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Frequencies and Predictors of Barriers to Mental Health Service Use: A Longitudinal Study of Hurricane Ike Survivors

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Abstract

Background—The majority of disaster survivors suffering from psychological symptoms do not receive mental health services. Research on barriers to service use among disaster survivors is limited by a lack of longitudinal studies of representative samples and investigations of predictors of barriers. The purpose of this study was to address these limitations through analysis of a three-wave population-based study of Hurricane Ike survivors ($N = 658$).

Methods—Frequencies of preference, outcome expectancy, resource, and stigma barriers among participants with unmet mental health needs were documented and logistic regression using a generalized estimating equations approach explored predisposing (e.g., age), illness-related (e.g., posttraumatic stress) and enabling (e.g., insurance coverage) factors as predictors of each type of barrier.

Results—Preference barriers were most frequently cited at each wave, whereas stigma barriers were least frequently cited. Older age and higher emotional support predicted preference barriers; being a parent of a child under 18-years old at the time of the hurricane, higher generalized anxiety, and lack of insurance predicted resource barriers; and higher posttraumatic stress predicted stigma barriers.

Conclusions—These findings suggest that postdisaster practices targeting subpopulations most likely to have barriers to service use may be indicated.

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Conflict of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Keywords

natural disasters; mental health services; barriers to service use; stigma; posttraumatic stress

Natural disasters affect about 13–15% of the general population at some point in their lives [1,2] and are associated with increased rates of mental health disorders [3,4]. Despite efforts by government and disaster relief organizations to mitigate postdisaster mental health problems [5], the majority of survivors suffering from psychological symptoms do not receive mental health services [6,7]. It is therefore important to understand barriers to service use among disaster survivors with unmet needs and the factors associated with them.

Research in non-disaster settings [8–12] has identified four categories of barriers that may explain unmet service needs: 1) *preferences*, including positive attitudes towards other forms of care or negative attitudes towards mental health care; 2) *outcome expectancies*, including expectations that symptoms might resolve without treatment or that treatment would not help; 3) perceived or actual lack of *resources*, including money, time, transportation, or knowledge of services; and 4) *stigma*, including embarrassment, shame, and concern about what others' might think about one's service use. Studies that have assessed these four categories suggest that preference barriers are most commonly reported, followed by outcome expectancies, resources, and stigma [10].

Although prior research has provided insight into barriers that may underlie postdisaster lack of services use, at least four gaps in the literature remain. First, to our knowledge, only two published studies, both using data from a representative sample of Hurricane Katrina survivors, have explored barriers in a disaster context [7,13]. Among participants who did not seek services since the hurricane, a resource barrier (financial concerns) was most commonly cited, whereas an outcome expectancy barrier (perceived ineffectiveness of treatment) was least commonly cited.

Second, few studies have explored predictors of barriers using an empirically supported theoretical framework. One potentially applicable framework is Andersen's [14] behavioral model, which posits that treatment-seeking is influenced by predisposing (e.g., age, stress exposure), illness-related (e.g., symptom severity), and enabling factors (e.g., social support, insurance coverage). This model has received empirical support in studies predicting service use among trauma survivors [15], yet to our knowledge has not been applied to studies examining barriers. Studies in non-disaster contexts have provided some support for each set of factors [16–18], and among the aforementioned Hurricane Katrina sample, the frequency of barriers varied by severity of psychological distress (an illness-related factor) and geographic region (a predisposing factor) [7,13]. However, extant studies have not explored these factors simultaneously in multivariate models [16–18].

Third, although a handful of studies have assessed barriers to service use among representative samples [7,9,10], the majority of research on this topic has been among limited samples, including veterans [17] and patients in clinical trials [12]. Lastly, the majority of studies on this topic are cross-sectional. It is therefore unclear whether frequencies of barriers shift over time. This issue is of particular relevance in the

postdisaster context, wherein distinct longitudinal patterns of psychological symptoms have been demonstrated [19].

Current Study

The aims of the current study were to (a) document the prevalence of four categories of barriers to mental health service use (preferences, outcome expectancies, resources, and stigma), and (b) explore predisposing, illness-related and enabling factors as predictors of barriers among a representative sample of Hurricane Ike survivors. Participants completed three postdisaster assessments, allowing for examination of changes in the frequencies of different barriers over time and the role of fixed and time-varying factors that may account for such changes. Given the lack of research on this topic, our analyses are best conceptualized as exploratory. However, we expected that the pattern of frequencies in barriers would correspond to the prior study of Hurricane Katrina survivors [7,13], and significant associations between predisposing, illness-related and enabling factors and barriers.

METHODS

Sample

Data were from the Galveston Bay Recovery Study, a population-based study in the aftermath of Hurricane Ike (*masked for blind review*). Adults (aged 18 or older) who lived in Galveston and Chambers counties in southeastern Texas at least one month prior to the hurricane were recruited. Counties were divided into five strata based on hurricane damage and likelihood of greatest distress among residents: (1) Galveston Island and Bolivar Peninsula, which suffered significant damage from the storm surge; (2) flooded areas of the mainland; (3) non-flooded areas of the mainland with high poverty rates, defined as 15% or more households living at or below the poverty level, according to data from the 2000 U.S. Census; (4) non-flooded, non-poverty areas of the mainland east of Route 146, which were affected by the storm surge and severe winds; and (5) non-flooded, non-poverty areas of the mainland west of Route 146 and the rest of Chambers County. From the five strata, we selected 80 areas made up of multiple census blocks and then 2,263 households in these areas. Participants were randomly selected from eligible households members.

Baseline interviews were conducted from November 2008 to March 2009 (Wave 1 [W1]: 2–6 months postdisaster); 658 participants were surveyed. Participants were reinterviewed twice: 529 (80%) of the W1 participants completed interviews between February and June 2009 (Wave 2 [W2]: 5–9 months postdisaster); and 487 (74%; 85% of those who participated in both W1 and W2) completed the interviews between November 2009 and April 2010 (Wave 3 [W3]: 14–19 months postdisaster). A total of 448 participants (68.1% of the W1 sample) completed all three waves. After the study was described to participants at each wave, oral informed consent was obtained. Institutional Review Boards of [*masked for blind review*] approved the study.

As reported elsewhere [*masked for blind review*], there were no significant demographic differences between the sample and the 2000 US Census population in the sampling frame

of Galveston and Chambers counties. There were also no significant differences on any of the variables included in the current study between participants who completed all three waves and those who did not. Among participants who completed all three waves, the rate of missing data for variables included in the study ranged from 0 to 11.2% ($M = 0.93\%$, $SD = 1.79\%$). Missing data within each wave were imputed using the Sequential Regression Imputation Method in IVEWare [20]. Five complete datasets were imputed based on variables collected prior to or at the same time as the variable with missing data.

Measures

Barriers to Service Use—A modified version of the Perceived Need for Care Questionnaire [21], which has evidence of reliability and validity [21], determined which participants had unmet service needs. Participants indicated whether they perceived five mental health needs (e.g., “need to talk through problems”). Those who reported needs were asked if they used any service in their community to address them. Participants with unmet needs completed the Care Beliefs Survey (CBS), which was derived for the study based on previous findings [22–25]. Participants indicated whether 16 statements reflected the reasoning behind their decision not to seek services on a four-point scale from *Not at all true* (1) to *Very true* (4). The CBS includes four four-item subscales: Preferences (e.g., “you wanted to solve the problem on your own”), Outcome Expectancies (e.g., “you didn’t think it would help very much”), Resources (“you didn’t think you could afford it”) and Stigma (“you worried that it would hurt your business prospects if anyone found out”). Each item was considered endorsed if given a *Very True* rating, and four dichotomous indicators were created denoting whether any item within each subscale was endorsed.

Predisposing factors

Demographics: At W1, participants indicated their age, gender, race and ethnicity, marital status, whether they were a parent of a child under 18-years old at the time of Hurricane Ike, and whether they were employed for pay in the week before the hurricane.

Predisaster mental illness: Participants’ predisaster mental health status was assessed at W1. To determine probable predisaster posttraumatic stress disorder (PTSD) as defined in the DSM-IV-TR, participants completed an inventory of traumatic events experienced before Hurricane Ike [26]. Those who reported prior trauma indicated which event was the “worst” and completed the PCL-C (described below) in reference to that event. Participants were classified as having probable predisaster PTSD if they rated *moderately* or above one or more re-experiencing symptoms, three or more avoidance symptoms, and two or more arousal symptoms, as well as if they reported feeling terrified or helpless at the time of the event, had symptoms that lasted more than 30 days, and had significant distress or impairment.

To determine probable predisaster major depressive disorder (MDD), participants completed the PHQ-9 (described below) in reference to any two-week period in their lifetime, and items assessing whether symptoms seemed to occur together and age of onset. Participants with scale scores of 10 or greater, and who indicated that symptoms occurred together with onset was prior to Hurricane Ike, were classified as having probable predisaster MDD.

[27,28]. The same procedure was applied to determine probable predisaster generalized anxiety disorder (GAD) using the GAD-7 (described below) [29].

Disaster exposure: Two indicators of disaster exposure were included at W1 [30]. First, participants indicated whether they had experienced seven stressors due to the hurricane (e.g., displacement for over a week, personal property loss). A sum of affirmative responses was included as an index of *Disaster-Related Stressors*. Second, participants indicated whether they endured three traumatic events during the hurricane and its aftermath: 1) physical injury; 2) death of a family member or close friend; and 3) saw dead bodies. An additional item was derived through the trauma inventory described below. Participants indicated whether any of the traumatic events were hurricane-related and, if so, “other trauma” was coded as 1. The sum of the four items was included as an index of *Disaster-Related Trauma*.

General trauma: At each wave, participants completed a traumatic events inventory [26] wherein they indicated whether they had experienced ten events (e.g., “unwanted sexual contact,” “sudden unexpected death of someone close”) and a sum of affirmative responses was computed. At W1, participants indicated whether events occurred before or after the hurricane, and whether the events were hurricane-related. Only post-hurricane events unrelated to the hurricane were included. At W2 and W3, participants indicated whether each event occurred since the previous interview.

General stressors: Participants completed a stressors inventory at each wave (modified from [31]). Participants indicated whether they had experienced 12 stressors (e.g., “serious financial problems,” “divorce or breakup”) and a sum of affirmative responses was computed. At W1, participants indicated whether stressors occurred before or after the hurricane, and whether they were hurricane-related. Only post-hurricane stressors unrelated to the hurricane were included. At W2 and W3, participants indicated whether each event occurred since the previous interview.

Illness-related factors

Posttraumatic stress: A modified version of the PTSD Checklist-Civilian Version (PCL-C) [32,33] assessed hurricane-related posttraumatic stress. At W1, questions were asked in reference to the period since the hurricane, and at W2 and W3, the period since the previous interview. The scale includes 17 items (e.g., “repeated, disturbing thoughts or memories of Hurricane Ike”) assessing DSM-IV-R symptoms of PTSD. Participants rated the extent to which they were bothered by each symptom from 1 (*not at all*) to 5 (*extremely*). PCL-C scores were created by summing responses to all items. The PCL-C has been shown to have excellent internal consistency and substantial agreement with PTSD diagnosis and symptom ratings [32]. Cronbach’s α : .92–.96.

Depression: The nine-item Patient Health Questionnaire-9 (PHQ-9) [27] assessed past-month depressive symptoms at each wave. Participants were asked whether there was ever a two-week period during which they were bothered by each symptom (e.g., “feeling down, depressed, or hopeless”) and, if so, how often they were bothered, from 0 (*not at all*) to 3

(*nearly every day*), and whether this occurred in the prior month. PHQ-9 scores were computed as the sum of ratings for symptoms reported to have occurred in the past month. Previous studies have found the PHQ-9 to have excellent internal consistency, test-retest reliability, and construct validity [28]. Cronbach's α : .79–.89.

Generalized anxiety: The seven-item Generalized Anxiety Disorder (GAD-7) [29] assessed past-month generalized anxiety symptoms. Participants were asked if there was ever a two-week period during which they were bothered by each symptom (e.g., “feeling nervous, anxious, or on edge”) and, if so, how often they were bothered from 0 (*not at all*) to 3 (*nearly every day*), and whether this occurred in the past month. GAD-7 scores were computed as the sum of ratings for symptoms reported to have occurred in the past month. The GAD-7 has been previously shown to have excellent internal consistency and test-retest reliability [29]. Cronbach's α : .84–.88.

Quality of life: Past-month quality of life was assessed using the short form of the Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q) [34]. Participants rated the extent to which they were satisfied with 14 aspects of their life (e.g., “physical health,” “social relationships”) during the past month from 1 (*not at all*) to 5 (*extremely*). Responses were summed to create scale scores. The Q-LES-Q has been previously shown to have high internal consistency and test-retest reliability [35]. Cronbach's α : .91–.92.

Enabling factors

Health insurance: At each wave, participants indicated whether they had health insurance coverage.

Past-week employment: Participants indicated whether they were employed for pay in the past week at each wave.

Social support: The Inventory of Postdisaster Social Support (modified from [36]) assessed emotional (3 items, e.g., “comfort you with a hug or another sign of affection”), informational (3 items, e.g., “give you information on how to do something”), and tangible (5 items, e.g., “give, loan, or offer you money”) support at each wave. Participants indicated how often they received each form of support from friends and family members from 1 (*never*) to 4 (*many times*). Responses were summed to create scale scores. At W1, participants were asked to respond based on the time period since the hurricane, and at W2 and W3, since the previous interview. The scales have been previously shown to have good internal consistency [36]. Cronbach's α s: .69–.80.

Analysis

Frequencies of each barrier to mental health service use were computed for each wave. Subsequently, logistic regression was conducted using a generalized estimating equations (GEE) approach to predict the four categories of barriers. The advantage of a GEE approach is that it accounts for the autoregressive correlation structure of repeated measures longitudinal data, accommodates missing values, and provides adjustment of standard errors [37]. Both fixed (between-subject) and time-varying (within-subject) variables can be

entered into the analysis. The results provide insight into between-subject effects, rather than change within individuals, and coefficients are therefore analogous to those from standard regression analysis. In the current study, a GEE approach allowed us to include participants who reported unmet service needs at some, but not all, waves and autocorrelated data for participants who reported unmet needs at multiple waves. The results of GEE logistic regression analyses represent an average of the analyses of the five imputed datasets, with Rubin's [38] correction of standard error.

RESULTS

Preliminary Analysis

Among participants providing data at each wave, 20.1% ($n = 132$) at W1, 14.0% ($n = 74$) at W2, and 19.5% ($n = 95$) at W3 reported unmet needs. Means, standard deviations, and frequencies for predisposing, illness-related, and enabling factors for the full sample and subsamples with unmet needs at each wave are provided as supplementary material. Bonferroni-corrected independent-samples t -tests and chi-square tests found that participants with unmet needs reported significantly higher posttraumatic stress, depression, and generalized anxiety, and significantly lower quality of life at each wave; reported significantly more Ike-related stressors and informational support at W1; reported significantly more general stressors at W2 and W3; and were significantly more likely to have had probable predisaster GAD at W2.

Frequencies of Barriers to Mental Health Service Use

Table 1 includes the frequency of each barrier, as well as any barrier within each subscale, at each wave. The majority of participants reported at least one barrier: 93.9% at W1, 91.9% at W2, and 89.5% at W3. The most common barrier category at each wave was preferences, followed by outcome expectancies, resources, and stigma. Among the preference items, the most commonly endorsed was a preference for self-reliance at W1 and W2, and for prayer or spiritual guidance at W3. Lack of trust in the provider was the least frequently cited preference barrier.

Outcome expectancy barriers were cited by nearly half the participants at W1, and over a third at W2 and W3. At each wave, the expectancy that services would not help much was the most commonly endorsed outcome expectancy barrier. Over a quarter of participants reported resource barriers at each wave, and the perception that one could not afford services was more commonly endorsed than lack of knowledge over where to go for services, lack of transportation for services, and lack of time and energy for services. Stigma barriers were least commonly cited, endorsed by less than twenty percent of participants at each wave. Concerns that the provider or service site would look down on the participant or that service use would hurt one's career or business were consistently among the least cited items.

Generalized Estimating Equations

The results of the models predicting each barrier among participants who ever reported unmet needs ($n = 210$, 31.9%) are presented in Table 2. Independent variables are sorted

into predisposing, illness, and enabling factors and, within these categories, between-participant (i.e., fixed) and within-participant (i.e., time-varying) factors.

Preferences—For the predisposing factors, older age was significantly associated with having a preference barrier. Each year older was associated with a 1.04 greater odds of reporting a preference barrier (95% confidence interval [CI]: 1.01–1.06). Having probable predisaster PTSD or lack of probable predisaster GAD, and having endured fewer disaster-related stressors were marginally significant. None of the illness factors reached statistical or marginal significance. Of the enabling factors, lack of past-week employment was marginally associated and higher emotional support was significantly associated with having a preference barrier. Each unit increase on the emotional support scale was associated with a 1.22 greater odds of reporting a preference barrier (95% CI: 1.02–1.47).

Outcome expectancies—There were no significant predictors of having an outcome expectancy barrier. However, three predisposing factors reached marginal significance: “single, never married” status, “separated, widowed or divorced” status, and lack of probable predisaster GAD. For the illness factors, higher posttraumatic stress was marginally significant. None of the enabling factors reached statistical or marginal significance.

Resources—For the predisposing factors, being a parent of a child under 18-years old at the time of the hurricane was significantly associated with having a resource barrier. The likelihood of reporting a resource barrier for parents was 3.62 times that of non-parents (95% CI: 1.40–9.35). Hispanic ethnicity, lack of predisaster employment, and exposure to more general traumatic events were marginally significant. Of the illness factors, higher generalized anxiety symptoms were significantly associated with having a resource barrier. Each unit increase on the GAD-7 was associated with 1.09 greater odds of reporting a resource barrier (95% CI: 1.00–1.18). For the enabling factors, lack of insurance was significantly associated with having a resource barrier. Participants with insurance were 0.35 times as likely to report a resource barrier relative to those without (95% CI: 0.16–0.76). Lower emotional support was a marginally significant predictor.

Stigma barriers—None of the predisposing factors was a significant predictor of having a stigma barrier; however, “single, never married” status was a marginally significant. For the illness factors, higher posttraumatic stress was significantly associated with having a stigma barrier. Each unit increase on the PCL-C was associated with a 1.04 greater odds of reporting a stigma barrier (95% CI: 1.01–1.08). None of the enabling factors reach significance or marginal significance.

DISCUSSION

Using data from a longitudinal population-based study after a large-scale disaster, we documented barriers to mental health service use and the predictors of barriers. The majority of participants with unmet needs endorsed at least one barrier to service use. There was variation in the frequency of different types of barriers, however; preference barriers were the most frequently cited, whereas stigma barriers were the least frequently cited. Older age

and higher emotional support predicted preference barriers; being a parent of a child under the age of 18-years old at the time of the hurricane, higher generalized anxiety, and lack of insurance predicted resource barriers; and higher posttraumatic stress predicted stigma barriers.

Only two other published studies to date, both drawing on data from a cross-sectional population-based study of Hurricane Katrina survivors, have assessed barriers in a postdisaster context [7,13]. In this sample, an item indicative of stigma was the least commonly cited, relative to items indicative of preferences, outcome expectancies, and resources. Consistent with this result, we found that stigma – indicated by four items – was the least common barrier category at three postdisaster waves. More generally, the relative frequencies of barriers were consistent over time, with preferences being the most common, followed by outcome expectancies, resources, and stigma. Therefore, although the frequency and severity of postdisaster mental health problems tend to decrease over time [19], the barriers to service use among those with unmet needs remain relatively stable.

Although no prior study has systematically applied Anderson's [14] behavioral model of treatment-seeking to barriers, points of overlap between the predictors included in the current study and in previous studies are worth noting. For example, among the predisposing factors, we found older age to be a significant predictor of preference barriers. This is in contrast to a previous study of community-dwelling younger (18–35 years) and older (61–90 years) adults, which found that younger adults had less knowledge and more fear of psychotherapy [39]. This divergence could be due to differences in the outcomes assessed, such that lack of knowledge and fear of psychotherapy are not entirely indicative of preferences for other forms of coping. Additionally, our finding that parents were more likely to have resource barriers to treatment might align with previously documented links between parenting and child-related concerns –which could reflect time, energy, or financial barriers – and increased risk for postdisaster psychological adversity [40,41].

Our findings regarding illness-related factors as predictors of barriers, on the other hand, were generally consistent with prior research. As in the current study, higher posttraumatic stress was a significant predictor of stigma among a sample of veterans [17] and, likewise, stigma was more frequently cited by Katrina survivors classified as having serious mental illness, as compared to those with mild-moderate or no mental illness [7]. Additionally, consistent with our finding that participants with higher generalized anxiety were more likely to report resource barriers, Katrina survivors with serious mental illness were more likely to report three resource barriers – financial concerns, lack of availability, and lack of transportation [7].

In contrast to a previous finding linking higher unit support to lower stigma and perceived obstacles to care among veterans [18], we found that emotional, instrumental, and tangible support were not significantly associated with outcome expectancy, resource, or stigma barriers, and higher emotional support was a significant predictor of preference barriers. One possible explanation for this divergence, which could be explored in further research, is that support plays a stronger role in reducing barriers among veterans than other populations. In a general population-based sample, higher emotional support could be more representative

of alternative, and preferred, means of coping with psychological needs [42]. Lastly, our finding that survivors with insurance were less likely to report resource barriers makes sense intuitively and is consistent with previous findings linking coverage and service use among persons suffering from mental illness [43].

The findings suggest that postdisaster practices that target subpopulations most likely to have barriers may be indicated. For example, physical health providers could screen older persons for mental health problems, validating preferred ways of coping and suggesting the potential additional benefits of services. Information about services that do not require insurance could reduce perceived resource barriers among the uninsured. Services that provide childcare could alleviate resource barriers among parents by addressing financial and time constraints associated with alternative childcare arrangements. Providers could also assess resource barriers among highly anxious persons and help identify services that address them. Providers could be especially attentive to stigma among persons with posttraumatic stress, and help them cope with such concerns, for example through emotion regulation and cognitive restructuring strategies [44].

Future studies could seek to understand the factors that sustain or reduce barriers over time. One possibility would be to collect more in-depth information on persons with unmet needs, including multiple assessments of barriers, service use, and other means of coping. Longitudinal studies could explore the role of barriers and other factors in shaping symptom trajectories among those with unmet needs.

Four limitations of this study are worth noting. First, barriers were only assessed among those who reported unmet needs. The results therefore do not provide insight into barriers among the larger population or among those with needs as defined by symptom severity. Second, data were self-report and other means of assessment could possibly yield a different pattern of findings. Third, retrospective assessments of pre-disaster mental health were likely affected by postdisaster functioning, potentially influencing associations with barriers. Lastly, replication is needed in the aftermath of other disasters, and in light of missing data within and across waves.

Despite these limitations, this study is among the first to explore barriers to mental health service use in a disaster context. Although preference barriers were most commonly endorsed, many participants cited outcome expectancy, resource, and stigma barriers. Associations with predisposing, illness-related, and enabling characteristics differed among the four barrier categories. Efforts to target subpopulations likely to experience each category of barrier might be indicated in to increase postdisaster service use.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Mental Health had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

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Table 1

Frequencies of Barriers to Mental Health Services

	Wave 1 n = 132		Wave 2 n = 74		Wave 3 n = 95	
	n	%	n	%	n	%
Preferences						
I wanted to solve the problem on my own.	78	59.1%	41	55.4%	53	55.8%
I prefer to rely on family or friends.	63	47.7%	37	50.0%	39	41.2%
I think it is better to pray or seek spiritual guidance.	69	52.2%	29	39.2%	55	57.9%
I did not trust the person or place providing services.	4	3.0%	3	4.1%	5	5.3%
Any preference barrier	110	83.3%	60	81.1%	77	81.1%
Outcome Expectancies						
I did not think it would help much.	41	31.2%	16	21.6%	22	23.2%
I tried something like this before and it didn't help.	20	15.2%	10	13.5%	12	12.6%
I thought the problem would go away.	26	19.7%	7	9.5%	13	13.7%
I thought it might make things worse.	15	11.4%	3	4.1%	7	7.4%
Any outcome expectancy barrier	64	48.4%	28	37.8%	37	38.9%
Resources						
I didn't know where to go for services.	25	18.9%	8	10.8%	10	10.5%
I did not have transportation to services.	10	7.6%	8	10.8%	8	8.4%
I did not have time or energy for services.	15	11.4%	5	6.8%	7	7.4%
I did not think I could afford services.	33	25.0%	10	13.5%	18	18.9%
Any resource barrier	52	39.4%	20	27.0%	24	25.3%
Stigma						
I was too embarrassed or ashamed to use services.	14	10.6%	2	2.7%	8	8.4%
I did not want family or friends to know about service use.	10	7.6%	5	6.8%	12	12.6%
I thought the person/place providing services would look down on me.	3	2.3%	4	5.4%	4	4.2%
I was worried that service use would hurt my career or business.	4	3.0%	3	4.1%	6	6.3%
Any stigma barrier	22	16.7%	8	10.8%	16	16.8%
Any Barrier	124	93.9%	68	91.9%	85	89.5%

Note. Values are based on the first imputation.

Table 2
Results of Models Predicting the Likelihood of Endorsing Any Item within Each Category of Barriers to Service Use

	Preferences			Outcome Expectancies				
	B	S.E.	Wald χ^2	OR (95% CI)	B	S.E.	Wald χ^2	OR (95% CI)
Predisposing Factors								
Between-participant								
Age	.04	.01	6.93**	1.04 (1.01, 1.06)	.01	.01	1.60	1.01 (.99, 1.03)
Male gender	.16	.38	.18	1.18 (.56, 2.48)	.39	.31	1.52	1.47 (.80, 2.72)
Non-Hispanic Black	.55	.73	.56	1.73 (.41, 7.24)	.27	.42	.04	1.31 (.58, 2.97)
Hispanic	.40	.47	.72	1.50 (.59, 3.78)	-.11	.39	.07	.90 (.42, 1.94)
Single, never married	-.08	.58	.02	.92 (.30, 2.85)	.73	.43	2.90 ^a	2.07 (.90, 4.79)
Separated, widowed, or divorced	.03	.52	< .01	1.03 (.37, 2.88)	.64	.33	3.72 ^a	1.90 (.99, 3.66)
Parent of children < 18 years	-.31	.48	.42	.73 (.14, 1.87)	.47	.39	1.41	1.60 (.73, 3.46)
Predisaster employment	.73	.48	2.29	2.07 (.81, 5.33)	-.03	.38	.01	.97 (.46, 2.03)
Predisaster probable PTSD	1.11	.64	3.02 ^a	3.03 (.87, 10.56)	.34	.46	.06	1.41 (.58, 3.45)
Predisaster probable MDD	.15	.51	.09	1.16 (.43, 3.18)	.05	.35	.02	1.05 (.53, 2.07)
Predisaster probable GAD	-1.01	.55	3.36 ^a	.37 (.13, 1.07)	-.74	.44	2.81 ^a	.48 (.20, 1.13)
Disaster-related trauma	.03	.37	.01	1.30 (.81, 2.07)	-.05	.31	.03	.95 (.52, 1.73)
Disaster-related stressors	-.24	.13	3.67 ^a	.97 (.74, 1.26)	.08	.09	.90	1.09 (.91, 1.30)
Within-participant								
General trauma	.26	.24	1.19	1.03 (.50, 2.15)	.30	.20	2.27	1.34 (.91, 1.98)
General stressors	-.03	.14	.06	.78 (.61, 1.01)	-.13	.13	.92	.88 (.68, 1.14)
Illness Factors								
Within-participant								
Posttraumatic stress	-.02	.02	1.81	.98 (.94, 1.01)	.02	.01	3.48 ^a	1.02 (1.00, 1.05)
Depression	.03	.04	.61	1.03 (.95, 1.12)	-.01	.04	.05	.99 (.92, 1.07)
Generalized anxiety	.02	.04	.25	1.02 (.94, 1.11)	> -.01	.04	< .01	1.00 (.93, 1.08)
Quality of life	.01	.02	.17	1.01 (.97, 1.05)	< .01	.02	.02	1.00 (.96, 1.04)
Enabling Factors								
Within-participant								

	Preferences				Outcome Expectancies			
	B	S.E.	Wald χ^2	OR (95% CI)	B	S.E.	Wald χ^2	OR (95% CI)
Insurance coverage	-.14	.39	.14	.87 (.41, 1.85)	-.53	.33	2.61	.59 (.31, 1.12)
Past-week employment	-.78	.45	3.05^a	.46 (.19, 1.10)	-.27	.38	.49	.77 (.36, 1.62)
Emotional support	.20	.09	4.53[*]	1.22 (1.02, 1.47)	> -.01	.07	< .01	1.00 (.87, 1.15)
Informational support	-.11	.09	1.66	.89 (.75, 1.06)	> -.01	.07	< .01	1.00 (.87, 1.15)
Tangible support	-.03	.06	.17	.98 (.87, 1.10)	< .01	.05	.01	1.00 (.91, 1.11)
Time								
<i>Within-subject</i>								
Time 1	--	--		--	--	--	--	--
Time 2	-.16	.47	.12	.85 (.34, 2.14)	-.24	.38	.40	.79 (.37, 1.66)
Time 3	-.53	.45	1.41	.59 (.24, 1.42)	-.41	.40	1.02	.67 (.30, 1.47)
Predisposing Factors								
<i>Between-participant</i>								
Age	.01	.01	.66	1.01 (.99, 1.03)	-.01	.02	.5	.99 (.96, 1.03)
Male gender	-.42	.34	1.53	.66 (.34, 1.28)	.51	.49	1.10	1.67 (.64, 4.38)
Non-Hispanic Black	.63	.45	1.95	1.88 (.78, 4.53)	.93	.60	2.42	2.53 (.79, 8.15)
Hispanic	.77	.45	2.88^a	2.15 (.89, 5.23)	.56	.58	.92	1.74 (.56, 5.45)
Single, never married		.52	1.17	1.75 (.64, 4.84)	1.26	.72	3.04^a	3.52 (.86, 14.47)
Separated, widowed, or divorced	.16	.41	.15	1.17 (.53, 2.60)	.84	.69	1.46	2.31 (.59, 8.99)
Parent of children < 18 years	.56	.48	7.09^{**}	3.62 (1.40, 9.35)	.53	.55	.93	1.70 (.58, 5.02)
Predisaster employment	-.76	.44	2.92^a	.47 (.20, 1.12)	-.54	.59	.84	.58 (.19, 1.85)
Predisaster probable PTSD	-.58	.48	1.47	.56 (.22, 1.43)	-.48	.70	.48	.62 (.16, 2.41)
Predisaster probable MDD	.09	.42	.05	1.10 (.48, 2.51)	-.86	.59	2.14	.42 (.13, 1.34)
Predisaster probable GAD	-.06	.46	.02	.94 (.38, 2.34)	.21	.56	.15	1.24 (.42, 3.69)
Disaster-related trauma	.24	.34	.48	1.27 (.65, 2.47)	.07	.42	.03	1.07 (.47, 2.44)
Disaster-related stressors	.08	.10	.62	1.08 (.89, 1.31)	-.18	.16	1.29	.83 (.61, 1.14)
<i>Within-participant</i>								

	Resources				Stigma			
	B	S.E.	Wald χ^2	OR (95% CI)	B	S.E.	Wald χ^2	OR (95% CI)
General trauma	.45	.23	3.76^a	1.57 (1.00, 2.47)	.08	.32	.05	1.08 (.57, 2.02)
General stressors	-.13	.14	.80	.88 (.67, 1.16)	.10	.18	.35	1.11 (.79, 1.57)
Illness Factors								
<i>Within-participant</i>								
Posttraumatic stress	.02	.01	1.58	1.02 (.99, 1.04)	.04	.02	6.90**	1.04 (1.01, 1.08)
Depression	-.02	.04	.32	.98 (.90, 1.06)	.01	.05	.03	1.01 (.91, 1.12)
Generalized anxiety	.09	.04	4.31[*]	1.09 (1.00, 1.18)	.08	.05	2.07	1.08 (.97, 1.20)
Quality of life	-.03	.02	1.70	.97 (.93, 1.01)	-.02	.03	.28	.98 (.93, 1.05)
Enabling Factors								
<i>Within-participant</i>								
Insurance coverage	-1.06	.40	7.01**	.35 (.16, .76)	-.68	.48	2.01	.50 (.20, 1.30)
Past-week employment	0.31	.45	.46	1.36 (.56, 3.29)	.56	.56	1.00	1.76 (.58, 5.30)
Emotional support	-.16	.09	3.17^a	.85 (.72, 1.02)	-.14	.10	1.87	.87 (.71, 1.06)
Informational support	.07	.08	.76	1.07 (.91, 1.27))	-.06	.11	.33	.94 (.76, 1.17)
Tangible support	.01	.06	.03	1.01 (.90, 1.13)	.08	.08	1.14	1.09 (.93, 1.27)
Time								
<i>Within-subject</i>								
Time 1	--	--	--	--	--	--	--	--
Time 2	-.61	.40	2.31	.54 (.24, 1.20)	-.72	.59	1.47	.49 (.15, 1.56)
Time 3	-.71	.45	2.44	.49 (.20, 1.20)	-.06	.59	.01	.94 (.29, 3.01)

Note. $n = 210$. PTSD = Posttraumatic Stress Disorder; MDD = Major Depressive Disorder; GAD = Generalized Anxiety Disorder.

^a
 $p < .10$,

^{*}
 $p < .05$,

^{**}
 $p < .01$.