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Environmental health risk relationships, responsibility, and sources of information among Vietnamese Americans in coastal Mississippi

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Abstract

Coastal communities along the U.S. Gulf of Mexico have been profoundly shaped by environmental health (EH) threats, reflecting the region's history of natural and technological disasters, as well as ongoing issues of environmental degradation and pollution. The Vietnamese American community in the state of Mississippi is vulnerable to EH threats, but there is limited research on their risk perceptions. Understanding perceptions of risk and responsibility is important to manage EH risks and promote community resilience. This community-based participatory research study characterizes Vietnamese American perceptions of EH risks, sources of information, and responsibility in coastal Mississippi. Five focus groups were conducted in 2016 and 2017 in Biloxi, Mississippi with Vietnamese Americans working in the seafood industry (n=24) and mothers of children under the age of 18 (n=25). Findings related to participants' concerns with air quality, drinking water quality, and the 2010 Deepwater Horizon oil spill are interpreted using Boholm's relational theory of risk. Unreliable access to healthcare and limited English proficiency constrain participants from acting on their environmental health risk relationships. A community-based organization in Biloxi that works with Vietnamese Americans plays an important role in addressing risk in this population.

Keywords

environmental health; risk perception; Vietnamese American; relational risk; Mississippi; community-based participatory research

Introduction

Coastal communities along the U.S. Gulf of Mexico have been profoundly shaped by environmental health (EH) threats, reflecting the region's history of natural and

technological disasters, as well as ongoing environmental degradation and pollution (Lichtveld, 2018). The Vietnamese American community in the region is particularly vulnerable to EH threats given the prevalence of resource-dependent livelihoods and language barriers (Ngo et al., 2014). There has been little research conducted to understand perceptions of risk and responsibility in this community, even though such knowledge is important for managing EH threats and promoting community resilience. In this community-based participatory research study, we characterize Vietnamese American perceptions of risk, main sources of information, and responsibility for responding to EH threats along the coast of the state of Mississippi. We make sense of participants' daily experiences of risk by drawing upon relational risk theory (Boholm, 2003; Boholm & Corvellac, 2011) and interpret barriers to participants acting on risk through the lens of community resilience (NASEM, 2019). Lastly, we discuss the role of a community-based organization in environmental health risk governance.

Community resilience and vulnerability to environmental health threats in the U.S. Gulf Coast

In the past 15 years, the U.S. Gulf Coast has experienced over a dozen major natural and technological disasters, including Hurricane Katrina in 2005, the Deepwater Horizon (DWH) oil spill in 2010, and Hurricanes Harvey and Irma in 2017 (Lichtveld, Kennedy, et al., 2016; Lichtveld, 2018). The increasing frequency of such events has reduced the inter-disaster recovery period, often preventing individuals and communities from recovering their pre-disaster assets by the time the next disaster hits (Lichtveld, 2018). In addition to the cumulative impacts of disasters, the region faces environmental contamination and ecological degradation from industrial and agricultural operations and coastal development (Lichtveld, 2018; NASEM, 2018; NOAA 2020). These acute and chronic shocks to social and ecological systems (NASEM, 2019) can bring about adverse psychosocial and physical health outcomes for residents, which are further exacerbated by historical stressors, such as health disparities and socioeconomic inequality (Abramson et al., 2015; Sandifer et al., 2017).

Since the devastation of Hurricane Katrina in 2005, the concept of resilience, defined as 'the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events' (NRC, 2012, p. 1), has come to frame much of the discourse in the US around disaster risk management (Parker, 2019) and the health and well-being of communities (Lichtveld, 2018; Wulff et al., 2015). This is especially the case along the Gulf Coast (NASEM, 2019) where communities suffer from a high burden of noncommunicable diseases (Lichtveld et al., 2017) and where severe weather events, sea level rise, and other impacts of climate change are ongoing and projected to accelerate (Petkova et al., 2015). Definitions and frameworks of resilience, abound, but a recent consensus study convened by the US National Academies of Science, Engineering and Medicine reports that six capitals or dimensions of community resilience are most commonly found in the literature: natural or environmental, built infrastructure, economic, human and cultural, social, and political (NASEM, 2019).

Community resilience is often coupled with vulnerability or a community's susceptibility to harm. Inherent to vulnerability are the inequitable social structures and other factors that place a community at risk to an environmental health threat (Laska & Morrow, 2007). Along the Gulf Coast, those at-risk for disproportionate impacts from EH threats include individuals with resource-dependent livelihoods (for example, fisherfolk and seafood industry workers) (Abbott-Jamieson & Ingles, 2015), low-income residents, children, the elderly, people of colour (Laska & Morrow, 2007), and those with limited English proficiency (Fussell et al., 2018). To reduce vulnerability and maximize resilience, it is critical to understand community members' perceptions of EH risks (Wachinger et al., 2013).

Vietnamese Americans in Biloxi, Mississippi

In the late 1970s, after the Vietnam War, Vietnamese immigrants increasingly settled in the southern US states along the Gulf of Mexico, drawn to the warm climate and access to the same fishing livelihoods practiced in Vietnam (VanLandingham, 2017). In Mississippi, Vietnamese immigrants have mainly settled in communities on the coast, with a relatively small enclave concentrated in and around Biloxi, Mississippi. Biloxi is the fifth largest city in the state (population: 45,568) with a population that is 67.6 per cent White, 21.4 per cent Black, 4.6 per cent Asian, and 6.3 per cent two or more races, American Indian, Hawaii or Pacific Islander, and other. Vietnamese descendants make up 1.6 per cent of Biloxi's population (U.S. Census Bureau, 2018).

Approximately 80 per cent of workers in the Gulf Coast shrimping industry and 50 per cent of all fisherfolk in Mississippi are of Vietnamese descent (Abbott-Jamieson & Ingles, 2015; Ngo et al., 2014). They work as fishers, shrimpers, deck hands, shrimp packers, oyster shucks, and crab pickers. Many are self-employed or work seasonally. Self-employed fisherfolk typically lack adequate property insurance to buffer damage and losses incurred by technological and natural disasters (Ngo et al., 2014). A great many also lack personal health insurance. For example, just 13 per cent of a sample of Vietnamese-speaking fishermen from Biloxi (n=78) had health insurance (Croisant et al., 2017). The seafood industry has been shrinking in the area since 2010, while gaming and casino industries have grown with increased property development and gentrification (Abbott-Jamieson & Ingles, 2015). Job prospects for displaced fisherfolk in other industries are restricted due to their limited English proficiency (Ngo et al., 2014; Schewe et al., 2020). Limited English proficiency, coupled with a lack of Vietnamese-speaking medical and social service providers, constrains access to social support services, the health care system, and state-sanctioned relief resources (Ngo et al., 2014; Park et al., 2010). Due to their natural resource-dependence livelihoods and lack of access to healthcare, Vietnamese Americans living on the Mississippi coast have experienced disproportionate economic and health impacts from EH hazards (Ngo et al., 2014; Park et al., 2010; Mayfield-Johnson et al., 2020).

On the other hand, the Vietnamese American community along the Gulf Coast has leveraged cultural ties and kin connections to cope with acute and chronic shocks and stressors (Chen et al., 2007; VanLandingham, 2017). Also, faith- and community-based organizations

support the Vietnamese American community by enhancing social networks and mobilizing individuals for community health and well-being (Chen et al., 2007; Lichtveld & Dao, 2013). There are fewer of these organizations in Biloxi, however, as compared to New Orleans and Houston where Vietnamese enclaves are larger (Ngo et al., 2014).

Relational theory of risk

This study draws upon a relational theory of risk (Boholm, 2003; Boholm & Covellac, 2011) to examine how Vietnamese Americans in Biloxi perceive risk. Relational risk is dynamic and both subjective and objective. It relies upon a contextual ‘cognitive frame’ linking an object of risk (for example, hurricane winds), an object at risk (for example, fishing boat), and an evaluation of the potential consequences (for example, whether the boat could be damaged or not and how badly). An object of risk is perceived as the source of harm, while the valued object at risk is the target of harm. Uncertainty is inherent to risk – uncertainty about the likelihood of a negative outcome and the outcome itself. The act of determining the value of the object at risk is culturally and socially situated. What may be considered of value to one person or in one culture, may not be viewed as such by another. Risk relationships are tied to decision-making and action. With knowledge of risk, organizational and governmental risk managers can assess an uncertain situation and then decide upon and recommend a course of action.

To comprehend cultural variation in risk perception, Boholm (2003) describes three modes of risk knowledge. Experience-near risk knowledge is encountered in everyday experience and is situated in one’s personal context (such as, food, transportation, local environment etc.) and social networks. Experience-far risk knowledge consists of science-driven scenarios and collective narratives. Science-driven scenarios communicate probabilities of cause and effect events based upon scientific results, such as global warming, often disseminated to the public by multiple forms of media – movies, TV, newspapers, and the internet. Collective narratives deal with events, like the DWH oil spill, and are communicated by the news media in ways that impart morality and responsibility. These three modes are not independent and can interact and exchange information. For example, individuals can alter their behaviour after learning about new scientific results through the media.

Methodology

This study is part of a community-based participatory research (CBPR) project carried out with the Vietnamese American community in Biloxi, Mississippi. The project emerged in response to community concerns regarding the long-term health implications of the DWH oil spill. CBPR is a collaborative research approach emphasizing research *with* communities, as opposed to research *in* communities (Israel et al., 1998). CBPR projects are grounded in community-academic partnerships that involve all partners in each step of the research process from ‘design to dissemination’ (Lichtveld, Kennedy, et al., 2016). By leveraging the skills and knowledge of both community members and researchers, CBPR improves the applicability and use of research findings. In public health, the approach is utilized as a means to improve community health and well-being (Israel et al., 1998) and it is often used as a strategy for building community capacity to address environmental health

concerns (Williamson et al., 2020). In line with CBPR principles, the research topic for this study was identified by community members and data collection was carried out by both academic researchers and community organization staff. Team members also engaged in efforts to address community needs that emerged during the project. For example, the team led an outreach campaign on indoor air pollution, advocated for language access, and facilitated a Health Impact Assessment (HIA) training to build local capacity to address potential EH threats (Centers for Disease Control and Prevention, 2016).

The project was led jointly by the Center for Gulf Coast Environmental Health Research, Leadership, and Strategic Initiatives and Boat People SOS (BPSOS). Based at Tulane University in New Orleans, Louisiana, the Center conducts multidisciplinary community-based research with the goal of advancing environmental and reproductive health among health disparate communities through collaborative research, education, and community engagement. BPSOS is a national non-profit organization that works closely with the Vietnamese American population in the US to provide mental health services, youth programming, disaster relief, health education, insurance enrollment assistance, and adult education, among other services. The Biloxi branch of BPSOS participated in this project. Initially, the Center partnered with another community-based organization serving the Vietnamese American community in Biloxi. However, due to unforeseen circumstances, this organization was unable to continue its participation after completion of the first two focus groups. BPSOS subsequently became the primary community partner for the remainder of the project, which included implementing three focus groups and leading stakeholder meetings and the outreach campaign. The continuity of Center staff during this project and use of the same discussion guide for all focus groups helped to ensure that the change in community partner did not compromise data collection.

Data collection and analysis—In this study, five focus groups were conducted in Biloxi between August 2016 and May 2017, three with mothers of children under the age of 18 and two targeting workers in the seafood industry. A total of 49 Vietnamese American community members participated in the focus groups, representing 25 mothers and 24 seafood workers. Overall, 30 women and 19 men participated. All participants were at least 18 years old. We recruited mothers and those currently working in the seafood industry to capture the perspectives of individuals with relatively higher vulnerability to EH threats. We wanted to gain insight from individuals with resource-dependent livelihoods, including both men and women, and from mothers, who could report on women's and children's environmental health. We conducted separate focus groups to maintain homogeneity in participant composition (Krueger & Casey, 2014). We initially expected mothers and fisherfolk to report distinct perspectives. Results revealed, however, that similar themes were discussed between and among groups. Staff members of the community organizations recruited participants through convenience sampling strategies, including recruitment from the organizations' client database and the dissemination of flyers.

Focus groups were conducted in Vietnamese and moderated by team members with experience in conducting focus groups. The moderator used a discussion guide to facilitate the groups. Discussions centered on participants' perceptions of the environment and health in their community, sources of information, and perceptions of responsibility to protect the

environment and to respond to environmental events. All focus groups were audio-recorded, transcribed verbatim, and translated into English by native Vietnamese speakers. The Mayring approach to qualitative analysis was applied to the focus group data to identify the prominent themes that emerged in a preliminary analysis of the data. These initial themes were used to develop a codebook, which was deductively applied to the focus group transcripts for the final analysis. This is a systematic way to analyze qualitative data that involves both inductive and deductive analysis (Mayring, 2004). Results were disseminated to and validated with focus group participants through an in-person workshop conducted in Vietnamese with 11 participants. After validation with participants, the research team also facilitated a half-day in-person workshop with local stakeholders representing the health, environment, law, and development sectors to further validate and disseminate the study findings. The research protocol was approved by Tulane University's Institutional Review Board and all participants provided informed written consent.

Findings

This section presents the main themes that emerged in the five focus groups regarding perceptions of EH risks, sources of information, and responsible parties for protecting and responding to EH threats.

Perceptions of EH risks—Discussions across all focus groups predominantly concerned environmental conditions with negative implications for health. One mother explained: ‘The environment right now is not healthy. It has to be clean ...so we could say it is healthy. How can I be healthy when the environment is not?’ Participants reported several health effects they perceived to be potentially associated with environmental exposures, including allergies, skin irritation, and coughing. They also reported several indirect effects of the environment on health, namely how environmental deterioration can affect livelihood practices and household income. Participants discussed three main EH threats: air quality due to ongoing road construction in Biloxi, the DWH oil spill, and drinking water quality.

One of the most prominent topics discussed across focus groups was air quality concerns related to long-term road construction occurring in Biloxi at the time of the focus groups. In 2014, the city began a large construction project to replace water, sewer, and storm drainpipes beneath roads covering 55 miles in east Biloxi (WLOX, 2016), where many Vietnamese Americans live. The construction process had been delayed by design errors and left numerous holes in the roads, unpaved patches of road, and entirely unpaved roadways. Damage to vehicles from driving on the roads, such as flat tires or dust in air conditioning units, was common. In terms of health, participants were concerned about poor air quality caused by dust generated by the roadwork, which was exacerbated by road traffic. While participants agreed that when the upgrades were finished, air quality would improve, they were generally unhappy with construction delays and slow progress as well as perceived negative respiratory health effects. One participant explained: ‘Since they are fixing the road, the air is very dusty, in the house or outside, during the afternoon it is very dusty. When I inhale the dust, it is hard to breathe, sometimes making me cough’. Another described: ‘Digging the street up then leaving it there without even paving it makes everything very dusty. Slow-moving cars are OK, but the fast ones throw nothing but dust into our house.’

Two mothers mentioned being concerned about letting their children play outside because of the dust. One commented: ‘I would like, often times, to allow them [children] to play outside, but it is too dusty due to road construction, even in the public parks’.

The DWH oil spill was also a prominent theme in all five focus groups, even though the oil spill occurred over six years prior to data collection. Participants were displeased with the slow progress and use of chemical dispersants in the clean-up, as well as the reduced shrimp and fish populations. They also perceived negative health consequences from the oil spill, such as skin irritation, breathing difficulty, headaches, and allergies. Participants in focus groups with both fisherfolk and mothers discussed how the spill’s impact on fish and seafood have negatively impacted livelihoods and household income. One fisherman stated: ‘Harvesting oysters is the only thing I know, but I haven’t worked since [the spill] and now I’m faced with starvation’.

Drinking water quality was another key concern perceived by participants across focus groups, with participants stating that they thought water quality varied by neighbourhood. Participants from two focus groups discussed the recent improvements in water quality after the government replaced old pipes. However, another participant reported that while water quality temporarily improved after repairs were done, the water soon went back to being ‘as nasty as before’. Others in the same focus group discussed taking protective health measures by installing water filters in their homes or drinking bottled water. Participants perceived water quality issues as being linked to the DWH oil spill as well as the old pipes throughout the community. They attributed poor water quality to various health problems, including skin irritation and hair loss.

Several respondents commented on the potential cumulative effects of these multiple stressors. One mother stated: ‘The environment became so destitute after the hurricane [Katrina]. It was no longer comfortable. Plus, the road construction brought in a lot of dust that made normal life almost intolerable’. Another mother similarly stated: ‘We all went downhill after Hurricane Katrina. Then adding insult to injury, the BP [DWH] oil spill kept us staying down’.

Sources of EH information—Most focus group participants reported obtaining information on environment and health issues from local organizations (such as, BPSOS), community meetings, family, and friends. Notably, only a few participants in two focus groups, one with mothers and one with fisherfolk, reported obtaining their information from the internet and/or television. Other participants reported several barriers to obtaining information on EH issues, including limited English proficiency and lack of computer literacy. These participants noted how younger generations have more access to information due to their ability to understand English and navigate the internet. One man mentioned: ‘Unlike our children, we, the Vietnamese refugees, do not learn much about the internet’. Several participants reported overcoming language barriers by receiving information from family members and friends. One man stated: ‘Word-of-mouth lets us know when there are problems that affect our health’. Also, some mothers reported receiving information from their children, who were informed by their teachers. A few mothers reported obtaining information from television and the internet and giving this information to elders in the

community. In three focus groups, participants were unsure of where to obtain information regarding EH issues.

Perceptions of EH responsibility—Participants generally viewed a clean, healthy physical environment as inextricably linked to and often leading to the health of people. Accordingly, discussions of EH responsibility across the focus groups tended to emphasize addressing environmental issues over health issues. Discussions centered on who was responsible for addressing visible environmental contamination, such as littering, and acute environmental crises, such as severe weather events and oil spills. Health topics, when discussed in relation to responsibility, were mainly described in terms of environmental pollution and livelihood well-being, which influenced access to food and healthcare.

In all focus groups, participants reported that the government was responsible for protecting the environment. The term ‘the government’ was used frequently, with a few participants specifying a group within the government that was responsible, such as ‘the city’, ‘the state’, ‘the federal government’, ‘DMR’ (the Mississippi Department of Marine Resources), ‘the Department of Health’, and ‘FEMA’ (Federal Emergency Management Authority). Several participants discussed the government’s responsibility to protect the aspects of the environment that have affected fishing and shrimping. Some participants framed themselves as ‘normal people’ that needed authorities to protect and improve the environment. For example, one mother stated: ‘No one can do these things beside the government. The city is responsible for it. Normal people can’t do anything about it’.

Participants considered the government to be a key agent in responding to environmental events. They specifically discussed the government’s responsibility to respond to natural disasters, such as hurricanes, in conjunction with insurance companies. Participants were divided as to whether they believed the government was fulfilling its responsibilities in this regard. One mother reported: ‘America is very responsible and concerned for the people,’ whereas another mother discussed how the government did not ‘listen’ to the community’s requests for help after Hurricane Katrina. Additionally, participants across the five focus groups considered both the government and private companies involved as responsible for responding to technological disasters. For example, participants felt that both BP and the government were responsible for the response to the DWH oil spill. Many participants stated that they were not satisfied with the compensation they received through the official claims process, reporting that large boat owners received better compensation than ‘normal citizens like us’.

In focus groups comprised of both mothers and fisherfolk, participants stated that both individuals and the collective were responsible for protecting the environment and responding to environmental events. One focus group’s participants stated that individuals should be held accountable for their own actions and were personally responsible for keeping the environment clean, such as not littering. They also emphasized the importance and effectiveness of community members coming together to collectively address EH issues. One participant in a fisherfolk group stated: ‘We get our strength through our community, acting alone seems like just swatting a mosquito’ and another commented that: ‘Strength comes from unity’. However, individual and community actions were mainly framed in

terms of holding authorities accountable for maintaining EH. Participants suggested relying on local organizations, such as BPSOS and local churches, to represent their interests at higher levels.

Notably, some participants expressed uncertainty regarding who to turn to in order to address EH concerns. One participant explained: ‘Only people who live here for a long time know where to go and where to get that information. They can call to complain about it. No one else knows anything’. Another participant in this focus group stated: ‘I don’t know who I can talk to. Vietnamese people talk to Vietnamese people about the problems. I don’t know where to go to talk to the big people who can take care of the problems’. Participants in one focus group discussed their inability to hold the government accountable due to language barriers, while others stated that they have not taken action to address EH problems due to lack of time and/or competing work responsibilities.

Whereas individuals, communities, and the government were considered responsible for protecting the environment, health was generally viewed as an individual’s responsibility, albeit one that was hard for participants to fulfill. Difficulty accessing healthcare services was an important theme that emerged across all focus groups. Several participants noted the difficulty of making an appointment with an in-network provider and the lack of financial resources to pay for medical expenses or health insurance. One woman said: ‘My foremost concern is illness. We obviously need treatment when we get sick, but health costs are so expensive. We have to pay a lot if we don’t have health insurance. Even if we do, we still have to pay 20 per cent. It is very burdensome when we get sick’.

Fisherfolk and mothers also noted language and cultural barriers that impede their access to healthcare, including the lack of Vietnamese-speaking providers in Mississippi, the different dialects and varying levels of fluency among interpreters, and the long wait times to schedule an appointment with interpreter services. A male participant related: ‘If we had Vietnamese doctors, it would be much easier for direct consultation because we are reluctant to communicate through interpreters. Sometimes, we have to wait too long for the interpreter service, one to three months, then we feel even sicker’. Participants across focus groups reported that they often delay seeking medical attention. One fisherman stated: ‘I breathe dusty air. I am sure it is bad, but I just don’t know how sick I may become because I haven’t seen a doctor yet’.

Overall, these issues highlight how participants recognized that individual abilities to take action for health were constrained due to a general lack of access to care and a lack of culturally competent health care services in the Biloxi area. However, it is notable that participants did not discuss the potential role or responsibility of the government or healthcare and insurance companies in improving access to care.

Discussion

This study characterized Vietnamese American perceptions of EH risks, sources of information, and responsibility in coastal Mississippi. Findings highlight participants’ daily experiences with EH threats, with emphasis on air quality, the DWH oil spill, and drinking

water quality. Applying Boholm's (2003) relational theory of risk to the findings provides insight on how study participants perceive environmental health risks. Both the road construction and the drinking water examples represent experience-near modes of risk knowledge. They are context-dependent, personal, and everyday experiences for participants. In these cases, participants cite dust and water as the objects of risk and, in both situations, their health and that of their family are the objects at risk. Some participants manage their risk by keeping their children inside (to avoid exposure to dust) or by filtering their water or drinking bottled water (to avoid exposure to contaminants in tap water). While they identify health symptoms from exposure (for example, coughing, skin irritation, hair loss), they are constrained in their ability to seek medical advice due to unreliable access to healthcare - they lack of health insurance, care is expensive, and there are just a few interpreters and culturally competent medical providers. They are left feeling relatively powerless to address their risk. Of note is that there did not seem to be differences in risk relationships among study participants based upon position (motherhood) or livelihood (seafood industry workers). One explanation for this is that participants' shared status as immigrants overrode other aspects of their position and identity and they thus faced similar barriers to healthcare. Indeed, immigration is a social determinant of health (Castañeda et al., 2015).

Another research study based in Biloxi and a news report confirm that other members of the community, including government officials, shared a similar risk relationship about the dust and its impact on human health (Caray, 2015; Mayfield-Johnson et al., 2019). In the case of the drinking water, however, it is not clear if other community members and stakeholders share participants' concerns. There is no scientific evidence that the oil spill impacted drinking water (Lichtveld, Sherchan, et al., 2016) and the Annual Water Quality Report issued by the city of Biloxi does not indicate any contamination of drinking water (City of Biloxi, 2018). This information is disseminated in English mainly through the internet and utilizes highly technical language, as was the case for most of the information about the DWH oil spill's impacts and recovery (Simon-Friedt et al., 2016). Messages disseminated using this one-way, deficit model of communication (Trench, 2008) are unlikely to reach study participants and most members of the general public.

For the DWH oil spill, the oil was the initial object of risk, but participants also perceived several other sources of harm – the claims process, closed fisheries, dispersants used in the clean-up, and a largely inaccessible healthcare system. The objects at risk were the environment, income and assets, food sources, and personal health. Unlike the road construction and drinking water, the oil spill is a historical event and there is no uncertainty about the risk it poses. The spill, previously part of participants' everyday experience, has transformed into a collective narrative or better said, a collective trauma (see Ngo et al., 2014).

Despite the increasing frequency of natural disasters and other impacts of climate change along the Gulf Coast, they were not mentioned among participants' environmental health concerns. We hypothesize three possible explanations for this. First, climate change is perhaps not discussed through the near forms of communication that most participants rely upon for information, namely family, friends, community meetings, and local community-

based organizations. Thus, lacking knowledge of climate change, participants have not established a risk relationship for it. Alternatively, they have indeed established a risk relationship for climate change, but they have decided they do not need to act or have encountered barriers to doing so. Climate change impacts are slow-moving (NASEM, 2019), and perhaps participants have decided the risks are low or simply do not affect them (see Van Voorst, 2015 for a discussion of systemic risks). Or, quite the opposite, they perceive the risks as high and would like to act, but they are unable to do so because of financial, functional, or other barriers (Gifford, 2011).

Situations where study participants encounter barriers to acting upon their risk knowledge reveal community resilience attributes. Using the framework of community resilience capitals (NASEM, 2019), it becomes apparent that participants have described a situation where they lack certain aspects of human and cultural capital, namely health insurance, access to healthcare, and English proficiency. On the other hand, in the terms of social capital, they benefit from the presence of a community-based organization that advocates on their behalf, promotes social networks, and links them to external resources. In this study, the community-based organization serves to mitigate their risk. One way that BPSOS seeks to address barriers to healthcare access for community members is through employment of community health workers (CHW). The CHWs, who are themselves members of the Vietnamese American community, serve as liaisons with local health centers, provide interpretation for and accompany clients to medical appointments, and assist clients to obtain health insurance when possible. The CHW model has been successfully implemented in the U.S. Gulf Coast (Sherman et al., 2017) and other national and international contexts.

The purpose here, however, is not to assess or diagnose participants' resilience, but to illustrate how even with an established risk relationship, the link between risk knowledge and action can be tenuous. For participants, risk knowledge is not 'the springboard for decision and action' (p. 187) that Boholm and Corvellac (2011) describe it as for professional risk managers. In fact, relational risk theory does not account for how social inequities and other factors impose barriers that impede individuals' abilities to act on a risk relationship. As a result, people try to devise coping strategies for living with risk (Becerra et al., 2020). A particularly egregious and high-stakes example of being unable to act on risk occurred during Hurricane Katrina. The City of New Orleans issued a mandatory evacuation order, but some 20 per cent of the city's population did not have personal transportation and thus had no means to evacuate. The consequences of being unable to leave were dire (Laska & Morrow, 2007). For risk research, this implies that not only is an individual's determination of the value of the object at risk culturally and socially situated, but so is the decision-making and action (or inaction) ensuing from an established risk relationship.

Understanding the balance between collectivism and individualism among community members is important for understanding expectations for public and/or private action in the face of an EH threat (Milman et al., 2018). While participants did feel responsible for taking some personal action to address environmental issues, they reported that the government was responsible for protecting the environment and responding to environmental events. Specifically, they viewed natural disaster response as pertaining to the government, and technological disaster response as pertaining to the government and the responsible

companies. Wachinger et al. (2013) also note distinct perceptions of responsibility for natural and manmade disasters. In this study, participants were generally dissatisfied with compensation received for economic and property damages caused by the DWH oil spill. The claims process for the spill was based on income reported on previous years' tax returns (Mayer et al., 2015), but fisherfolk commonly operate on a cash basis (Abbott-Jamieson & Ingles (2015). Participants' dissatisfaction with their compensation likely stemmed from not being compensated for their true losses.

BPSOS engages in 'communication on risk' (Boholm, 2009) with community members through several means, such as community meetings, one-on-one conversations, health fairs, health screenings, and social media (though its social media presence is fairly limited). These interactions take place in neighborhoods, on fishing docks, and at the organization's office and neutral community spaces, like the public library. They acknowledge the community's socio-cultural context, risk relationships, and power asymmetries. Success in communicating about risk is based upon the well-established social trust between the community and BPSOS, as evidenced by study participants reporting that the organization is one of their primary sources of environmental health information. A future area of research should delve more into how community members make sense of this communication on environmental health risk and how it influences their decision-making.

BPSOS' communication on risk plays an important role in risk governance for Biloxi's Vietnamese American community. With limited English proficiency and little political power (Ngo et al., 2014), participants are able to voice their risk concerns in their native language to organization staff. BPSOS is then in a position to speak for and represent the community's concerns to government officials or other stakeholders. It may also be able to obtain resources (human, financial or otherwise) or provide existing resources that might assist community members to reduce their risk. In the case of the road construction, the partnership with the university provided strategies for reducing individual exposure to dust and building capacity to address future health risks. The organization's staff assisted community members to document financial costs of vehicle damage from driving on the potholed and dusty roads; this information was gathered to try to seek redress from the construction company.

The outreach and advocacy efforts in this CBPR study came into being after the results-sharing workshop for participants. At the workshop, participants confirmed that air quality from the road construction was their primary environmental health concern. They also brought up several other issues that we ultimately incorporated into the project - how they could reduce exposure to dust and other contaminants in their own homes, how to best communicate environmental health information to the Vietnamese American community, and how to improve language access in relation to public safety. In response, our team conducted an outreach campaign on indoor air pollution for the Vietnamese American community. Outreach materials in Vietnamese were jointly developed by the two project organizations and disseminated at locations frequented by the Vietnamese community, including local businesses and churches, and also published in a Vietnamese language newspaper. Materials were designed for low literacy levels and utilized visuals to convey practical steps that individuals could take to improve indoor air quality. We also engaged in

advocacy related to language access, including meetings with local officials to promote the hiring of a Vietnamese-speaking 911 emergency response dispatcher. Our HIA workshop trained local stakeholders to help address future policy and information gaps by ensuring that potential community health concerns are accounted for prior to the start of a project, such as road construction or casino development. Although HIAs are voluntary in the U.S., successful implementation of assessments across the country have resulted in community health protection (Ross, 2007).

Data collected in this study is limited to Vietnamese American fisherfolk and mothers in coastal Mississippi. Accordingly, our findings may not be applicable to other geographic areas or Vietnamese Americans in other regions. Additionally, we did not collect information on the length of time participants had lived in the Biloxi area, which may have influenced participants' knowledge of and experience with EH threats in coastal Mississippi. It is possible that participants in this study disproportionately represented first generation immigrants in the Vietnamese American community since BPSOS interacts with this population more than second or third generation immigrants that typically have greater English proficiency and relatively greater access to the internet. In general, during the focus group discussions, participants did not provide many concrete examples or detailed comments. This may be due to lack of familiarity with the focus group format or unknown social dynamics among participants. In addition, the ideal size of a focus group is five to eight participants (Krueger & Casey, 2014), however, most of our focus groups were larger than this. Thus, the number of participants may have constrained offering more in-depth perspectives. We purposely over-recruited participants assuming that several invitees would not attend, but in some cases, all attended. The results of our study are strengthened, however, by our CBPR approach, as well as the results validation that was conducted after data collection with other members of the community and prominent institutional stakeholders.

Conclusion

This study characterizes perceptions of environmental health risks, sources of information, and responsibility among Vietnamese American participants from Biloxi. We used Boholm's (2003) relational theory of risk to clarify and interpret participants' risk relationships. This theoretical approach, however, does not account for situations where individuals encounter linguistic and other structural barriers to acting upon their understandings of risk. In this study, the link between environmental risk knowledge and action was tenuous, at times non-existent, due to limited English proficiency and unreliable access to healthcare. Addressing language and healthcare access in immigrant communities is key to reducing vulnerability to environmental health threats.

Community-based organizations have supported Gulf Coast Vietnamese Americans to prepare for and recover from large-scale natural and technological disasters. This study provides insight on how a community-based organization is involved in managing risk for a localized environmental health threat - dust from road construction. In the future, climate change will introduce new and additional threats for populations in the U.S. Gulf Coast. To

meet this challenge, it is vital to draw upon the expertise of ethnic community-based organizations in mitigating environmental health risks.

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References

- Abbott-Jamieson S, & Ingles P (2015). Natural and manmade disasters: Continuing nemesis for Louisiana, Mississippi, and Alabama fishing communities pre-and post-Katrina. *Marine Fisheries Review*, 77(3), 1–17.
- Abramson DM, Grattan LM, Mayer B, Colten CE, Arosemena FA, Bedimo-Rung A, & Lichtveld M (2015). The resilience activation framework: A conceptual model of how access to social resources promotes adaptation and rapid recovery in post-disaster settings. *Journal of Behavioral Health Services & Research*, 42(1), 42–57. [PubMed: 24870399]
- Becerra S, Belland M, Bonnassieux A, & Liousse C (2020) ‘Living with’ air pollution in Abidjan (Cote d’Ivoire): A study of risk culture and silent suffering in three occupational areas. *Health, Risk & Society*, 22(1), 86–106.
- Boholm A (2003). The cultural nature of risk: Can there be an anthropology of uncertainty? *Ethnos*, 68(2), 159–178.
- Boholm A (2009). Speaking of risk: Matters of context. *Environmental Communication*, 3(3), 335–354.
- Boholm A, & Corvellac H (2011). A relational theory of risk. *Journal of Risk Research*, 14(2), 175–190.
- Caray G (2015, 11 11). Mayor speaks up on east Biloxi roads. WLOX. <https://www.wlox.com/story/30487672/mayor-speaks-up-on-east-biloxi-roads/>
- Castañeda H, Holmes S, Madrigal D, Young ME, Beyeler N, & Quesada J (2015). Immigration as a social determinant of health. *Annual Review of Public Health*, 36, 375–92.
- Centers for Disease Control and Prevention. (2016, 9 16). Health impact assessment. Retrieved from <https://www.cdc.gov/healthyplaces/hia.htm>
- Chen AC, Keith VM, Leong KJ, Airriess C, Li W, Chung K, & Lee C (2007) Hurricane Katrina: Prior trauma, poverty and health among Vietnamese-American survivors. *International Nursing Review*, 54, 324–331. [PubMed: 17958660]
- City of Biloxi. (2018). Annual report on the quality of drinking water. <https://biloxi.ms.us/wp-content/uploads/2018/06/waterquality2018.pdf>
- Croissant S, Lin Y, Shearer J, Prochaska J, Phillips-Savoy A, Gee J, Jackson D, Panettieri R, Howarth M, Sullivan J, Black BJ, Tate J, Nguyen D, Anthony A, Khan A, Fernando H, Ansari GAS, Rowe G, Howrey B,...Elferink C (2017). The Gulf Coast Health Alliance: Health Risks Related to the Macondo Spill (GC-HARMS) Study: Self-reported health effects. *International Journal of Environmental Research and Public Health*, 14(11), 1328. doi: 10.3390/ijerph14111328
- Fussell E, Delp L, Riley K, Chavez S, & Valenzuela A (2018). Implications of social and legal status on immigrants’ health in disaster zones. *American Journal of Public Health*, 108(12), 1617–1620. 10.2105/AJPH.2018.304554 [PubMed: 30359114]
- Gifford R (2011). The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, 66(4), 290–302. 10.1037/a0023566
- Israel BA, Schulz AJ, Parker EA, & Becker AB (1998). Review of community-based research: Assessing approaches to improve public health. *Annual Review of Public Health*, 19, 178–202.
- Krueger RA, & Casey MA (2014). *Focus groups: A practical guide for applied research*. Sage Publications.
- Laska S & Morrow BH (2007). Social vulnerabilities and Hurricane Katrina. *Marine Technology Science Journal*, 40(4), 16–26.

- Lichtveld M (2018). Disasters through the lens of disparities: Elevate community resilience as an essential public health service. *American Journal of Public Health*, 108(1), 28–30. [PubMed: 29211534]
- Lichtveld M, Covert H, & Sherman M (2017). The Gulf Region Health Outreach Program as a model for strengthening the fragile public health infrastructure. *Journal of Public Health Management and Practice*, 23, S8–S10. [PubMed: 28961646]
- Lichtveld M, & Dao VT (2013). The Versailles Social Movement and implications for Asian American environmental health in post-Katrina New Orleans. In Goo A, Le M, & Oda A (Eds.), *The handbook of Asian American health* (pp. 411–419). Springer.
- Lichtveld M, Kennedy S, Krouse R, Grimsley F, El-Dahr J, Bordelon K, Sterling Y, White L, Barlow N, DeGruy S, Paul D, Denham S, Hayes C, Sanders M, Mvula M, Thornton E, Chulada P, Mitchell H, Martin W, ... Cohn R (2016). From design to dissemination: Implementing community-based participatory research in postdisaster communities. *American Journal of Public Health*, 106(7), 1235–1242. [PubMed: 27196662]
- Lichtveld M, Sherchan S, Gam KB, Kwok RK, Mundorf C, Shankar A, & Soares L (2016). The Deepwater Horizon oil spill through the lens of human health and the ecosystem. *Current Environmental Health Reports*, 3(4), 370–378. [PubMed: 27722880]
- Mayer B, Running K, & Bergstrand K (2015). Compensation and community corrosion: Perceived inequalities, social comparisons, and competition following the Deepwater Horizon oil spill. *Sociological Forum*, 30(2), 369–390. [PubMed: 26120247]
- Mayfield-Johnson S, Le D, Fastring D, & Nguyen J (2019). Describing vulnerability and resilience through Photovoice: General perspectives from the Mississippi Gulf Coast Vietnamese community. *Journal of Health Care for the Poor and Underserved*, 30 (4 Supplement), 130–150. [PubMed: 31735726]
- Mayfield-Johnson S, Fastring D, Le D, & Nguyen J (2020). Addressing the social vulnerability of Mississippi Gulf Coast Vietnamese community through the development of community health advisors. *Sustainability*, 12, 3892. [PubMed: 32714606]
- Mayring P (2004). Qualitative content analysis. In Flick U, von Kardoff E, & Steinke I (Eds.), *A companion to qualitative research*. London: SAGE Publications Ltd.
- Milman A, Warner BP, Chapman D, & Short Gianotti A (2018). Identifying and quantifying landowner perspectives on integrated flood risk management. *Journal of Flood Risk Management*, 11(1), 34–47.
- NASEM (National Academies of Science. Engineering and Medicine). (2018). *Understanding the long-term evolution of the coupled natural-human coastal system: The future of the US Gulf Coast*. The National Academies Press.
- NASEM (National Academies of Science. Engineering and Medicine). (2019). *Building and measuring community resilience: Actions for communities and the Gulf Research Program*. National Academies Press.
- NOAA (National Oceanic and Atmospheric Administration). Apoxia. Retrieved 7 19, 2020, from <https://oceanservice.noaa.gov/hazards/hypoxia/>,
- NRC (National Research Council). (2012). *Disaster resilience: A national imperative*. National Academies Press.
- Ngo D, Gibbons JL, Scire G, & Le D (2014). Mental health needs in Vietnamese American communities affected by the Gulf oil spill. *Psychology*, 5(2), 109–115.
- Park Y, Miller J, & Van BC (2010). Everything has changed: narratives of the Vietnamese American community in post-Katrina Mississippi. *Journal of Sociology and Social Welfare*, 37, 79.
- Parker D, (2020). Disaster resilience – a challenged science. *Environmental Hazards*, 19(1), 1–9.
- Petkova E, Ebi K, Culp D, & Redlener I (2015). Climate change and health on the U.S. Gulf Coast: Public health adaptation is needed to address future risks. *International Journal of Environmental Research and Public Health*, 12, 9342–9356 [PubMed: 26270669]
- Ross CL (2007). *Atlanta BeltLine: Health impact assessment*. Center for Quality Growth and Regional Development, Georgia Institute of Technology. Atlanta, GA. Retrieved from <http://www.pewtrusts.org/~media/assets/2012/03/01/atlantabeltline.pdf>

- Sandifer PA, Knapp LC, Collier TK, Jones AL, Juster RP, Kelble CR, Kowk RK, Miglarese JV, Palinkas LA, Porter DE, Scott GI, Smith LM, Sullivan WC, & Sutton-Grier AE (2017). A conceptual model to assess stress-associated health effects of multiple ecosystem services degraded by disaster events in the Gulf of Mexico and elsewhere. *GeoHealth*, 1(1), 17–36. [PubMed: 30596189]
- Schewe RL, Hoffman D, Witt J, Shoup B, & Freeman M (2020). Citizen science and participatory research as a means to improve stakeholder engagement of Vietnamese American fishers on the U.S. Gulf Coast. *Environmental Management*, 65, 74–87. [PubMed: 31813047]
- Sherman M, Covert H, Fox L, & Lichtveld M (2017). Successes and lessons learned from implementing community health worker programs in community-based and clinical settings: Insights from the Gulf Coast. *Journal of Public Health Management and Practice*, 23(Suppl 6), S85–S93. [PubMed: 28961658]
- Simon-Friedt BR, Howard JL, Wilson MJ, Gauthé D, Bogen D, Nguyen D, Frahm E, & Wickliffe JK (2016). Louisiana residents' self-reported lack of information following the Deepwater Horizon oil spill: Effects on seafood consumption and risk perception. *Journal of Environmental Management*, 180, 526–537. [PubMed: 27289418]
- Trench B (2008). Towards an analytical framework of science communication models. In Cheng D, Claessens M, Gascoigne NRJ, Metcalfe J, Schiele B, & Shi S (Eds.), *Communicating science in social contexts* (119–135). Springer.
- Census Bureau US. (2018). American Community Survey 5-year estimates: Biloxi city, Mississippi. Retrieved from <https://data.census.gov/cedsci/table?q=Biloxi%20city,%20Mississippi&g=1600000US2806220&hidePreview=true&tid=ACSDP5Y2018.DP05&table=DP05>
- Van Voorst R (2015). Applying the risk society thesis within the context of flood risk and poverty in Jakarta, Indonesia. *Health, Risk & Society*, 17(3–4), 246–262.
- VanLandingham MJ (2017). *Weathering Katrina: Culture and recovery among Vietnamese Americans*. Russell Sage Foundation.
- Wachinger G, Renn O, Begg C, & Kuhlicke C (2013). The risk perception paradox: Implications for governance and communication of natural hazards. *Risk Analysis*, 33(6), 1049–1065. [PubMed: 23278120]
- Williamson DHZ, Yu EX, Candis HM, Kaufman JA, Komro K, Jelks NO, Johnson DA, Gribble MO, & Kegler MC (2020). A scoping review of capacity-building efforts to address environmental justice concerns. *International Journal of Environmental Research and Public Health*, 17, 3765.
- Wulff K, Donato D, & Lurie N (2015). What is health resilience and how can we build it? *Annual Review of Public Health*, 36, 361–374.
- WLOX. (2016, 5 13). Contractor says East Biloxi roadwork could take an extra year to finish. WLOX. Retrieved from <http://www.wlox.com/story/31971171/contractor-says-east-biloxi-roadwork-could-take-an-extra-year-to-finish/>