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ORIGINAL PAPER

Psychiatric Diagnoses and Medications for Hurricane Harvey Sheltered Evacuees

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Abstract

To report on the diagnosis of and pharmacological services provided to 229 evacuees of Hurricane Harvey housed within a large convention center. Retrospective chart review of services rendered. Evacuees were primarily adults who presented with varied diagnoses, most commonly mood, anxiety and/or psychotic disorders. There was significant need for medications and psychosocial support to address preexisting conditions, as well as emerging problems (e.g., insomnia). Individuals presenting for pharmacological services following natural disasters may require medications to continue ongoing care, and/or treatment for insomnia. Therapists can provide direct intervention as well as identify those in need of further evaluation/intervention. Providers should be prepared with a fully stocked pharmacy, accessible but confidential location, and a pre-established method of record keeping.

Keywords Natural disaster · Hurricane · Flood · Pharmacotherapy

Prior disaster research highlights the need for established processes for rapid diagnostic assessment, availability of psychotropic medication, interventions for support and distress management, and coordination of ongoing care for evacuees (North et al. 2015; North and Pfefferbaum 2013). Guiding principles for mental health interventions post-disaster have been set, including psychiatric care (Holder et al. 2017; North et al. 2015). Findings on disaster response research can help substantiate these guidelines and elucidate differing findings and approaches. While there is research on psychiatric medication usage in the months post-disaster (Wang et al. 2007, 2008), information on the immediate post-disaster psychiatric medication needs for evacuees in shelters remains limited. Further, psychiatric needs may vary based on the disaster, setting and timing (North 2010), supporting the need for continued research on psychiatric services for those sheltered during disasters.

Post-disaster research has focused on posttraumatic stress disorder (PTSD), but for evacuees in shelters PTSD is not the most prevalent problem (North 2010). North et al. (2008) found that for Hurricane Katrina, PTSD was only recorded for 3% of those who were seen in the shelter less than 2 weeks post disaster; whereas pre-existing major depression (25%) and schizophrenia/schizoaffective disorder (21%) were the most common diagnoses. Approximately 20% of adults were identified with lifetime alcohol/drug use disorder. The most common symptoms reported were insomnia (21%), depression (17%) and anxiety (16%).

Lessons learned after Hurricane Katrina suggest that systems must be in place to provide medication refills with collaborations with pharmacists to access data systems to review prior regimens, and be prepared to treat new mental health conditions (Broz et al. 2009). After Hurricane Katrina, operating principles for disaster shelter mental health services were established (North et al. 2015) including: (a) provide supportive services such as psychological first aid; (b) collaborate with pharmacies to have medications available (e.g., quetiapine, risperidone, trazodone, lorazepam); (c) use caution when providing medications that may be addictive (e.g., alprazolam); (d) have linkages to services

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for substance abuse and opioid maintenance medications; (e) have rapid data systems that allow for triage and documentation; (f) have clearly defined roles, responsibilities and structure for key personnel; (g) have a center for mental health services separated from the living area but have outreach workers engaging evacuees; and (h) have mental health services available 24/7 with psychiatric services (or on call services) available. Decisions about the amount of medication dispensed will depend on the type of medication, setting, and when offsite community providers are available (North et al. 2015). For example, after the Boston marathon bombing, one psychiatry department decided that given evidence that benzodiazepines may be contraindicated for recent trauma (Guina et al. 2015), benzodiazepines were only temporarily prescribed for patients with severe/persistent insomnia and anxiety (Oser et al. 2015).

People with prior history of psychiatric medication use are the most likely to need and use medication post-disaster. For example, of 1,008 respondents from telephone interviews a month after the September 11, 2001 attacks, 92% of the participants who indicated psychiatric medication usage prior to the attack continued usage post-disaster. For new users, there was only a 3% increase in psychiatric medication, with panic attacks and/or PTSD most associated with new usage (Boscarino et al. 2003). Evacuees with medication for pre-existing conditions may have to go without medication when access is not available in shelters (Ghosh et al. 2007). People with preexisting mental health conditions may discontinue treatment post-disaster due to structural barriers such as access, costs, and transportation (Wang et al. 2008). Although research highlights the need to address structural, financial, and attitudinal barriers for psychopharmacology and/or psychotherapy in the months after the disasters (Wang et al. 2007), there is little research on disaster medication distribution during and immediately after the disaster among evacuees in shelters. During a disaster, it is likely that for some individuals the period of discontinuation of psychiatric medication occurs immediately during evacuation when medications are not available. Therefore, this study provides descriptive information on psychiatric diagnoses and medication for evacuees, including children, in a shelter during Hurricane Harvey and while implementing many of the recent guiding principles for sheltered mental health services.

Hurricane Harvey made landfall August 25, 2017. With 130 mph winds, Hurricane Harvey also brought ~ 4.5 feet of rain causing catastrophic flooding in surrounding areas. In fact, the storm brought the largest amount of rain from a single storm in United States history. Almost 800,000 residents had to evacuate from their homes resulting in 42,000 people in 692 temporary shelters after the storm. The disaster response was the largest in the history of Texas (Federal Emergency Management Agency 2017). Baylor College of Medicine Menninger Department of Psychiatry provided psychiatric services for approximately two weeks at the George R. Brown Convention Center (GRBCC), where ~ 10,000 were sheltered. This report describes the psychiatric diagnoses and medications prescribed to sheltered evacuees at the GRBCC, as well as discusses efforts to implement disaster shelter mental health principles and lessons learned.

Method

Following Harvey, ~ 60 clinicians, primarily psychiatrists, psychiatry residents/fellows, and several therapists, staffed the clinic setting within the shelter that was available for individuals across the age span. Initially only two psychotropic medications (sertraline, fluoxetine) were available (as well as diphenhydramine) and supplied through samples and/or a local pharmacy; after 2 days, nearly all medications were available through this pharmacy, which donated a supply. Initially psychiatric providers were available from 8 a.m. to 12 p.m.; shortly after this was revised to be from 8 a.m. to 8 p.m. Two social workers and psychologists were present throughout the day divided between two shifts; their role was to engage individuals throughout the GRBCC (especially those who appeared distressed), provide support and distress tolerance skills based on the clinician's judgment, and triage when appropriate for further psychiatric and/or medical evaluation. The Federal Disaster Medical Assistance Team (DMAT) was present overnight with psychiatric support. Information was recorded on paper unless the individual was an established patient within a Baylor College of Medicine affiliate.

Descriptive statistics were reported using valid percent (percentages calculated after excluding missing data), and frequencies reported for data where $n \geq 5$. If more than 10% of data missing this was noted in the text. All study procedures were reviewed by the institutional review board (IRB) at the Baylor College of Medicine and were determined to be exempt from IRB approval. The first author has received research support from NIH and All Children's Hospital Research Foundation, and royalties from Wiley, Elsevier, American Psychological Association, Springer, and Lawrence Erlbaum. The last author has received research funding from NIH, the Simons Foundation, and Biohaven Pharmaceuticals. All other authors report no known conflicts of interests and no financial relationships with commercial interests.

Results

229 individuals were assessed at GRBCC between 8/27/2017 and 9/08/2017. Multiple visits were recorded for 34 individuals (2–7 visits) either for monitoring or due to initial

medication unavailability. The vast majority who evacuated were from nearby areas (primarily impoverished localities), homeless, and/or were relocated from heavily impacted areas. Although precise data are unavailable, ~90% had pre-existing behavioral health concerns.

Only 5 participants (2.2%) were aged less than 18 years; thus, we just report on those > 18 years. The mean age of the 224 adults was 42 years (SD = 12, range 18–80). There were 112 males (51%) and 109 females (49%; gender for 3 adults was not available). Data on race was missing for 129 (58%) participants; of the remainder, 51 (54%) were African American, 32 (34%) were Caucasian, and 12 (13%) were Hispanic.

Table 1 presents data on previous patient-reported psychiatric diagnoses (up to 4 recorded), and psychiatrist-determined current diagnoses (up to 2 recorded). Due to practical limitations, psychiatrists were unable to determine a specific diagnosis for a minority of participants (18%), and of the diagnoses made, 50 (19%) were recorded as 'unspecified'.

Information on up to 4 medications was recorded. No medication was prescribed to 54 (24%) patients. This was due to the patient being transferred to the emergency department or inpatient facility (n = 14, 6%), not seeing the provider (n = 13, 6%), declining medication (n = 6, 3%), receiving a referral to another service (n = 6, 3%), or not requiring medication (n = 4, 2%). No information about prescription decisions was available for 11 (5%) patients.

For those who were prescribed medication, the number of different medications were 1 (n = 90, 40%), 2 (n = 54, 24%), 3 (n = 23, 10%), or 4 (n = 3, 1%). Participants were most commonly prescribed quetiapine (n = 53, 24%), trazodone (n = 29, 13%), sertraline (n = 28, 13%), diphenhydramine (n = 25, 11%), hydroxyzine (n = 21, 9%), fluoxetine (n = 18, 8%), gabapentin (n = 16, 7%), risperidone (n = 13, 6%), valproic acid (n = 9, 4%), aripiprazole (n = 8, 4%), olanzapine (n = 8, 4%), or citalopram (n = 7, 3%).

Table 1 Information on psychiatric disorders of adult participants (n = 224)

Diagnosis	Psychiatric history		Diagnosed by psychiatrist	
	n	%	n	%
Any diagnosis	209	93	182	81
No diagnosis	10	4	1	0
Diagnosis unknown/undetermined	5	2	41	18
Bipolar disorder	87	39	38	17
Depressive disorders	67	30	55	25
Schizophrenia and schizoaffective disorders	66	29	44	20
Anxiety disorders	56	25	26	12
Substance use disorders	36	16	12	5
Post-traumatic stress disorder[a]	30	13	12	5
Personality disorder	2	1	5	2
Adjustment disorder	0	0	5	2

Note Data not reported for disorders where history and psychiatrist diagnoses both n < 5

[a]Pre-existing PTSD diagnoses

Discussion

Psychiatric services are an important part of disaster preparedness/response, especially in light of the broad impact of a hurricane (or other large-scale disaster) on a locality and its infrastructure. These findings further substantiate the importance of providing emergency psychiatric services to those requiring shelter post-disaster to promote symptom stability, prevent medication withdrawal effects, and/or relieve distress post-disaster. Similar to North (2010), bipolar and depressive disorders (42%) and schizophrenia spectrum disorder (~20%) were the most common diagnoses. Most individuals had pre-existing conditions versus new trauma/stress diagnoses although many individuals experienced symptom exacerbation due to the disaster and it is unclear what proportion may have developed posttraumatic stress symptoms over time. Given the significant role of pharmacotherapy in the management of these conditions (Barnes 2011; Goldberg et al. 2015) as well as the possibility that people may evacuate without an adequate supply of medication (Ghosh et al. 2007; Wang et al. 2008), evacuation centers should be prepared with a selection of often-prescribed medications for an array of disorders, from the outset. Indeed, the principle of having a fully stocked pharmacy onsite for those sheltered is a critical component of sheltered disaster mental health services. Initially on site, only two psychotropic medications were available; yet, plans were in place to have other medications to refill prescriptions and/or to assist with insomnia, which was a common complain. As a result, we have developed a ten medication emergency formulary (1 week supply) of commonly used medicines to have readily available.

Despite our best efforts to follow the principle of having the clinic separated from the main living areas, the 'clinic' location was not sufficiently discreet which may have discouraged individuals from presenting for help and/or returning after initial appointments. Indeed, we found that individuals did not readily seek out psychological first aid which may in part explain relatively low utilization rates when considering how many people were sheltered overall. Therefore, we directly engaged evacuees by walking through the dormitory with signs stating "need to talk?" Beyond providing supportive counseling in the limited instances in which people approached the team, the majority of our effort was focused on providing distress tolerance skills, identifying individuals in need of further evaluation, and helping

gain access to food, clothing vouchers, medical care, and accessing FEMA.

We also had limited resources for ensuring comprehensive disposition follow through. Given the chaotic nature of the disaster, other clinics were not staffed making it nearly impossible to locate individuals' regular providers. Despite best efforts, it was not possible to guarantee that patients were followed by appropriate providers upon leaving GRBCC. This contributed to few lithium prescriptions as we were concerned about ongoing monitoring of lab values. While DMAT greatly facilitated care while individuals were sheltered (e.g., covering nights, multidisciplinary collaboration, etc.), there were also challenges in reconciling differences in documentation between teams, patient registration, and care access.

In sum, this report highlights the post-disaster need for psychotropic medications to continue ongoing care, and/or treatment for insomnia. Post-disaster, providers should be prepared with a fully stocked pharmacy, accessible but confidential "clinic" locations, and a pre-established method of record keeping. Further, actively engaging evacuees in dormitories and common areas (versus only seeing if they present in clinic) is likely to facilitate identifying individuals in need.

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