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Provision of mental health services immediately following a natural disaster: Experiences after Hurricane Maria in Puerto Rico

Michelle E. Alto, PhD,
Medical University of South Carolina, Charleston, South Carolina; now at: Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland.

Andel V. Nicasio, PhD,
Mental Health Disparities and Diversity Program, Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina, Charleston, South Carolina.

Regan Stewart, PhD,
Mental Health Disparities and Diversity Program, Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina, Charleston, South Carolina.

Tania D. Rodríguez-Sanfiorenzo, PhD,
Counseling Psychology Graduate Program, Albizu University, Mayaguez Academic Center, Mayaguez, Puerto Rico.

Gisela González-Elías, PhD,
Interdisciplinary Baccalaureate Program, Albizu University, Mayaguez Academic Center, Mayaguez, Puerto Rico.

Rosaura Orengo-Aguayo, PhD
National Crime Victims Research & Treatment Center, Department of Psychiatry & Behavioral Sciences, Medical University of South Carolina, Charleston, South Carolina.

Abstract

Objective: The increased risk of mental health disorders in the months and years following a natural disaster highlights the need for more immediate preventive intervention. The objective of the current study was to learn from a real-time implementation of a natural disaster response following the Hurricane Maria in Puerto Rico to identify strategies for providing mental health services immediately after a natural disaster.

Methods: Two focus groups were held with faculty (n = 6) and graduate students (n = 4) from a graduate psychology program at the Universidad Carlos Albizu, Centro Universitario Mayagüez. An additional key informant interview was conducted with two faculty member participants. Data were analyzed qualitatively using thematic analysis.

Results: The delivery of mental health services was organized into three major themes: (1) finding a way to communicate, (2) targeting key access points for outreach and centralization of resources, and (3) providing triaged mental health care based on level of need.

Conclusions: Findings are used to guide recommendations for mental health response preparation in future natural disaster contexts.

Keywords

hurricane; natural disaster; disaster mental health response; psychological first aid

On September 20, 2017, the Hurricane Maria struck Puerto Rico as a high-end category four hurricane, making landfall only 2 weeks after the Hurricane Irma passed the island. Hurricane Maria caused the longest basic utility outage in US history, leaving many citizens of Puerto Rico without power, water, or communication for 3 months to over a year.[1] Its cost to the infrastructure on the island reached $90 billion and an estimated 4,645 people lost their lives.[1,2] A survey conducted with over 96,000 Puerto Rican youth highlighted widespread exposure to trauma,[3] and 6 months after the hurricane, residents continued to report significant daily stressors related to the disaster.[4]

Puerto Ricans are not alone in this exposure to natural disaster. Each year, approximately 175 million children and an even greater number of adults around the world are exposed to natural disasters.[5] This exposure increases risk for a range of mental health problems, including post-traumatic stress disorder (PTSD), depression, traumatic grief, anxiety disorders, externalizing problems, and substance use disorders.[6] Many Puerto Ricans experienced similar mental health consequences following the Hurricane Maria. For example, among adults in one small town on the east coast of the island, two-thirds of respondents reported clinically significant symptom elevations for major depression, generalized anxiety, or PTSD 6 months after the hurricane.[4] Among youth across Puerto Rico, 7.2 percent (n = 6,900) reported clinically significant symptoms of PTSD 5–9 months after the Hurricane Maria.[3] Although these prevalence rates highlight a significant need for mental health services about 6 months after a hurricane, little is known about mental health needs and services in the days and weeks following natural disasters. This window of time may present a critical opportunity for immediate preventive intervention.

Current guidelines for post-disaster mental health interventions recommend three main phases of intervention: Phase 1: immediate aftermath (day of disaster to approximately 1 month); Phase 2: short-term recovery and rebuilding (approximately 1 month to a year); and Phase 3: long-term recovery (approximately 1 year to several years).[7] Focus in Phase 1 is on restoring access to basic needs and using brief, present-focused interventions like psychological first aid (PFA)[8] to promote a sense of safety and security.[9] The focus shifts to teaching evidence-based coping skills in Phase 2, using interventions like skills for psychological recovery.[10] In Phase 3, individuals with moderate to severe mental health needs are connected with evidence-based psychotherapeutic interventions for trauma.

Following most natural disasters, it can take providers months to organize, train, and identify individuals in need of mental health treatment, causing them to miss the opportunity for Phase 1 intervention. However, some communities have successfully coordinated an evidence-based Phase 1 response. For example, after a deadly mudslide and catastrophic flooding in Sierra Leone in 2017, mental health nurses implemented PFA in combination with medical care and service coordination.[11] Within 1 week of the mudslide, nurses had delivered the intervention to over 1,000 affected individuals.[11] This response is unique because the mental health nurses were already well trained in PFA and were therefore able

to deploy immediately to deliver services. Unfortunately, many communities experience limited resources and unique barriers that prevent them from being able to offer such an immediate response.

However, the community of Mayagüez had its own unique approach to mental health services following the Hurricane Maria. Graduate students and their faculty supervisors from the Psychology Department at the Universidad Carlos Albizu, Centro Universitario Mayagüez (UCA-Mayagüez) in Puerto Rico were part of the immediate response effort following the hurricane. The purpose of this study is to answer the following research question: how did UCA-Mayagüez faculty and graduate students support the mental health of Puerto Ricans following the Hurricane Maria? The experiences of these students and faculty can provide important information about how to access and serve populations in an immediate post-disaster setting with limited resources.

METHODS

Participants

A total of 10 participants took part in this study, including six faculty members and four graduate students from UCA- Mayagüez. All graduate students had a bachelor's or master's degree at the time of participation and were enrolled in the Doctor of Psychology (PsyD) program. All faculty members had a doctoral degree at the time of participation and were part of the counseling, school, and clinical psychology programs. Participants were all over the age of 18 and were required to have provided mental health services immediately (1 day to 3 weeks) following the Hurricane Maria. All participants were female, identified as Latina/Latinx, and all but one were born in Puerto Rico. All spoke Spanish and English, but focus groups and interviews were conducted in the language of preference.

Procedure

Participants were recruited with a flyer distributed via email. Participants took part in one of two focus groups (one for graduate students and one for faculty) in private rooms via a HIPAA-compliant video conferencing platform, with participants located in Puerto Rico and focus group facilitators in South Carolina. Separate focus groups for students and faculty were designed to minimize any potential power dynamics and capitalize on shared experiences based on participants' role and level of experience. An additional key informant interview was conducted with two of the faculty participants via phone after the focus groups took place. Researchers obtained ethical approval for this study from the Medical University of South Carolina IRB, and all participants provided informed consent prior to participation.

Focus groups were conducted in November 2019, and the key informant interview was conducted in February 2020. The second author conducted both focus groups in Spanish, and the third author conducted the key informant interview in English. A semistructured focus group guide was designed to answer the research question: "How did UCA-Mayagüez faculty and graduate students support the mental health of Puerto Ricans following Hurricane Maria?" Questions in both groups and the key informant interview covered topics

in the areas of (1) Puerto Ricans' needs immediately following the Hurricane Maria, eg, What were people's needs following the Hurricane Maria? What unique needs did you see among children?, and (2) how participants met those needs, eg, How did you access populations in need? What did mental health care look like? Focus groups lasted 46 and 62 minutes. Focus groups did not last longer than 60 minutes to minimize the burden on participants' time and increase the likelihood that participants would be available between their scheduled classes. The key informant interview lasted 32 minutes. Focus groups and the interview were audio recorded, deidentified, and transcribed verbatim, resulting in 56 pages of single-spaced transcription. Transcripts were professionally translated before coding, and one of the coders, who is bilingual, reviewed both the English and Spanish transcripts to assess the accuracy of the content.

Data analysis

Data were analyzed qualitatively using thematic analysis.[12] ATLAS.ti 7 Mac software[13] was used to organize the data. First, two coders (the first and second authors) independently completed the first-level coding within ATLAS.ti to identify key ideas expressed by participants and develop a comprehensive codebook. Both coders used this codebook to independently analyze the data by marking their codes within ATLAS.ti. Inter-rater discrepancies were discussed and resolved.

Next, second-level codes that synthesized first-level codes were generated to establish a preliminary thematic framework and work toward building an explanation of how mental health services were delivered immediately following the Hurricane Maria.[12] For example, the codes "radio," "shelters," "community outreach," "UCA- Mayagüez," and "government" were captured by the theme "Access Points." Transcripts were then independently recoded by both coders to assess fit with the framework and identify confirmatory evidence for the model. Key informant interviews were conducted as a purposeful sampling strategy to confirm and disconfirm emerging themes[14] and to validate the data using a triangulation approach.[15] Quotations associated with each code were organized within ATLAS.ti, and those that best captured the final themes were agreed upon between coders and included in the manuscript. The second author, whose first language is Spanish, back-translated the chosen quotations to ensure they were accurately translated.

RESULTS

Findings suggest that the delivery of mental health services immediately following the Hurricane Maria was organized into three major themes: (1) finding a way to communicate, (2) targeting key access points for outreach and centralization of resources, and (3) providing triaged mental health care based on level of need. Each theme represents a key aspect of how mental health services were organized within this Phase 1 response.

Communication

Because there was no electricity throughout the vast majority of the island after the Hurricane Maria, communication became a significant need. Puerto Ricans could not check

on loved ones, spread information about resources, or organize response efforts over the phone, TV, or internet. As one faculty member explained:

> Not having communication I would say was the most difficult thing, getting up and you don't know what is going on half an hour from your house in the rest of the country. You don't know anything at all. I think that was the most overwhelming part of not having communication.

This lack of communication was a significant stressor and contributed to an overwhelming sense of uncertainty.

As a result, the radio station became a critical resource for communication. Participants described how people lined up at the radio station to send messages to friends and family. Communication over the radio also became an important way to spread information about resources and available services. For the students and faculty at the UCA-Mayagüez, communication via the radio station was the first step in organizing their response effort, as a faculty member described:

> The only thing that was working was a radio station, an AM radio station, and this director went to the radio station and he let everyone know that UCA was all right and that we were going to have a meeting with voluntary psychologists that wanted to join and help us go to the communities.

Given the damage of the hurricane, communication could not have been possible without the radio station as a key resource.

Access points

Once messages were communicated and services coordinated, the next task in addressing mental health became targeting access points for service delivery and centralization of resources. As one faculty member described, mental health services changed to fit the post-disaster context:

> [The mental health] structure changed completely, because then [therapy] did not necessarily take place in some specific centers, but it began by going to the shelters, to provide services there, or to the radio, or to the communities, to the houses directly, right. So we had to make a switch in terms of what it is like to provide services in an office, right, with a schedule agreement, and all the structure that we typically have in traditional services.

People in need of mental health support could no longer simply be referred to the university clinic. Rather, students and faculty had to find a way to identify those in need and reach them at these key access points.

Because of its critical role in communication, the radio became an important access point. Faculty and students at UCA-Mayagüez organized, so they could assess and treat people waiting in line at the radio station. One faculty member described how these services were organized:

> We divided into time and days and then we not only announced on the radio that we were available, but we attended to people who came directly to the only station. […] When the announcers or administrative staff identified that someone was in crisis or that they had some need to vent or something like that, they provided us with a radio booth that obviously had at least some confidentiality. […] We also gave direct services there and also were able to gather some referrals.

The radio also became an access point for other basic resources, like food, water, and medication. As a result, it became a critical intervention setting.

Both pre-existing and emergency shelters, eg, stadiums and schools, became another key access point. As two faculty members explained:

> We had already been active at the shelters because of our other work, and the shelter at Mayagüez is very close to UCA [the university]. So even though UCA wasn't open, we went there as soon as we heard on the radio that they were going to be meeting up."

Because of their pre-existing connections, these faculty members could bring graduate students with them to the shelters to quickly increase their capacity.

Participants also organized to deliver services directly in communities. Damage from the storm had destroyed infrastructure and severely limited access to several remote communities. One graduate student recalled:

> I remember that once I went with another partner and we got stuck in the middle of a hill and the car could not go up and we were doing it because there were people in this community that did not have access. They had no way to get down in order to receive these services.

Community outreach was important not only for direct provision of services but also for distributing resources, spreading information, and identifying cases in need of referral. Sometimes, mental health services were delivered right "in the field" in these communities. One graduate student reflected on how people's perceptions of mental health within the communities changed during this time. She explained how people were "*eager to receive us*" and "*that vision that 'this is for crazy people,' that 'I do not need it' was totally opposite. Nobody refused, on the contrary they were looking for us*." In this way, community outreach was a way for UCA-Mayagüez graduate students and faculty members to overcome both tangible and intangible barriers to mental health.

UCA-Mayagüez itself became a central coordination site for gathering resources and organizing services, as well as providing clinic-based mental health care for those with more acute needs. Importantly, UCA-Mayagüez served as a link between organizations. One faculty member explained:

> We were able to provide help in another way that didn't have anything to do with psychology, right, like giving security, being available for governments, entities, and other organizations, connecting people that didn't know each other, and then they continued and have created initiatives.

UCA-Mayagüez reopened within 3 weeks of the hurricane, which also made it an important source of basic resources, eg, water and electricity, and emotional support for graduate students. One faculty member described how she modified her course:

> At least one thing that I did in my course was that at the beginning of each class when we met we talked for five minutes, ten minutes about how they had been, how each one was. There was a space of relief around the circumstances. And once after we talked a little about their experiences and the things that others needed, they told each other, “Oh I have that, I can give it to you,” etc.

UCA-Mayagüez increased service capacity by connecting organizations and supporting its graduate student providers.

Finally, the government was a major source of resources, placing service providers in shelters and offering access to important supplies, such as vehicles that were equipped to reach remote communities. Government officials communicated with UCA-Mayagüez faculty and staff about the crises in the community. As one faculty member described:

> When [government officials] had any situation in the communities that they had to go handle, and there was something of a crisis, then they would alert us and someone from the psychological team would go with them in the government cars and just go to the mountains, go to wherever was needed.

This collaboration with governmental officials allowed important information and resource sharing to better serve the greater community.

Triaged care

Participants explained that their services fell into three major domains: providing resources to meet the basic needs, offering empathy and support, and making referrals for more intensive mental health treatment. People often first requested information and supplies to attend to their basic needs. Psychological services were either provided in tandem, or sequentially once basic needs were met. One graduate student walked through the process, saying:

> It all started by gathering [supplies] that we brought back. Then we took [the supplies] to the places […]. If it was identified that there were needs beyond the basics, then it was referred or attended to immediately because there were people there from the university, or a place was identified where the person could go, either in the same community if there was one of us or another identified site that could assist them in terms of psychological needs and referrals for follow up.

This process of assessment allowed graduate students and faculty members to tailor their services to meet people’s most acute needs.

Basic needs emerging among the population included food, water, clothing, shelter, electricity, medication, and safety. Certain populations also had unique needs. For example, children needed safe spaces to play, particularly while their parents were addressing the family’s concrete needs. One of the faculty members explained:

> At the shelters, […] our focus was the children. Because the families, they had a lot of family members that had to be doing the paperwork for FEMA. They had to do all sorts of stuff, so the children were left, like, running around. We then went every day, we organized, we had some activities [for the children].

In addition, one graduate student described how parents had the unique need "*to explain to the child what is happening, 'How long will we not have food?' 'When will the electricity return?' That parental concern was also very frequent*." The elderly also had unique needs, particularly with respect to medication and electricity to maintain their medical care. One graduate student described how families did not know how to care for the elderly under these circumstances:

> It was hard for me to see how many people were abandoned in the shelters, how their children brought the elderly to those shelters for someone to take care of them, but there came a time that shelter had to close and they could not find where to place those elderly.

Participants highlighted how addressing these basic needs to establish stability and survive was often first and foremost on people's minds.

The main emotional need that participants observed was a sense of grief and loss. As one graduate student aptly described: "*Grieving is not only to lose someone you love, but also economic or material things*." Participants observed that this sense of loss was related to a lack of basic supplies, a sense of disorientation about how to move forward, uncertainty about the future, death of loved ones, and a realization that things would never be the way they had been before the hurricane.

Although specific needs varied, students noted that it was important to address every individual with empathy and support. They explained how the fact they were all experiencing the same situation brought everyone to the same level, helped with communication and fostered relationships. Specifically, one graduate student highlighted the importance of suspending judgment about the extent of someone's loss:

> And also not to minimize because there was someone in Puerto Rico who was more affected than others, so I cannot assume that since it was the same as where I live, that everyone saw it and experienced it from the same perspective.

Participants emphasized the power of empathy and "humanity" as a simple intervention.

Finally, participants explained how a subset of individuals required more intensive mental health treatment. Several participants noted acute concerns related to suicidal ideation; one described a patient diagnosed with schizophrenia who could no longer access his medication, and another explained that her patient had a personality disorder that had not been detected until the hurricane. Those with more significant mental health needs could be referred to the UCA-Mayagüez university mental health clinic, which opened 3 weeks after the hurricane.

Some participants referred to this pattern of triaged care as PFA. Although faculty and students both referenced a course on psychotherapy that included an overview of PFA and

noted that they received the PFA manual after the hurricane, there was discussion among the graduate students about the formality of their PFA training. One graduate student explained:

> I think we were not trained in Psychological First Aid […]. After we started to provide services, the manual was handed to us and they explained to us what Psychological First Aid was, but not formally. We were taught […] we are going to ask about basic needs first, we were given an idea about that, but we were not taught Psychological First Aid.

However, another student stated:

> We were taking that class of Psychotherapy Techniques and we stopped everything and were given Psychological First Aid [training] and also were given the manual. She trained us and from there we continued to learn in the field.

Despite this difference in opinion, graduate students and faculty all described a pattern of triaged care that consisted of identifying people's most acute needs, providing basic resources and support, and making referrals for those in need of more intensive mental health treatment.

DISCUSSION

This qualitative study aimed to identify how graduate students and faculty members at UCA-Mayagüez in Puerto Rico organized and delivered mental health services immediately following the Hurricane Maria. Consistent with prior post-disaster research, communication emerged as a central theme. Disaster communication interventions such as the disaster communication intervention framework highlight the importance of providing information about the event, safety, coping skills, resources, and social support to decrease disaster-related distress and promote resilience.[16] UCA-Mayagüez similarly sought to provide information about these important topics, but encountered communication barriers due to power outages and damaged infrastructure. As a result, they capitalized on the local radio station to provide this vital communication, as other communities have also done in post-disaster contexts.[17,18] This adaptation illustrates that one-way communication can take place in contexts with limited resources and highlights the radio as an important element of future disaster preparedness plans.

The participants' emphasis on access points aligns with research on cross-sector collaborations in post-disaster contexts.[19] As shown following the hurricanes Katrina and Rita, cross-sector collaborations can form post-disaster as an effort to compensate for weakness in one sector and result in greater and more effective public health response.[20] For the faculty and graduate students at UCA-Mayagüez, previously established collaborations, eg, shelters, radio, and government, allowed for quicker response, while the circumstances of the hurricane also encouraged the formation of new collaborations facilitated by UCA-Mayagüez intended to strengthen future disaster responses. These findings emphasize the importance of identifying access points and creating cross-sector networks as part of disaster response planning.

Finally, triaged care emerged as PFA-informed response following the Hurricane Maria. The core actions of PFA, ie, contact and engagement, safety and comfort, stabilization, information gathering, practical assistance, connection with social supports, information on coping, and linkage with collaborative services,[8] align with many of the themes identified in this study. Official PFA training guidelines recommend participation in a 6-hour online course and an in-person training with a certified trainer. Although graduate students had been exposed to the tenets of the model in their coursework and were able to reference the manual, they were not formally trained in PFA. However, their PFA-informed approach is consistent with Phase 1 natural disaster response guidelines[7,21] and recommendations for the intervention during immediate and midterm post-mass trauma phases, ie, sense of safety, calming, sense of self- and community efficacy, connectedness, and hope,[9] emphasizing the natural fit of UCA-Mayagüez's response to the needs of the setting and the existing literature. Given the natural fit of PFA to the Phase 1 context, these findings have important implications for PFA training prior to a natural disaster as they were observed in the successful response to the 2010 mudslides in Sierra Leone.[11]

Limitations

It is important to consider these findings in the context of several limitations. First, the sample size of this study was limited by the number of students and faculty eligible and available to participate, due in part to the fact that Puerto Rico was struck by an earthquake in the middle of data collection. As a result, data did not reach saturation. To counteract this limitation, we conducted additional key informant interviews with two faculty members to further refine codes and triangulate the data.[14,15] It is also important to note that findings also may not be generalizable to other forms of natural disaster or other contexts. However, these results can still help to inform future post-disaster Phase 1 interventions by highlighting the radio as a key communication resource, identifying important access points, and emphasizing the need for PFA training in preparation for natural disasters. Finally, transcripts were translated to English prior to coding because the first author is not fluent in Spanish, which may have introduced some error. However, translation was done by a professional translator and checked by a bilingual research team member to ensure accuracy.

Recommendations and conclusions

These findings have important implications for training and planning for future natural disaster response efforts, particularly as natural disasters and global pandemics become increasingly common. Graduate programs, schools, and government officials should consider standardizing the formalized training in PFA, along with training in traumatic stress, post-disaster response, and self-care for responders. In addition, results suggest that post-disaster mental health response plans should address logistics, like meeting spots for providers to organize and a way to communicate that does not require electricity. Further, plans should capitalize on pre-existing cross-sector collaborations and incentivize the creation of new collaborations to facilitate resource sharing. Finally, plans should utilize graduate students as important human resources and take advantage of the post-disaster context as a rich, in vivo training environment for emerging mental health providers.

This study's findings and implications offer important opportunities for future research. Within the Puerto Rican context, assessing how this experience informed future disaster response plans within and outside of Mayagüez could illustrate the generalizability and sustainability of these findings. In addition, it would be valuable to assess the relevance of these findings outside of Puerto Rico and in response to different kinds of natural disasters. This could be done by comparing these results to Phase 1 responses in other contexts or by implementing a Phase 1 response informed by these findings in another setting. Finally, it would be important to assess the long-term impacts of this response by following up with the individuals served by UCA-Mayagüez and evaluating the impact of the subsequent steps taken by UCA-Mayagüez following this Phase 1 response on their well-being and mental health. These subsequent Phase 2 and Phase 3 services are described elsewhere by Orengo-Aguayo et al.[21,22]

The Phase 1 response period is critical for stabilization and prevention of mental health disorders following a natural disaster.[7] By quickly identifying a means of communication, targeting key access points, and providing triaged mental health care, mental health providers can more effectively and immediately serve survivors. In doing so, mental health providers can play a key role in supporting resilient mental health outcomes and rebuilding strong communities.

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