Patterns and Predictors of Engagement With a Mobile Mental Health Intervention Among Hurricane-Affected Adults

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Objective: Mental disorders commonly increase after disasters, yet access to care is often limited by logistical barriers. Digital mental health applications may help address these gaps by providing private, low-cost, and readily accessible support. The authors examined patterns and predictors of engagement with Bounce Back Now (BBN), a self-help mobile application (app) designed to address posttraumatic stress, depression, and sleep disturbance among disaster-affected adults.

Methods: Participants included 1,357 adults affected by Hurricanes Harvey, Irma, Maria, Florence, or Michael. Use data were passively collected in the BBN app. Generalized linear models were used to examine demographic and clinical predictors of number of logins to the app and frequency of module access.

Results: Of the 717 participants randomly assigned to BBN, most accessed the activate (84%) and coping tools (87%) modules. Income emerged as the only consistent demographic predictor of multiple outcomes. Lower income was significantly associated with more frequent access to the coping tools (b=−0.20, p=0.003) and activate (b=−0.03, p=0.035) modules, as well as greater odds of accessing these modules.

Conclusions: These findings challenge assumptions about a persistent digital divide in engagement with mental health mobile apps and suggest that digital interventions designed to minimize access barriers may successfully reach economically marginalized populations after disasters. These results have important implications for the design and dissemination of scalable digital interventions to improve access to care in postdisaster contexts.

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Disasters are a major public health concern, affecting one in six adults over their lifetime and disrupting the well-being of thousands to millions of people at once (1–5). Disaster exposure is associated with increased risk for depression (4, 6), posttraumatic stress disorder (PTSD) (7), and sleep disturbance (8, 9). Accessing mental health care after disasters can be challenging because of displacement, financial burden, limited service availability, and preferences for self-reliance (10–16). Underserved populations, including individuals of minoritized races and ethnicities and lower socioeconomic status, often experience additional disaster-related stressors and are at increased risk for disaster exposure and adverse mental health outcomes, yet they are less likely to receive care (4, 17–19).

Digital mental health interventions (DMHIs) have demonstrated efficacy across trauma-related symptoms, anxiety, depression, and substance use (20–24). These interventions may reduce barriers to care by providing low-cost, private, and readily accessible support. Smartphone ownership is widespread, with approximately 90% of U.S. adults owning a smartphone and similar rates across Latine (91%), non-Latine Black (84%), and non-Latine White (91%) adults (25). Latine

HIGHLIGHTS

- Engagement with a digital mental health intervention was high among adults affected by major U.S. hurricanes.
- Low-income participants engaged with core intervention components to a greater extent than did high-income participants, challenging traditional expectations regarding digital access.
- The findings suggest that scalable digital interventions may help extend mental health support to economically marginalized populations after disasters.

and non-Latine Black adults may be more likely than non-Latine White adults to seek health information online and use health applications (26, 27). However, little is known about factors associated with engagement in DMHIs after disasters. Previous research findings suggest that younger adults, women, individuals with higher levels of education, individuals with higher incomes, and those experiencing greater psychological distress may be more likely to engage with DMHIs (26, 28, 29). Notably, findings related to psychological distress are mixed, with some previous research suggesting that individuals experiencing greater distress may be less likely to engage with these tools (29). Within postdisaster settings, we have previously found comparable use rates among Latine, non-Latine White, and non-Latine Black individuals and increased use among younger adults (30, 31).

Currently, Bounce Back Now (BBN) is a free self-help mobile app designed to support emotional recovery after disasters (24). Informed by earlier web-based intervention research (23), BBN includes symptom monitoring; coping tools; self-help interventions targeting PTSD, mood, and sleep symptoms; and referral resources for mental health services. Previous studies have demonstrated feasibility of BBN and its web-based predecessor for trauma-exposed adults (24, 32) and the web-based version's efficacy in reducing PTSD and depression symptoms among disaster-affected adolescents (33). In a randomized controlled trial involving 1,357 adults affected by Hurricanes Harvey, Irma, Maria, Florence, or Michael, use of BBN moderately reduced symptoms, with greater improvements in depressive and sleep symptoms than enhanced usual care (EUC), although findings for PTSD were mixed (24). Symptom improvement did not differ between Latine and non-Latine White participants (34).

Understanding who engages with DMHIs is critical for maximizing their reach and impact after disasters (29). The purpose of this study was to examine predictors of engagement with the BBN app among hurricane-affected adults. Predictors included age, gender, income, education, race-ethnicity, baseline mental health symptoms, app prompts, and hurricane exposure. On the basis of previous research, we hypothesized that younger age, higher income, greater educational attainment, female gender, and receipt of app prompts would be associated with greater engagement. We further hypothesized that more severe mental health symptoms would be associated with lower engagement and that use would be comparable across racial-ethnic groups. Hurricane exposure was examined as an exploratory predictor.

METHODS

Study Design and Recruitment

This study was a secondary analysis of data from a randomized controlled trial evaluating the efficacy of BBN compared with an EUC app among adults affected by major hurricanes in the United States. The study was approved by the institutional review board of the Medical University of South Carolina before study initiation. Participant enrollment and data collection were conducted between December 19, 2017, and May 6, 2021. In the present study, we focused on patterns and predictors of engagement among participants randomly assigned to the BBN condition (N=717).

Participants (N=1,357) affected by Hurricanes Harvey (Texas), Irma (Florida), Maria (Puerto Rico), Florence (North Carolina), or Michael (Florida and Georgia) were recruited primarily through geographically targeted Facebook advertisements directed toward residents of hurricane-affected areas. Individuals who clicked an advertisement were directed to a study website, where they received information about the study and a unique access code that randomly assigned them to either the BBN or EUC app. Regional American Red Cross leaders serving affected areas were informed about the study and were encouraged to share study information. Recruitment for Hurricanes Harvey, Irma, and Maria began 3–4 months after landfall because of final app development activities, and recruitment for Hurricanes Florence and Michael began 4–6 weeks after landfall. Because BBN was available only in English during the study period, individuals who did not speak English were not eligible to participate. All consent, assessment, and intervention procedures were completed through the app. After completion of informed consent and the baseline assessment, participants were granted access to either the full BBN app or the EUC app according to their randomized assignment. Follow-up assessments were completed via the app at 3, 6, and 12 months postbaseline, and participants received automated e-mail and push notification reminders when assessments were due.

This study consisted of 717 individuals who were randomly assigned to BBN. These participants received access to a self-help intervention that included a weekly symptom monitoring tool; coping tools; self-help interventions targeting PTSD (write module), mood (activate module), and sleep (sleep module) symptoms; and referral resources for professional services. On first opening the app, participants received symptom-based recommendations regarding which intervention components might be most helpful, followed by a brief tutorial highlighting key app features. Participants could access any intervention component at any time. Additional details regarding intervention content, study methodology, and clinical outcomes are reported elsewhere (24).

Participants in the EUC group received access only to the Get Help and My Profile functions. The EUC app provided information about and links to the Disaster Distress Helpline and other mental health resources but did not include any educational content, personalized feedback, symptom monitoring, or active intervention components. Participants assigned to EUC were excluded from the present analyses.

Measures

Metrics of access and completion. BBN use was passively and automatically tracked, including the total number of logins, access to app components, and completion of in-app activities. Both count and dichotomous variables were derived from these data. Count variables included the total number of

logins and the number of times participants accessed the coping tools and activate modules. Sleep and write access were not analyzed as count variables because <25% of participants accessed these modules. Dichotomous variables (1=yes, 0=no) were created for any access to the activate, coping tools, sleep, and write modules. Because all participants logged in at least once, a dichotomous login variable was not created.

Depression. Depression symptoms were assessed with the eight-item NIH Patient-Reported Outcomes Measurement Information System (PROMIS) Depression Short Form 8a. Items are rated on a 5-point scale, yielding scores ranging from 8 to 40, with higher scores indicating greater symptom severity. Items reflect *DSM-5* criteria for a major depressive episode. Scores >21 correspond to a T score ≥60 and indicate clinically elevated symptoms (35).

PTSD. PTSD symptoms were assessed with the PTSD Checklist for DSM-5 (PCL-5) (36). The PCL-5 includes 20 *DSM-5* PTSD symptoms rated from 0 (not at all) to 4 (extremely). Total scores range from 0 to 80, with higher scores indicating greater symptom severity. Scores of 31–33 or higher are considered clinically elevated.

Sleep. Sleep difficulties were assessed with the eight-item NIH PROMIS Sleep Disturbance Short Form 8a. Items are rated on a 5-point scale, yielding scores ranging from 8 to 40, with higher scores indicating greater sleep difficulties. Scores >29 correspond to a T score ≥60 and indicate clinically elevated sleep disturbance (37).

Screening variables used to create in-app prompts. Participants completed a screening measure consisting of six items from the Kessler Psychological Distress Scale (38) assessing nervousness, hopelessness, restlessness-fidgetiness, depression, worthlessness, and perceived effort burden, along with four additional items assessing worry, avoidance, disaster-related distress, and sleep quality. Participants rated symptom frequency during the past month on a 5-point scale (ranging from 0, none of the time, to 4, all of the time). On the basis of these responses, participants received automated feedback and recommendations for relevant BBN modules. Recommendations were generated when any symptom was rated >1, including the sleep module for sleep difficulties and the activate module for depressive symptoms. Because of a technical error, nearly all participants received a recommendation for the write module; therefore, the associated PTSD prompt was excluded from analyses. Participants reporting minimal symptoms (all items rated 0 or 1) were directed to the coping tools section to learn coping strategies.

Data Analysis

We conducted all analyses in Mplus, version 8. Missing data were estimated with full information maximum likelihood. Among all study variables, only income was missing for >10% of observations (N=83, 12%). Because app use and the disaster affecting each participant were tracked automatically, these data had no missing observations.

We used a series of generalized linear models to examine predictors of BBN use. Continuous outcomes included total number of logins and number of times accessing the activate and coping tools modules. Any access to the activate, sleep, write, or coping tools modules was examined as dichotomous outcomes with a logistic function. Age, race-ethnicity, income, education, and gender were used as predictors in all models. We also used domain-specific symptoms and recommendations as predictors (e.g., depression symptoms and receipt of an activate recommendation predicting use of the activate module). Because of the error causing all participants to receive a prompt to use the write module, receiving a prompt was not used as a predictor for any access to the write module, but PTSD symptoms were still included as a predictor.

Categorical data were dummy coded or dichotomously coded such that women (vs. men) and non-Latine White participants (vs. Hispanic or Latine, non-Latine Black, and non-Latine other) were the reference groups in all analyses. PROMIS depression 8a scores were also included as predictors of logins. Other symptoms were not included in this model to avoid potential multicollinearity. The disasters affecting participants were initially included as predictors, but because Hurricane Maria affected Puerto Rico and virtually all participants from Puerto Rico were Hispanic or Latine, we examined models that included and excluded a variable that coded for which disaster affected each participant. Results did not significantly change for individual variables, but models appeared unstable with several variables, leading to nonpositive definite solutions when the disaster variable was included. We therefore present results with this variable removed. Similarly, models failed to converge when education level was included as a predictor of count variables, and it was therefore removed from these models. Several safeguards were implemented to prevent duplicate enrollment, including automated flagging based on IP (internet protocol) address, e-mail address, contact information, and survey completion speed, followed by manual review. This process identified and excluded 704 duplicate entries, resulting in a final analytic sample of 717 participants.

RESULTS

Participants' (N=717) reported age, gender, education level, race-ethnicity, and household income are shown in Table 1. Of the sample, 50% (N=358) exceeded clinical cutoff scores for the PCL-5, 55% (N=395) did so for the PROMIS 8a for depression, and 44% (N=315) did so for the PROMIS 8a for sleep.

Count Outcomes: Logins to BBN and Number of Times Accessing Coping Tools and Activate

Participants logged in to BBN a mean±SD of 16.8±31.5 times and accessed coping tools 50.7±96.5 times (Table 1). Only income was associated with the number of times participants

TABLE 1. Descriptive characteristics of participants engaging with the Bounce Back Now app (N=717)[a]

Variable	M	SD
Age in years	43.0	12.9
N of logins	16.8	31.5
N of times accessing activate module	0.9	0.4
N of times accessing coping tools module	50.7	96.5
PTSD symptoms (PCL-5 score)	37.0	19.1
Depression symptoms (PROMIS score)	23.3	9.0
Sleep symptoms (PROMIS score)	27.7	8.6
Variable	**N**	**%**
Women	536	75
Race-ethnicity		
Hispanic or Latine	361	50
Non-Latine White	231	32
Non-Latine Black	34	5
American Indian or Alaska Native	9	1
Native Hawaiian or Pacific Islander	3	<1
Asian	10	1
Other[b]	13	2
Did not report	56	8
Education level		
High school graduate or GED or below	142	20
Some college or technical training	259	36
College graduate	164	23
Graduate work	107	15
Did not report	45	6
Income (in US$)		
<10,000	149	21
10,000 to <20,000	169	24
20,000 to <40,000	148	21
40,000 to <60,000	87	12
60,000 to <80,000	44	6
80,000 to <100,000	16	2
≥100,000	21	3
Did not report	83	12
Disaster		
Hurricane Harvey	102	14
Hurricane Florence	31	4
Hurricane Irma	32	5
Hurricane Michael	171	24
Hurricane Maria	381	53
Any access to each module		
Activate	604	84
Write	131	18
Coping tools	627	87
Sleep	162	23

[a] PCL-5, PTSD Checklist for DSM-5 (scores range from 0 to 80, with higher scores indicating greater PTSD symptom severity); PROMIS, Patient-Reported Outcomes Measurement Information System (scores on each subscale range from 8 to 40, with higher scores indicating greater depression or sleep problems).

[b] Racial-ethnic groups aside from those listed in the table were combined into a single "other" group.

accessed the coping tools and activate modules. This association was in the opposite direction of our hypothesis, with income being significantly negatively associated with the use of coping tools (b=−0.20, SE=0.07, p=0.003) and activate (b=−0.03, SE=0.01, p=0.035) modules (Table 2). No other predictor was significantly associated with the number of logins or number of times participants accessed the coping tools or activate modules.

Dichotomous Outcomes: Predicting Any Access of BBN Modules

Most participants accessed the activate (84%) and coping tools (87%) modules, and a minority accessed the write (18%) and sleep (23%) modules (Table 1). For the activate and sleep modules, domain-specific symptoms were associated with significantly greater odds of using that component. Indeed, participants with higher PROMIS sleep scores were significantly more likely to access the sleep module (adjusted odds ratio [AOR]=1.04, b=0.04, SE=0.01, p=0.001), and those with higher depression scores were more likely to access the activate module (AOR=1.04, b=0.04, SE=0.02, p=0.020). However, PTSD symptoms were not significantly associated with use of the write module. Income was negatively associated with the odds of accessing the activate (AOR=0.75, b=−0.29, SE=0.10, p=0.004) and coping tools (AOR=0.76, b=−0.28, SE=0.11, p=0.012) modules but not the write or sleep modules (Table 3). Age was negatively associated with the odds of accessing the coping tools module (AOR=0.97, b=−0.03, SE=0.01, p=0.006). Education level was positively associated with the odds of accessing the write module (AOR=1.26, b=0.23, SE=0.10, p=0.027). No other variable was associated with the odds of accessing any individual module; that is, access did not significantly differ for those receiving prompts, across race-ethnicity, or by gender (Table 3). Rates of access to each module are reported in Table 4.

DISCUSSION

In this study, we examined predictors of use of the BBN app among hurricane-affected adults. Contrary to our hypotheses and previous research suggesting that women, younger individuals, and those with higher education levels are more likely to engage with DMHIs (26, 29), demographic predictors were largely unrelated to engagement in the app. Education level was associated only with access to the write module, gender differences were not statistically significant, and age was associated only with access to the coping tools module. One possible explanation for these results is that the postdisaster context attenuates demographic differences typically observed in digital health engagement, because widespread disruption, elevated distress, and reduced access to traditional services may increase motivation to seek support across groups (39). Unlike previous studies conducted in more structured settings (18, 40), BBN was fully self-guided, with recruitment via Facebook, minimal onboarding, and no prescribed use expectations. Because BBN was free, private, and immediately available, barriers that often contribute to disparities in digital health use may have been less influential in this study (41). These findings suggest that DMHIs deployed after disasters may reach a broader and more diverse population than previously assumed.

Notably, lower-income participants showed greater engagement compared with higher-income participants, with increased odds of accessing the activate and coping tools modules and more frequent use of these components among the low-income individuals. These findings differ

TABLE 2. Prediction of count variables by number of logins, number of times accessing the activate module, and number of times accessing the coping tools module of the Bounce Back Now app

	N of logins			N of times accessing activate			N of times accessing coping tools		
Variable	b	SE	p	b	SE	p	b	SE	p
Age	−0.002	<0.01	0.564	<0.001	0.001	0.786	0.004	0.006	0.508
Income	−0.12	0.06	0.070	−0.03*	0.01	0.035	−0.20*	0.07	0.003
Race-ethnicity (reference: White)									
Hispanic or Latine	0.18	0.14	0.203	<0.01	0.04	0.962	0.22	0.15	0.133
Non-Latine Black	−0.15	0.25	0.550	0.03	0.07	0.674	−0.23	0.30	0.438
Other race-ethnicity[a]	0.43	0.53	0.414	−0.08	0.11	0.494	−0.21	0.35	0.548
Women (reference: men)	−0.16	0.23	0.482	0.02	0.04	0.580	−0.32	0.20	0.109
Prompted for activate module[b]	na	na	na	<−0.01	0.05	0.943	na	na	na
Depression symptoms[b,c]	0.001	<0.01	0.883	<0.01	<0.01	0.103	na	na	na

[a] Because of the small sample size, all other racial-ethnic groups aside from Hispanic or Latine, non-Latine Black, and non-Latine White were combined into a single group.
[b] na, not applicable.
[c] For depression symptoms (Patient-Reported Outcomes Measurement Information System Depression Short Form 8a), possible scores range from 8 to 40, with higher scores indicating greater depressive symptoms.
*p<0.05.

from those of earlier research suggesting that lower socioeconomic status is associated with reduced health app use (26) and indicate that traditional demographic predictors may not fully explain engagement in postdisaster settings. Emerging research suggests that engagement self-efficacy, outcome expectations, mental health literacy, perceived need for support, and previous experiences with digital platforms may influence engagement (42, 43). Future studies could examine these potentially modifiable factors to improve uptake and sustained use.

Consistent with some previous research, we found that individuals experiencing more severe mental health symptoms were more likely than individuals with less severe symptoms to access intervention components relevant to their concerns (44). Symptom severity was significantly associated with access to the sleep and activate modules but not the PTSD-focused write module. This observation may reflect the relative ease with which sleep and depression problems are recognized and their impact on daily functioning (45). Although users who screened positive for sleep or depressive symptoms received automated prompts encouraging module use, these prompts were not associated with greater engagement, suggesting that automated reminders alone may be insufficient to drive sustained use of self-guided interventions.

Our analyses of racial-ethnic differences revealed no significant variation in the number of logins or module access between non-Latine White participants and those identifying as Hispanic or Latine, non-Latine Black, or other race-ethnicity. This

TABLE 3. Predictions of any access to the activate, write, sleep, or coping tools modules of the Bounce Back Now app[a]

	Any access to activate		Any access to write		Any access to sleep		Any access to coping tools	
Variable	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Age	1.00	0.98–1.03	0.99	0.97–1.02	1.01	1.00–1.03	0.97*	0.95–0.99
Education	1.05	0.80–1.39	1.26*	1.02–1.54	1.15	0.95–1.40	1.17	0.86–1.61
Income	0.75*	0.62–0.91	0.94	0.80–1.10	1.00	0.86–1.16	0.76*	0.61–0.94
Race-ethnicity (reference: White)								
Hispanic or Latine	1.26	0.65–2.43	1.49	0.92–2.40	1.27	0.81–2.01	1.81	0.88–3.73
Non-Latine Black	1.11	0.31–4.03	0.98	0.38–2.49	1.24	0.52–2.92	0.70	0.16–3.09
Other race-ethnicity[b]	0.41	0.13–1.32	0.76	0.24–2.40	0.83	0.29–2.36	1.27	0.19–8.73
Women (reference: men)	0.90	0.49–1.63	1.65	1.00–2.73	1.42	0.29–2.36	0.65	0.29–1.43
Prompted for activate module	1.00	0.55–1.82	na	na	na	na	na	na
Prompted for sleep module	na	na	na	na	1.07	0.44–2.61	na	na
Depression symptoms[c]	1.04*	1.01–1.82	na	na	na	na	na	na
PTSD symptoms[d]	na	na	1.01	1.00–1.02	na	na	na	na
Sleep symptoms[e]	na	na	na	na	1.04*	1.02–1.07	na	na

[a] Results of logistic regression. AOR, adjusted odds ratio; na, not applicable.
[b] Because of the small sample size, all other racial-ethnic groups aside from Hispanic or Latine, non-Latine Black, and non-Latine White were combined into a single group.
[c] For depression symptoms (Patient-Reported Outcomes Measurement Information System [PROMIS] Depression Short Form 8a), possible scores range from 8 to 40, with higher scores indicating greater depressive symptoms.
[d] For PTSD symptoms (PTSD Checklist for DSM-5), possible scores range from 0 to 80, with higher scores indicating greater PTSD symptom severity.
[e] For sleep symptoms (PROMIS Sleep Disturbance Short From 8a), possible scores range from 8 to 40, with higher scores indicating greater sleep difficulties.
*p<0.05.

TABLE 4. Access to the activate, write, sleep, and coping tools modules of the Bounce Back Now app, by race-ethnicity[a]

Module	N	%
Activate		
Hispanic or Latine	318	88
Non-Latine White	206	89
Non-Latine Black	31	91
Other race-ethnicity	25	71
Write		
Hispanic or Latine	63	17
Non-Latine White	51	22
Non-Latine Black	7	21
Other race-ethnicity	5	14
Coping tools		
Hispanic or Latine	328	91
Non-Latine White	214	93
Non-Latine Black	32	94
Other race-ethnicity	29	83
Sleep		
Hispanic or Latine	77	21
Non-Latine White	62	27
Non-Latine Black	9	27
Other race-ethnicity	6	17

[a] N=361 for Hispanic or Latine, N=231 for non-Latine White, N=34 for non-Latine Black, and N=35 for other race-ethnicity.

finding is encouraging given that marginalized populations face an elevated risk for disaster exposure and related mental health concerns (17) yet often encounter barriers to care (19). Findings of previous analyses have also demonstrated comparable symptom improvement among Latine and non-Latine White participants (34). However, because the study was not population based and the app was available only in English during Hurricane Maria, these findings should be interpreted with caution.

This study had several strengths. It is among the first to examine predictors of engagement with a mobile mental health intervention delivered shortly after a natural disaster, extending earlier work that often focused on interventions delivered months or years later or under more controlled conditions (3, 4). We recruited a large and diverse sample affected by multiple hurricanes. Participants logged in to the app multiple times on average, and those reporting sleep and depression symptoms were more likely to engage with relevant intervention components, providing preliminary support for the reach of self-guided digital interventions.

Several limitations warrant consideration. First, we did not assess participants' familiarity with mobile apps or overall internet use, both of which may influence engagement in the intervention. Second, the non–population-based sample limits its generalizability, and the exclusive use of English-language recruitment materials and app content restricts applicability to non–English-speaking populations. Third, because participants were recruited via Facebook advertising, we could not determine the total number of individuals exposed to advertisements or calculate a participation rate. Fourth, recruitment occurred at varying time points after each hurricane, which may have influenced symptom severity and engagement patterns. Future research should examine the impact of intervention timing relative to disaster exposure. Moreover, recruitment through Facebook may have introduced selection bias, because Facebook users may differ from the broader disaster-affected population in important sociodemographic characteristics. Finally, the demographic questionnaire may have limited accurate reporting among individuals with multiple racial-ethnic identities or those identifying as nonbinary or transgender.

CONCLUSIONS

In this study, we examined predictors of engagement with the BBN app among hurricane-affected adults. Contrary to previous research, lower-income participants had greater app engagement compared with higher-income individuals. Younger participants and those with higher levels of education had increased odds of accessing one module. Gender was not significantly associated with use. Participants with sleep and depressive symptoms were more likely to access corresponding intervention components, and automated prompts did not increase engagement. No racial or ethnic differences in app use were observed among the participants, although these findings should be interpreted with caution given the recruitment strategy and English-only availability of the app. The findings suggest that self-guided DMHIs may reach diverse disaster-affected populations. Future research should focus on improving reach, sustained engagement, and implementation while addressing barriers such as limited connectivity, literacy, and privacy concerns (46). Despite increasing availability of mobile health apps, high discontinuation rates remain a persistent challenge (47, 48). To support these efforts, our team recently launched *Pa'lante Hoy*, a Spanish-language version of BBN, and we plan to expand dissemination through disaster response organizations.

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