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## Mental Health of Puerto Ricans Who Stayed in Puerto Rico Compared to Those Who Migrated to Florida After Hurricane Maria

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MENTAL HEALTH OF PUERTO RICANS WHO STAYED IN PUERTO  
RICO COMPARED TO THOSE WHO MIGRATED TO FLORIDA AFTER  
HURRICANE MARIA

by

SOPHIA ELIZABETH CHAPDELAINÉ

A thesis submitted in partial fulfillment of the requirements  
for the Honors in the Major Program in Sociology  
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## **Abstract**

September 20th, 2017 was a devastating day for many Puerto Ricans as Hurricane Maria made landfall in Puerto Rico. A majority of people were left without electricity, water, transportation, and communication between friends and family. In addition, many experienced losses such as destruction of their home and personal belongings as well as the death of family members and friends. This resulted in a decline in mental health. According to previous literature, key indicators of poor mental health in Puerto Rico after Hurricane Maria were increased diagnoses of depression, anxiety, and Post Traumatic Stress Disorder (PTSD). This study provides a comprehensive literature review that examines differences in mental health and trauma between those who, after Hurricane Maria, migrated to Florida compared to those that remained in Puerto Rico. I also used interviews from a previous study and various newspaper articles to answer my research question. Preliminary findings suggest that trauma and anxiety have been identified in both groups. Finally, I was able to interview a mental health counselor from Puerto Rico via Zoom. Findings from the literature review and other data sources explored several contextual differences related to mental health including trauma, PTSD, resilience, depression, anxiety, as well as medical and psychological needs.

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## **Introduction**

Previous studies have reported that Puerto Ricans struggle with mental health symptoms, and those became worse after Hurricane Maria for Puerto Ricans who migrated (Sacaramutti et al., 2019). Furthermore, it has been indicated that Puerto Ricans exhibited trauma and anxiety regardless if they stayed in Puerto Rico or migrated to Florida after Hurricane Maria (Sacaramutti et al., 2019). This research considers whether there are differences in mental health between these groups by conducting a comprehensive literature review and other data sources. Specifically, I am looking for symptoms related to trauma. Previous research suggest that there are differences in mental health symptoms by context (Sacaramutti et al., 2019). Some research suggests that those who migrated to Florida were at a greater risk of developing Post Traumatic Stress Disorder (PTSD) and generalized anxiety disorder compared to those who stayed in Puerto Rico (Palinkas & Wong, 2020). Furthermore, those who migrated to an urban area opposed to a rural or suburban area were more vulnerable to developing these risks (Scaramutti et al., 2019). A possible interpretation for this may be due to individuals who moved to Florida suffered the most loss, such as leaving behind what was left of their home, personal belongings, and family. Another possible explanation is that individuals who had migrated to an urban area may have been more vulnerable due to the lack of social support in their community.

My research question considers if there are differences in mental health between Puerto Ricans who stayed on the island compared to those who migrated to Florida after Hurricane Maria, and I used the Theory-Stress paradigm to guide my analysis. I also used previous interviews from an ongoing study “Capacity and Change in Climate-Migrant Receiving Communities in the Gulf:

A Three-Case Comparison”. The National Academy of Sciences’ Gulf Research Program fund this study including the University of Central Florida’s Puerto Rico Research Hub to explore the capacity of receiving communities to prepare for and integrate climate migrants. UCF led the study of Puerto Rican migrants after Hurricane Maria to Central Florida. The study team, led by the Urban Institute in Washington DC, also includes universities in Houston, Texas, and New Orleans, Louisiana. The study focused on communities’ capacity to assist migrants before, during, and after Hurricane Maria in five outcome areas: (1) housing markets, (2) financial services, (3) employment and economic development opportunities, (4) healthcare providers’ capacity, and (5) social, cultural, and recreational facilities (The National Academies of Sciences Engineering Medicine, 2019). I focused on the healthcare providers’ capacity sector to explore my research question. In addition, I interviewed a mental health counselor from Puerto Rico via Zoom and used various newspaper articles to further explore contextual differences in mental health. The aim of my research question was to explore how context can influence mental health outcomes and the exploration of how communities can prepare better for natural disasters. While the research question focuses primarily on the experience of Puerto Ricans, with the influx of climate change, other communities and groups can benefit from the results of this study. I explored the perceptions of mental care providers for key mental health outcomes including trauma and PTSD, resilience, depression, anxiety, as well as medical and psychological needs. An interesting finding is that children were predominantly susceptible to these mental health outcomes (Palinkas & Wong, 2020). This may be because they experienced a tremendous amount of loss at such a young age.

## **Background**

### **Context**

Overall, the health of Puerto Ricans has been viewed as adverse, especially when compared with other Latinx groups throughout the United States. These adverse health outcomes include significant rates of cardiovascular disease consequences, obesity, asthma, and various mental health factors (Mora et al., 2021). Not only do Puerto Ricans suffer from poor health outcomes, but they also lack a strong social system (Mora et al., 2021). It has been found that the Mexican immigrants who have arrived in the United States have an advantageous family and social support system, whereas Puerto Ricans leaving the island do not receive the same benefits. However, a recent study exploring the mental health of mainland Puerto Ricans compared to island Puerto Ricans found that social support was crucial in both groups for reducing mental health outcomes (Mora et al., 2021). Many individuals have attempted to examine why Puerto Ricans are vulnerable to mental health outcomes and weak social support systems. The main explanation is that Puerto Ricans on the mainland as well as the island are faced with disadvantageous socioeconomic conditions (Mora et al., 2021).



## **Theory**

Based on the literature review, I used the Theory-Stress paradigm to study the differences in mental health and trauma between those who migrated to Florida compared to those that remained in Puerto Rico. According to this paradigm, the result of mental health in individuals may be due to the stress of particular life events. This theory takes into account that there are strategies individuals can use in their daily life to help manage stress. The social support of family may be beneficial depending on the particular situation. The main factor that needs to be taken into consideration is how a society accepts individuals coming from a different culture (Rivera, 2007).

This theory was previously used by Ensel and Lin (1991) to examine how stressors and resources contribute to psychological conditions. The six models that were used include an independent model, a stress-suppressing model, a stress-conditioning model, a resource deterioration model, a counteractive model, and an interactive model (Ensel & Lin, 1991). The independent model demonstrates that the presence or addition of resources will result in a reduction of stress. Furthermore, the amount of stressors should not affect the resources pertaining to distress. This effect is evident among individuals despite whether they experienced losses due to a natural event or not. The stress-suppressing model focuses on how the addition of resources limits distress because having more resources allows you to manage stress in a more effective way. The stress-conditioning model demonstrates how limited resources and the exposure of stressful events result in higher levels of distress. On the other hand, if resources are not limited then the risk of

distress is lower. As a result, individuals who experience a natural event and have limited resources are more likely to experience high levels of distress (Ensel & Lin, 1991).

The fourth model, the resource deterioration model, explores how the consequences of life experiences pertaining to distress are affected by the addition of resources. Furthermore, this model examines how resources become important as a result of an individual experiencing a traumatic situation. Moreover, this model states that a decrease in resources due to a stressful event will result in higher levels of distress. The counteractive model examines how the exposure of stressors results in more resources. This is due to the idea that experiencing a stressful situation will result in taking advantage of the resources provided to limit stress. The buffering model claims that stressors will affect the amount of distress if there is a lack of resources. As a result, it is expected that distress is higher when there is a significant amount of stressors and low resources. The key finding from this study is that social stressors negatively impact social resources, meaning that resources decline when social stressors increase. In addition, physiological stress contributes to the amount of social stressors. As for psychological resources, an increase in these resources contribute to an increase in social resources and a decrease in distress (Ensel & Lin, 1991).

I used the Theory-Stress paradigm to explore the effect of social, physiological, and psychological resources. Specifically, I used the six models to examine if a lack of resources contributes to higher levels of distress. On the other hand, I examined if an increase in resources contributes to lower levels of distress. In addition, I explored how the amount of social, physiological, and psychological resources contribute to resilience among individuals. I expected that having a strong social support system would contribute to lower levels of stress and lower the risk of mental health outcomes overall.

## **Methodology**

In order to analyze the differences in mental health between those who migrated to Florida after Hurricane Maria vs. those who stayed in Puerto Rico, I conducted a comprehensive literature review. In addition to the review, I analyzed other supplementary data sources including previous interviews from a study that included climate migrants from Puerto Rico to Central Florida, a personal interview, and a review of newspaper articles. I conducted a comprehensive literature review that explored articles related to the research question. I utilized social science research databases including Proquest, EBSCOhost and Google Scholar with keywords such as: mental health services Puerto Rico, Hurricane Maria, Florida, trauma, health impact, climate migration, and Puerto Ricans. My search yielded thousands of different articles, but I included fifteen articles.

### **Previous Interviews**

I used previous interviews from the study “Capacity and Change in Climate-Migrant Receiving Communities in the Gulf: A Three-Case Comparison” to further explore if there were any mental health differences between individuals who stayed in Puerto Rico compared to those who migrated to Florida after Hurricane Maria. This study has five different sectors including housing markets, financial health supports, employment and economic development, healthcare provider capacity, as well as social, cultural, and recreational service providers. I focused on the healthcare provider capacity sector to answer my research question.

An interview discussed the main mental health outcomes of Puerto Ricans after Hurricane Maria. This interview discussed a background in behavioral and mental health advocacy. One of

the interview questions was, “Did you find, when being in contact with these newcomers, any disaster-specific health conditions, such as respiratory disease, stress from the move, or from integration into a new community?” The interviewee replied, “We saw a lot of depression, PTSD, a lot of people with asthma, anxiety, heart conditions. It was a big variety of different diagnoses.” Therefore, stress from the move or integration into a new community may cause individuals to develop depression, PTSD, and anxiety.

Another interview discussed a background in counseling services and what kind of services they provided to individuals after Hurricane Maria. One interview question was, “Did organizations in your area primarily provide short-term response, ongoing services, or a mix of both?” The interviewee replied, “I would say that in the very beginning most of the services were provided to send to the island because of the lack of communication. We were contacted by organizations on the island just to provide information about family members who live in Florida to be contacted and let them know how they were doing and if they were needing something.” The interviewee further explained that different levels of support were provided to individuals because some needed more of a crisis intervention to cope. The interviewee stated, “We offered that Crisis Intervention I think for the rest of the year and then I think by November we started working on post trauma because some of the people were impacted in ways that they develop post-trauma symptoms, so we started working on that with systemic interventions.” Another interview question was, “How have the health needs of these migrants evolved in the years since their arrival?” The interviewee replied, “They evolve from that crisis and post-trauma more to adaptation.” Therefore, individuals were able to cope by developing a routine that was beneficial for adapting properly.

One interview from the healthcare provider capacity sector focused on psychology and medical education. The interviewee mentioned that the main health need was access to medication for both physical disabilities and mental health. The main medications that individuals had difficulty accessing were antidepressants and anti-anxiety agents. Furthermore, the interviewee said that the health needs were not different from the population already living in Puerto Rico prior to Hurricane Maria, but the mental health disorders were most likely a little more severe after going through the experience of the hurricane. However, accumulated exposure to the stressful events due to Hurricane Maria did contribute to the mental health needs of individuals who migrated to Florida. The interviewee explained that the main stressors for these individuals were leaving their home behind, adjusting to a new living environment, no job, no family, and not being able to speak the dominant language. She also explained that these stressors can increase symptoms in people who already have mental health disorders, or they may create disorders in individuals who did not have disorders in the first place. Many individuals who did not have depression prior to Hurricane Maria displayed signs of this disorder after the hurricane because they lost their house in Puerto Rico and they did not know what was going on back home due to lack of communication.

Another interview discussed a background in counseling services and mentioned how lack of communication affected the individuals who migrated to Florida after Hurricane Maria. The interviewee stated that her organization was contacted by organizations in Puerto Rico just to provide information about family members who live in Florida to be contacted and let their family members know how they were doing. She also said that there were two organizations who started

welcoming people in the airport and providing various levels of support. One of the organizations provided individuals with sources within the community for finding clothing, food, shelter, and other basic needs. The other organization worked with families who needed more of a crisis intervention due to post trauma after Hurricane Maria. The interviewee stated that individuals were impacted in ways that they developed post-trauma symptoms and some are able to adapt to their new environment, whereas others had a harder time adapting. Furthermore, she explained that many individuals struggled with migrating to Florida because Florida's culture is immensely different from Puerto Rico's culture. In addition, a few families had difficulty adjusting to the cultural aspects in Florida to the point where they considered going back to Puerto Rico because they did not have the resources to assimilate properly.

A third interview discussed a background in behavioral and mental health advocacy. Furthermore, the interviewee mentioned that the amount of mental health services offered in Florida is less than what Puerto Rico offers in terms of acceptability to different types of services. Therefore, many individuals who migrated to Florida had difficulty accessing mental health services. Another barrier for individuals who migrated to Florida was finding culturally and linguistically competent mental health care service providers to treat the disorders they developed. Common disorders that individuals displayed include depression, PTSD, and anxiety. Furthermore, the interviewee explained that financial problems, housing problems, and other stressors contributed to mental health problems in individuals who migrated to Florida after Hurricane Maria. He also explained that many individuals struggled with identifying the appropriate places to get assistance pertaining to their mental health needs because they did not know what their options were.

## **Personal Interview**

I had the privilege of interviewing a mental health counselor from Puerto Rico to further explore themes in the mental health of Puerto Ricans who stayed in Puerto Rico compared to those who migrated to Florida after Hurricane Maria. I had IRB approval to conduct the interview and create my own transcript. The interview explored themes such as the experience and background of service providers, common symptoms of individuals, prevalent ways individuals cope, differences in migration trends and those who returned to the island after Hurricane Maria, and how Hurricane Maria affected the practice of service providers. The interviewee explained that the most common symptoms he treated after Hurricane Maria were depression, adjustment issues, academic problems, anxiety symptoms, and disorders such as acute stress disorder due to flashbacks and experiencing a specific traumatic event. He also explained that some individuals experienced losses and decided to relocate to other areas in the United States. Most of the students that relocated to other areas struggled because they have never experienced a hurricane before and they felt hopeless. They also struggled with language because many of them were taking classes in English for the first time. Many of these students experienced problems with lack of sleep, appetite, and an overall demeanor of feeling down.

In addition, there were noticeable differences between those who migrated compared to those who returned to Puerto Rico. The interviewee explained that there was a difference in support because as a culture, Puerto Ricans are very family-oriented and very close with their families. He also explained that maybe people returned back to Puerto Rico because most of their

family was there, but individuals who migrated had a different experience. The individuals who migrated decided to move due to losing everything and wanting to start a new life. Many individuals decided to take advantage of this opportunity, but struggled financially and decided to migrate temporarily. Individuals who migrated temporarily wanted to return back to Puerto Rico because they did not have all the support that they were used to and the cost of living is much cheaper in Puerto Rico compared to Florida.

There were also noticeable differences in how individuals cope. The interviewee stated that individuals stay connected as a family and try to recover as a community in Puerto Rico. As a culture, Puerto Ricans have a lot of altruism, hope, and resilience because they have been through a lot and help each other because they understand what others are going through. On the other hand, the interviewee explained that people in Florida are much more individual than collective compared to the Puerto Rican culture. Other common ways that people cope in Puerto Rico is through religion and trying to get back to a normal routine as much as possible. He further explained that it is important to have a routine and individuals tried little by little, one day at a time to reconnect to their routine prior to Hurricane Maria. He also stated that most of the individuals started to connect and alleviate the symptoms of the impact of Hurricane Maria in terms of rural areas, individual, social, and occupation.

A key challenge for individuals was deciding whether to stay in Puerto Rico or migrate to Florida. Some people decided to move with their family, whereas others did not because they did not have family in Puerto Rico. Many students who decided to migrate experienced anxiety due to financial struggles and most of them were close to graduating at the time of Hurricane Maria. Most of the students who were close to graduating struggled with deciding what is going to happen if



they do not graduate and if they do not have this type of opportunity. They also struggled with deciding what they needed to do in order to have a better life and they were desperate for answers. Although they struggled at first, the interviewee stated that the difference decreased little by little when they received help.

Overall, the interviewee stated that trauma has improved in Puerto Rico since Hurricane Maria but some individuals still struggle. Some individuals still struggle because they were not able to receive the help they needed, especially in rural areas. He also mentioned that it was tough for the South side of the island because most of the schools were not able to open due to unsafe conditions. Furthermore, some individuals were able to move on better than others because they developed more efficient coping mechanisms. These types of individuals received more funds to process their trauma, and more psychology is being provided in the schools. This is a noticeable difference because individuals did not have this type of support before Hurricane Maria and the mental health stigma is decreasing little by little in Puerto Rico. He further explained that individuals raised the importance of mental health for the general well-being and function. The schools are specifically talking about trauma and the impact of Hurricane Maria because they realized that mental health is key for functioning well as an individual and socially with others.

### **Newspaper articles**

I utilized several newspaper articles to further explore my research question. I gathered my sources using the social science research database Nexis Uni with keywords such as: mental health services, Puerto Rico, Hurricane Maria, and trauma. My first search consisted of narrowing down the articles to news; September 17, 2017 - December 31st, 2022; and newspapers. The first set of keywords I entered were “mental health services” and “Puerto Rico”. This search yielded 667

newspaper articles. My second search consisted of narrowing down the articles to news; September 20, 2017 - December 31st, 2022; and newspapers. The second set of keywords I entered were “Hurricane Maria” “trauma” and “Puerto Rico”. This search resulted in 39,529 newspaper articles.

Many individuals who stayed in Puerto Rico after Hurricane Maria struggled with their mental health due to a lack of “drinkable water, food, medical care, electricity, phones, and the internet” (The Guardian - London, 2018). This increased anxiety in individuals because their daily routines were interrupted and they had difficulty accessing basic needs. Many individuals also struggled with lack of communication because they did not know what was happening in their house, how their family was, who was still alive, and they had difficulty adjusting to these new conditions (The Guardian - London, 2018). In addition, mental healthcare was already a struggle in Puerto Rico before Hurricane Maria, and the hurricane caused high unemployment rates as well as cases of migration that separated families (The Guardian - London, 2018). Furthermore, individuals struggled with access to prescription antidepressants and antipsychotics (The Guardian - London, 2018).

According to Puerto Rico’s suicide hotline, Linea Pas, there were increased reports of suicide from November 2017 through January 2018. There was a 246% increase in calls from individuals who attempted suicide, and an 83% increase in individuals who had thoughts of attempting suicide (The Guardian - London, 2018). An increase in suicide attempts may be due to house destruction, poor living conditions, lack of access to basic needs, and loss of family members. In addition, many students experienced trauma because the schools were closed for months and classes did not immediately resume even when the schools reopened (The Guardian -

London, 2018). Furthermore, not every teacher returned once schools reopened and some children had to wait until schools reopened to be able to play with other children (The Guardian - London, 2018). Parents also struggled with stress after Hurricane Maria because they worried about how they would be able to provide food and water to their children (The Guardian - London, 2018). Although both parents and children experienced difficulties after Hurricane Maria, there were signs of improvement. A previous report states that there were signs of improvement by late June because there were programs implemented to decrease trauma in children by improving their coping abilities and resilience (The Guardian - London, 2018). There were also workshops to provide support and training to parents (The Guardian - London, 2018).

In addition, this newspaper article mentions the struggles of a family who migrated to Florida after Hurricane Maria. The family was desperate to leave because they did not have electricity and it was difficult to access drinkable water, even more than two months after Hurricane Maria (The Guardian - London, 2018). They also moved because their daughter was a good student, but her school was closed through the end of November (The Guardian - London, 2018). Although they moved to Florida to ease their struggles, they struggled more when they migrated and decided to return to Puerto Rico. They moved back to Puerto Rico less than three weeks later because their daughter struggled at her new school (The Guardian - London, 2018). Their daughter struggled because none of the teachers would speak Spanish and she felt unsafe (The Guardian - London, 2018). Language was a common barrier for individuals who migrated to Florida and their daughter may have felt unsafe at school because it was an unfamiliar environment. She may have also felt unsafe because it was different from her routine that she was used to in Puerto Rico.

Another newspaper article highlighted the challenges of Puerto Ricans who stayed on the island compared to those who migrated to Florida. Aranda (2021) states, “Our work found that compared to life just before the hurricane, post-disaster migrants experienced more difficulty accessing necessities such as food and clothing, were more likely to face health care challenges, experienced greater hardship finding affordable and safe housing, and struggled to find employment and achieve financial security.” Many of these individuals decided to move back to Puerto Rico because they experienced difficulty learning the dominant language (Aranda, 2021). The article also states that some individuals were able to live a better life due to better education for their children and access to healthcare, but others struggled due to starting over (Aranda, 2021). Others most likely struggled due to resilience and having a hard time finding successful ways to cope.

## **Results**

### **Comprehensive Literature Review**

After reviewing the articles selected from the literature review search, I divided the literature into the following sections: Mental of Health of Puerto Ricans, Trauma and PTSD, Anxiety and Depression, Medical and Psychosocial Needs, Resilience, and Climate Change and Migration.

#### **Mental Health of Puerto Ricans**

Previous studies have explored various mental health topics among Puerto Ricans such as anxiety and mood disorders. For example, the 2016 report by the Administration of Mental Health and Anti-Addiction Services, or ASSMCA, on significant mental illnesses regarding Puerto Rico discovered that anxiety and mood disorders were the most common disorders among Puerto Ricans (Mora et al., 2021). Furthermore, it was found that women were at a greater risk of developing general anxiety disorder, major depression, and dysthymia compared to men (Mora et al., 2021). From my understanding, women may be at a greater risk of developing depression due to the exposure of particular conditions and stressful factors. Factors that may contribute to poor mental health include poverty, unemployment, reduction in population, abuse, lack of healthcare, dissatisfactory economic status, and an increase in crime rates (Mora et al., 2021). However, previous studies have found little difference in mental health between Puerto Ricans in the mainland compared to those in the island. A study done by Glorisa Canino and her colleagues discovered that Puerto Ricans who lived on the island had a stronger social support system compared to those living in the United States (Mora et al., 2021). This may explain why Puerto Ricans living in heavily populated areas of Puerto Rico are at a greater risk of developing anxiety

and mood disorders because they are exposed to various stressful situations, such as discrimination and a lack of social support.

### **Trauma and PTSD**

The most common mental health outcome of Puerto Rican individuals post Hurricane Maria, regardless if they stayed on the island or migrated, was post traumatic stress disorder (PTSD). According to the American Psychiatric Association (2021), “Posttraumatic stress disorder (PTSD) is a psychiatric disorder that may occur in people who have experienced or witnessed a traumatic event such as a natural disaster, a serious accident, a terrorist attack, war/combat, or rape who have been threatened with death, sexual violence or serious injury.” The severity of PTSD for individuals depended on the immensity of the hurricane, witnessing a loved one dying or getting hurt, identifying as a female, being younger, low socioeconomic status, poor education, minority status, family history and support, and overall instability. It has been found that there was a reported increase of 16% in the amount of suicides in 2016 and a 26% increase after Hurricane Maria. A study conducted by Scaramutti et al. (2019) found higher rates of PTSD in individuals who moved to Florida compared to those who stayed in Puerto Rico. This may be due to PTSD specifically as opposed to general mental health outcomes. This could also possibly be due to these individuals suffering the greatest loss, both materialistic and personal losses (Scaramutti et al., 2019). Among the individuals in both Florida and Puerto Rico, those who resided in urban areas compared to those who resided in rural/suburban areas were more susceptible to being diagnosed with PTSD (Palinkas & Wong, 2019). This may be due to the varying social support in these neighborhoods.

A case study was conducted by Cange & McGaw-Césaire (2019) to determine the public

health response after Hurricane Maria. The study focused on the critical period of Hurricane Maria as well as the latency period after the event. The critical period encompasses the time when exposure of an extreme climate event is the most significant and destructive. This time period also puts vulnerable individuals at a greater risk. The critical period of Hurricane Maria is September 20, 2017 and exposed individuals to various detrimental factors that increased in severity throughout the following years. The main risk factors include synthesized, conceptual, commercial, societal, and cultural (Cange & McGaw-Césaire, 2019). These risk factors led to poor cognitive and overall physical health, especially in youth.

Cange and McGaw-Césaire (2019) define the latency period as the interval between exposure and when symptoms first appear. The total latency period is approximately 5-15 years. PTSD was evident in numerous individuals due to the severe stress that was experienced and the intensity of Hurricane Maria. Environmental disasters, such as Hurricane Maria, that have high intensity can result in an increased latency period. As a result, negative health outcomes were evident over a significantly shorter amount of time.

### **Anxiety and Depression**

Anxiety and depression were commonly reported mental health factors, even by individuals who have never experienced these symptoms before (Michaud & Kates, 2017). Paek et al. (2018) observed the health challenges in federally qualified health centers (FQHCs) for the individuals that were affected by Hurricane Maria. The main conditions that were identified roughly one month after the hurricane include anxiety, depression, and other relevant social factors. Another study that discussed the general health challenges of Hurricane Maria survivors was done by Espinel and colleagues (2019). They discussed that communities exposed to significant climate

disasters are vulnerable to physical and cognitive harm, significant losses, and new life routines. As a result of these exposures, individuals are at risk for developing major depression and generalized anxiety disorder.

Another source that discusses anxiety and depression in individuals after Hurricane Maria, regardless if they showed symptoms prior to the hurricane or not, is an interview from the study “Capacity and Change in Climate-Migrant Receiving Communities in the Gulf: A Three-Case Comparison”. This interview focused on psychology and medical education. One of the questions was, “How did accumulated exposure to these and any other stressful events shape mental and physical health needs of new arrivals?” The interviewee replied, “You have no job, you might not have any family, you don’t speak the dominant language. So all of those things I think compound, and what we know about stressors in general is that they can increase symptoms in people who already have mental health disorders and physical disorders. Or they may create disorders in people who didn’t have disorders in the first place, so we worked with a number of people who were depressed because they lost their home in Puerto Rico.” Therefore, individuals developed signs of depression and anxiety after Hurricane Maria due to various stressors such as losing personal belongings and insufficient updates about what was going on in Puerto Rico.

Scaramutti et al. (2019) further explored the mental health of individuals that stayed in Puerto Rico compared to those who migrated to Florida. They used an online survey to examine how the hurricane affected Puerto Rican’s mental health. The mental health outcomes that they focused on include anxiety and depression. In order to measure anxiety and depression among these individuals, The Center for Epidemiologic Studies Depression Scale (CESD) and the Generalized Anxiety Disorder Scale (GAD-7) were implemented. These surveys were offered



online through Qualtrics for convenience purposes and could be completed using a smartphone or computer (Scaramutti et al., 2019). The CESD is a 10-item survey that measures participants' depressive symptoms in the last week, whereas the GAD-7 is a 7-item survey that measures daily symptoms associated with anxiety. Results indicate that Puerto Ricans who stayed on the island compared to those who migrated to Florida experienced about the same level of anxiety and depression, although there was a significant difference regarding communities. Furthermore, those who migrated to a rural or suburban area experienced greater levels of anxiety and depression compared to those who migrated to an urban area (Scaramutti et al., 2019).

### **Medical and Psychosocial Needs**

Two separate studies were conducted to examine the medical and psychosocial needs of these individuals. The first study done by Joseph and Diaz (2017) explores the impact of psychosocial support activities depending on location. Hurricane Maria made a significant impact on the social and psychological community framework as seen by the mass migration of individuals who moved to Florida, starting within the first two weeks after the hurricane made landfall. It is essential for individuals to feel that they have the proper support in regards to physical, social, and psychosocial aspects so it is detrimental when support is lacking in either of these areas. It is already difficult for individuals when they lose physical sources such as water and electricity, but it is an added stress factor when they lose family and friends as well. It is essential for individuals to feel as if they have a beneficial support system, so that is why many individuals united together after Hurricane Maria. Numerous individuals were able to empathize with one another because they know what it feels like to experience great loss.

According to Joseph and Diaz (2017), over 30,000 left Puerto Rico two weeks after the

hurricane and 100,000 individuals chose various states throughout the United States to be their permanent home. Although moving to a different setting will provide considerable benefits, these benefits do not come without a cost. Many individuals who did decide to migrate elsewhere were separated from their family, hometown, and culture (Joseph & Diaz, 2017). In addition, many individuals felt a sense of loss due to the fact that they did not know when Puerto Rico would be a place to call home again with sufficient resources. As a result of this sense of loss and stress, programs were created to help individuals feel like they have a place to receive the help they need. Joseph and Diaz (2017) state that psychosocial support is necessary after a weather event and it stems from the common needs that individuals need in order to recover accordingly. The factors that need to be implemented for successful recovery efforts include feedback from all members of the community, sufficient sources of information that provide details as to how the help of individuals can be implemented, sources within the community and human capital should be accounted for, and members of the community should make the efforts of creating and administering recovery projects a priority. This approach will allow for successful recovery efforts because it takes into account both the physical and social aspects that are required for an adequate and healthy lifestyle.

The second study was done by Ramphal (2018) at the Bantiox Clinic in Puerto Rico to assess the medical and psychosocial needs of residents after Hurricane Maria. Volunteer staff and physicians provided services to 4,941 residents from September 2017 through January 2018, with a total of 3,821 onsite visits. Staff also provided a total of 1,120 off site services to communities that suffered the most. One of the biggest challenges was lack of transportation to and from the sites as well as an insufficient amount of staff. As for medical needs, the biggest challenges were

individuals that had long-term diseases, respiratory and skin infections, and prescription refills. Other challenges include anxiety pertaining to future outcomes, housing, transportation, and sources of food. On the other hand, older patients experienced the most psychosocial needs. The individuals who suffered the most were older patients that lost their home and did not have sufficient support from family. Clinic staff provided services such as medical care and psychological testing for patients every week (Ramphal, 2018).

### **Resilience**

The amount of resilience among individuals who were affected by Hurricane Maria depended on family support and geographic location. Aros-Vera et al. (2021) provide three separate definitions for the term *resilience*. The first and third definition revolve around the idea of how quickly environmental aspects are able to recover after a natural disaster, whereas the second definition focuses on the ability of an individual to make adjustments to their life accordingly after a natural event. A study conducted by Nelson et al. (2021) focuses on the second definition as well as resilience evident among families. This study consists of nine separate families who migrated to Florida in November of 2018. The research question for this study was to explore how Latino families were able to make decisions in order to strengthen resilience in the entire family unit. The key themes that were identified include shared spirituality, a positive outlook on life, coming together as a family to discuss the future, a strong family support system, the ability to adapt to change quickly, social and economic factors, effective communication, and problem solving skills (Nelson et al., 2021).

A second study was conducted by Yabe et al. (2021) to compare the resilience among larger and smaller urban areas. The two main questions that are explored in this study include how

island communities cope as a whole after being repeatedly struck by natural disasters and how urban communities vary in resilience efforts depending on geographic location. This study consisted of collecting data by using mobile devices and Safegraph, which is a company that compares different locations, to obtain results. Results indicate that San Juan was able to recover faster than Ponce and Humaco because it is a bigger region and has a higher median income. San Juan is also the capital of Puerto Rico and has more social facilities compared to the other regions. In addition, results indicate that Humacao and Mayaguez were unable to recover back to their original conditions prior to Hurricane Maria while San Juan was more successful (Yabe et al., 2021). Results indicate that larger urban areas are able to recover quicker after a natural disaster due to having a higher budget and more community resources available.

### **Climate Change and Migration**

The topic of climate change and climate migration have been increasing in popularity in recent years. Templon et al. (2021) define migration as an individual moving to another location. Although this definition focuses on the individual, it can be a group effort because many individuals move with multiple people. As for the term climate migration, this is when an abundance of individuals move to another location due to environmental conditions. Individuals may choose to move for personal reasons, or they may move because there is no other option. Many of these individuals, or climate migrants, have chosen Florida to be their new home. Specifically, there have been trends of climate migrants moving to Orlando and Miami (Marandi & Main, 2021). This may be due to the favorable weather, increasing Spanish culture, and job opportunities across the state of Florida.

DeWaard et al. (2020) conducted a study to test the out-migration trends and return rate of

Puerto Rican residents after Hurricane Maria. Their study consisted of using the CCP, consumer credit panel, which is a sample of about 10 million individuals across the United States. The CCP collects data using credit reports and social security numbers. They chose to include the CCP to study climate migration because the mailing addresses of individuals are included in credit reports. Results indicate that approximately 15,020 individuals left the island between 2017 and 2018. As for return migration, approximately 13.4% of the individuals who left Puerto Rico during 2017 after Hurricane Maria made landfall were seen to return to the island by 2019. Therefore, a majority of individuals who left Puerto Rico decided not to return to the island.

Another study to test the out-migration trends of Puerto Ricans after Hurricane Maria was conducted by Alexander et al. (2019). The study used data from Facebook by examining age, sex, and advertisements. They estimated that there was an increase of about 17.0% in Puerto Rican migrants across the United States from October 2017 to January 2018. This increase is equivalent to about 185,200 people relative to the overall population of Puerto Rico, which consists of 5.6%. Florida experienced the largest influx of Puerto Rican migrants over the period of October 2017 to January 2018, with a total increase of 21.6%. This increase is equivalent to approximately 65,400 people.

## **Discussion**

Overall, it appears that individuals experienced poor mental health regardless if they stayed in Puerto Rico or migrated to Florida after Hurricane Maria. This is in line with preliminary findings suggesting that trauma and anxiety have been identified in both groups. The aim of my research question was to explore if there are differences in mental health between these groups, specifically related to trauma. I discovered that individuals who migrated to Florida after Hurricane

Maria showed greater signs of trauma compared to those who stayed in Puerto Rico. The main stressors that contributed to trauma include the lack of communication, language barrier, leaving family behind, adjusting to a new living environment, cultural aspects, difficulties in employment, and difficulty finding the appropriate assistance.

I used the Theory-Stress paradigm to further explore if there are differences in mental health between Puerto Ricans who stayed on the island compared to those who migrated to Florida after Hurricane Maria. Specifically, I focused on the six models to examine if a lack of resources contributes to higher levels of distress. According to the stress-conditioning model, individuals with limited resources and exposure to stressful events result in higher levels of distress (Ensel & Lin, 1991). This was evident in a previous interview from the study “Capacity and Change in Climate-Migrant Receiving Communities in the Gulf: A Three-Case Comparison”. This interview had a background in counseling services and one of the questions asked was, “How have the health needs of these migrants evolved in the years since their arrival?” The interviewee replied, “I think that every state has its own peculiarities and certain cultural aspects that they have been struggling with. To the point that we have seen a few families that have considered going back just because they didn’t have the resources to assimilate better.” Therefore, individuals with limited resources do experience higher levels of distress because they are not able to assimilate properly.

I also used the Theory-Stress paradigm to examine if an increase in resources contributes to lower levels of distress. In addition, I explored how the amount of social, physiological, and psychological resources contribute to resilience among individuals. My original prediction was that having a strong social system would contribute to lower levels of stress and lower the risk of mental health outcomes overall. According to Yabe et al., (2021) my initial prediction was correct

because San Juan was able to recover much faster compared to other areas. San Juan is the capital city of Puerto Rico, which means that it has a greater budget and individuals are able to access more resources. Yabe et al., (2021) explain, “We observe that San Juan, the capital city of Puerto Rico, recovers much faster than other regions both physically and socially, while Humacao and Mayaguez fail to recover back to their original states. In addition to such correlations, these relationships of recovery speed suggest the existence of interdependencies among the social and physical systems during the post-disaster recovery period.” As a result, individuals in San Juan had a greater level of resilience due to a greater amount of resources and a strong social system.

### **Limitations**

Originally, I was planning on answering my research question by incorporating observations and case studies of mental health providers in both Florida and Puerto Rico. I was planning on conducting five interviews in Florida and five interviews in Puerto Rico. The individuals that I was interested in interviewing include individuals who work at churches, nonprofits, government agencies, or schools. COVID-19 was a limitation to my study therefore, I was unable to travel to Puerto Rico. Email delays were another limitation to my study because people either did not respond back to me or declined to participate. I also received emails after I was no longer conducting interviews due to time constraints. Despite these limitations, I was able to interview a mental health counselor from Puerto Rico via Zoom.

### **Future Recommendations**

For future research, I recommend individuals implementing churches, nonprofits, and government agencies. The ongoing study “Capacity and Change in Climate-Migrant Receiving Communities in the Gulf: A Three-Case Comparison” interviewed individuals who worked in

these organizations because they had first-hand experience with the migrants. I had difficulty finding articles pertaining to these individuals, and I believe that it would be beneficial for future studies to implement more research in these areas. Another recommendation is to explore easier ways for individuals to access help. A key theme I noticed while writing my comprehensive literature review and methodology section is that many individuals did not receive the help they needed because they did not know what sources were available to them. One strategy that future research could implement may be to conduct surveys to migrants about the ways they were able to receive help. This would allow for communities to be better prepared if another event such as Hurricane Maria were to occur again. Communities would also be more ready to receive future climate migrants and assist them appropriately.

### **Conclusion**

The main theme I discovered is that trauma and anxiety have been identified in both individuals who stayed in Puerto Rico as well as individuals who migrated to Florida. Although, individuals who migrated to Florida struggled more because they experienced various stressors attributed to the hurricane and moving to a different state. Another key theme is that individuals tend to cope better when they have more social support.



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