, is related to overall well-being.

While the variable of age was significant in the well-being model, it was negatively associated with well-being. In other words, older respondents had lower scores of well-being than younger respondents. The relationship between age and well-being is still not well understood, especially because in some countries there is evidence of a U-shaped relationship, whereas well-being may decline with age in others (Steptoe *et al.*, 2015). The current findings are consistent with older Cambodians adults, for example those still residing in their homeland post-Khmer Rouge have been shown to exhibit higher levels of anxiety and depression than younger adults (Seponski *et al.*, 2019). For refugees resettled in the USA, long-term deterioration of infrastructure in the coastal community, combined with declining opportunities for social engagement and a low sense of belonging, can influence older community members' sense of well-being (Gao *et al.*, 2017; Lewis, 2009, 2010). Cambodian and Laotian refugee elders and their families are subjected to multiple jeopardies: minority status, limited English language skills, limited job skills and age. These multiple jeopardies intensify problems associated with growing old and negatively influence elders' well-being (Lewis, 2009, 2010).

The results from the model of preparedness confirm past research on risk perception (Kohn *et al.*, 2012; Perry *et al.*, 2001) confidence in government (Basolo *et al.*, 2009), sense of community and efficacy or confidence in preparedness (DeYoung and Peters, 2016). The finding that increased confidence in government is positively related to preparedness is interesting among the respondents, because of the potential intergenerational effects of trust in government on elder Cambodians and Laotians who fled from their government in the 1970s. More research should be carried out to further examine the complexities of confidence in government and disaster preparedness with exogenous variables such as past experiences with ethno-political conflict. Finally, the finding that ability to cope with a financial crisis provides an important addition to the overall body of research on disaster preparedness. While past research has suggested that poverty and hazard vulnerability, the relationship between household financial security and disaster preparedness is understudied, especially about working-class immigrant communities.

Community nonprofits and emergency managers working with the research team have indicated a strong interest in engaging in disaster preparedness outreach with the community members. Recent work by urban planners and disaster researchers put forth participatory planning to ensure that recovery and mitigation is equitable (Hendricks *et al.*, 2018) and bottom-up approaches for bolstering preparedness (Kwok *et al.*, 2018). Such strategies may be beneficial to Cambodian- and Laotian-American communities, especially because of their vulnerability. This vulnerability is linked with two sources: the social context – the immigrants and migrants who are disconnected from their homeland and social networks; and the physical context – community members face hurricanes, flooding and oil spills. More specifically, their vulnerability is rooted in both the immigrant status while also being dependent on the ocean (and ocean-related tourism) for thriving. Immigrants in the USA often face stigma, marginalization and discrimination (Morey, 2018). Reliance on the ocean among the working-class immigrants exacerbates economic well-being because spills, hurricanes and other extreme events can quickly impact the marine resources.

Interestingly, in conversations with some of the community members working for the research on-going project from which these data were gathered, there was a sense that the oil spill of 2010 provided a brief economic boom for people who had boats and were able to assist with the cleanup for pay. The perceptions of short-term payoffs vs long-term environmental degradation warrant further investigation, perhaps through expansions of current theories surrounding behavior and economics (Frederiks *et al.*, 2015). These studies should also include a focus on the meanings and interpretations of coastal preservation from the perspectives of the coastal communities (Widener, 2018).

Although the scales indicated high reliability and were based on previous theoretical work on well-being, sense of community and preparedness, the data gathered were not qualitative and therefore may lack richness in terms of capturing in-depth perceptions or motivations related to hazards and disasters. As an on-going part of this broader research, the researchers are conducting focus groups about what it means to thrive in the community and the ways in which community members engaged in disaster preparedness, health literacy, spiritual and traditional practices in the community, and other aspects of community resilience. However, the findings from those data are still in progress and the richness from the qualitative data cannot be addressed within the scope of this paper. Although the researchers included an open-ended item at the end of the survey about what people would like to share about their perceptions of the community, many respondents indicated not applicable, nothing or “no.” Preliminary analyses in qualitative interviews have indicated that some participants indicate their wish for more community meetings, more green space and recreational space for families and knowledge of shelters in the case of impending disasters. Community members also indicate that language barriers create confusion for receiving weather warnings and other critical information, especially among older adults.

People residing in the Gulf Coast may face relocation in the future because of continued storm surge flooding and repeated hurricane events. The Cambodian–American communities are recovering from intergenerational trauma associated with fleeing Cambodia in the 1970s, but they may have to move further from the Gulf Coast in the future as coastal flooding becomes more frequent and severe. Policy discussions and problem framing (Birkland, 2015) related to what it means to be an environmental refugee will likely continue. The original definition of a refugee in the 1951 Refugee Convention includes classifications that limit the ability to claim asylum based on environmental impacts (UNHCR, 2016). Bates (2002) examined this definition and argued that new classification should include different types of environmental refugees and attributed the cause of environmental migration to three occurrences: unforeseen natural hazards, expropriations for developmental projects and gradual deteriorations. On the other hand, McGregor (1993) argued that classifications are meaningless because these so-called “environmental refugees” are often forced to migrate not only because of environmental disruptions alone but also economic and political reasons. In recent years, media depictions have included negative depictions of refugees, rendering them as a security threat (McNamara, 2007). This xenophobia urges countries to shift their attitudes from helping refugees toward further increasing the border control of their respective homelands (Ehrlich, 2018; McNamara, 2007).

There are several limitations to the current research. One limitation of this research is that the results only represent the indicators from people who heard about the research project or who are within the social networks of the community partners. It is possible that the researchers did not reach all levels of the community, especially some members who are homebound or who are limited in mobility. Additionally, these data are cross-sectional and prospective and therefore generalizations beyond the community and the timeframe in which the data gathered are limited. However, this is the first empirical study to focus on disaster preparedness and well-being of the Cambodian and Laotian people living in the Gulf Coast of the USA and therefore our findings provide a useful foundation for future research.

Conclusion

This is the first study to assess well-being and disaster preparedness in Cambodian– and Laotian–American immigrant communities in the Gulf Coast of the USA. People living in these communities may become increasingly vulnerable to environmental changes because of urbanization, population expansion and economic development along the coastal areas. These factors damage the coastal ecosystem that protects the area from erosion and storm surge (Arkema *et al.*, 2013; Cheong *et al.*, 2013). Therefore, future interventions should focus on identifying factors that lead to increases in resilience against losses associated with sea level rise and extreme events. Reducing the root causes may be carried out, at least in part, through community-based participatory methods. As an example, there are multiple instances in which community-based initiatives improve ecosystem restoration in Thailand (Sudtongkong and Webb, 2008), the Philippines (Pomeroy and Carlos, 1997) and East Africa (Zorini *et al.*, 2004). Some of the strategies in these interventions could be applied in crab, shrimp and fisheries management along the USA Gulf Coast.

Through the lens of the PAR model, bolstering resilience among the Cambodian and Laotian communities will be more successful if future interventions reduce factors contributing to “root causes” of vulnerability such as pervasive poverty, reliance on a single resource for income (i.e. seafood industry) and other urgent community needs (such as paved roads, health access, education and training services). These interventions should also include assessments of well-being and other psychosocial factors (Moss *et al.*, 2013; Norris *et al.*, 2008).

Community resilience includes a community’s ability to use its assets to strengthen physical, behavioral and social health to withstand, adapt to and recover from challenges,

such as those associated with climate change. The Cambodian– and Laotian–Americans living near the Gulf Coast may experience changes in well-being over time due to cumulative stressors including relocation due to political conflict and war, intergenerationally transmitted trauma and current and future dependency on land and water that may become increasingly hazardous. These combined factors also fall under what some researchers call “root causes” of the PAR model of vulnerability in risk (Blaikie *et al.*, 2004). To identify root cause of vulnerability and risk, it is important to track communities over time and how their resilience changes, even after relocation and migration, such as with the Cambodian– and Laotian–Americans in the Gulf Coast.

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