Identifying Strategies for Lessening Hydrological Disaster Vulnerability:
A Case Study

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ABSTRACT

This qualitative exploratory single case study identified strategies for lessening population vulnerability during a hydrological disaster. The research occurred in a densely populated county in the South Atlantic region of the United States. Semi-structured interviews and thematic data analysis served to address the research question. Methods involved n = 15 semi-structured interviews with uniformed and sworn personnel working in emergency management and public safety roles from agencies and divisions within the county. The data analysis found four generic strategies for lessening population vulnerability to hydrological disasters, (1) resiliency management, (2) resiliency partnership, (3) safety preparedness, and (4) backup preparedness. These four strategies support previous empirical findings and identified best practices. The four generic strategies offer practical approaches that can become a part of a community's overall emergency management plan to assist in lessening the challenges associated with hydrological disaster vulnerability.

KEYWORDS

case study, disaster, emergency managements, preparedness, qualitative, resiliency, safety, vulnerabilities

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The impact of climate change in influencing the severity of tropical systems and the increasing number of hurricanes and floods has become an increasing focus of study (Woodward & Samet, 2018). An overburdened hydrological cycle triggered by climate change has escalated the prevalence of hydrological disasters such as floods (McClymont et al., 2020). Atmospheric scientists have drawn attention to the destructive nature of hydrological events on human activities (Woodward & Samet, 2018). A projection based on current trends predicted that by 2050 approximately 68% of the world's population will live in densely populated urban areas, many adjacent to large bodies of water and prone to flooding (McClymont et al., 2020). This anticipated and expected increase in people,

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infrastructure, and buildings, coupled with specific geographical features and climate changes, infer a more vulnerable society.

This qualitative exploratory single case study set forth to discover strategies for lessening vulnerabilities to hydrological disasters in a county located in the U.S. South Atlantic region. The purpose of selecting the specific region and county for the study was that the region had been negatively affected for decades by floods and hurricanes. The specific county is densely populated, with a large urban coastal city and a population of 2 million. In 2017 there were many destructive hurricanes across the United States, Central America, and the Caribbean (Woodward & Samet, 2018). August 2017 saw the development of Hurricane Harvey, followed by Hurricanes Maria and Irma in September and Hurricane Nate in October. Hurricanes Harvey, Maria, and Irma, each classified as category four hurricanes, caused widespread destruction along their South Atlantic path (Woodward & Samet, 2018). While the chosen county faces multiple hydrological disasters, they are known for effectively managing such disasters; hence they were chosen as a single case study to amplify the 'best practices'.

This single exploratory case study applied a qualitative methodological approach to a hydrological disaster-prone county's emergency management program to identify best practice strategies for reducing hydrological disaster vulnerabilities. The researchers chose this county as the focus of the study because of the county's experience with both previous disasters and the ongoing threat of future hydrological disasters. The central question that helped guide this study asked, what community-resilient strategies can be used to minimize the impacts of hydrological disasters in a U.S. South Atlantic region county?

Based on previous studies, the study reiterates areas that emergency managers and public safety personnel could focus on to reduce community vulnerability, increase community resiliency, and lessen the impact of hydrological disasters. The researchers built a convergent line of inquiry following a strict case study protocol focusing on semi-structured interviews with emergency management professionals in the county and archived county data sources (Yin, 2018). Specifically, the study used data from interviews with the county's Emergency Management Division, the Risk Management Division, and the Environment Planning and Community Resilience Division. Additionally, data were collected from previous studies conducted by the county and publications from the federal government and other archived, open-sourced, governmental, and media sources. Being a single exploratory case study, the research findings are limited to the county; however, they are analytically generalizable to other regions prone to hydrological disasters. Moreover, the study's findings reiterate previously identified best practices for reducing community vulnerability to disasters.

South Atlantic Region Background

Chapter 252 of the South Atlantic Region Statutes mandates that the political subunits establish emergency plans that are interrelated and consistent with the emergency planning of the region (Henry, 2020f). The county agencies and governments are obligated and responsible for managing and administering emergency management functions throughout the province, including mitigation, preparedness, prevention, protection, recovery, and response activities (Henry, 2020f). Tropical cyclones frequently produce torrential rainfall above six inches, resulting in dangerous and destructive flooding (National Oceanic and Atmospheric Administration [NOAA], n.d.). According to Milman (2019), evidence exists that hurricanes were getting stronger faster, resulting in more category four and five storms.

Likewise, tropical systems that quickly strengthened into formidable hurricanes have increased threefold in the last 30 years (Milman, 2019). For example, the annual Atlantic Hurricane season, which starts on June 1st and ends on November 30th, was increased by two days in length per year between 1980 and 2007 (Karloski & Evans, 2016). In the aftermath of hydrological disasters, communities usually struggle to recover due to the damage inflicted. For example, communities experience prolonged power outages after natural disasters. (Moreno & Shaw, 2019).

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