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ARTICLE

Engagement in linkage to mental health care program in the Rockaways after Hurricane Sandy

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Abstract

The Rockaways area of New York City was especially devastated by Hurricane Sandy. This study examined participant characteristics associated with acceptance of a linkage to and attendance at appointments for mental health difficulties (MHD). Participants (N = 1,011) completed questionnaires to assess mental health symptoms. Participants who met screening criteria (n = 442) were offered linkage to care. Individuals who had a higher mental health symptom burden (MHSB; i.e., those who screened in on more than one criteria vs. only one criterion) had 2.68 greater odds of accepting services (95% confidence interval [1.68, 4.26]). MHSB was not associated with attending a first appointment (p = 0.80). Female gender and Hispanic ethnicity were also associated with acceptance of linkage to care, though not attendance. Reducing stigma around MHD associated with natural disasters and increasing knowledge about the mental health care system could promote help-seeking behavior among survivors.

1 | BACKGROUND

1.1 | Sandy and the rockaways

Hurricane Sandy made landfall in New York on October 29, 2012 as the largest Atlantic storm in recorded history (Shukman, 2012). As a result of widespread flooding and power outages, an estimated 370,000 people were evacuated and over 300,000 homes were damaged in New York State (Blake, Kimberlain, Berg, Cangialosi, & Beven, 2013). In New York, 53 individuals died as a result of hurricane-related causes (Centers for Disease Control, 2013). The Rockaways area of New York City, a low-laying peninsula less than a mile wide off the southern shore of Queens, experienced widespread displacement and property damage in the wake of the storm (Subaiya, Moussavi, Velasquez, & Stillman, 2014).

Colloquially divided into the beachside and bayside, the Rockaways is a uniquely diverse area comprised of 10 distinct neighborhoods all encompassed within the Queens Community Board 14 (U.S. Census Bureau, 2016). An estimated 128,000 residents live across the peninsula in housing ranging from extravagant beach homes to New York City Housing Authority public housing developments (Kaplan & Kaplan, 2003). The median age in the Rockaways is 34.1 years and 52% of the population is female. The median household income is just over $44,000 with 22.8% of the population living below the poverty line (U.S. Census Bureau, 2016), 26% of the population was born outside of the United States and over 30% speak another language at home other than English.

In addition to the Rockaways' unique demographics, compared to the rest of New York City, the area is largely geographically isolated, and in the aftermath of Sandy, many residents reported feeling abandoned by recovery efforts that focused on lower Manhattan and Long Island (Maslin Nir, 2012). These sentiments are still felt today, as recovery efforts continue nearly 6 years after Sandy made landfall in the Rockaways (Durkin, 2017; Honan, 2017; Nonko, 2017). It is within this context that the present study was conducted to better understand the mental health impacts of Hurricane Sandy and its aftermath on the Rockaways community and to examine the potential for linkages to mental health care in the context of a natural disaster.

1.2 | Hurricanes and mental health

Exposure to natural disasters is associated with increased risk of developing mental health difficulties including anxiety, depression, and/or posttraumatic stress disorder (PTSD) (Fergusson, Horwood, Boden, & Mulder, 2014; Kim et al., 2016; Lieberman-Cribbin, Liu, Schneider, Schwartz, & Taioli, 2017 ; Liu, Wang, Li, Gong, & Liu, 2017; Lowe, Manove, & Rhodes, 2013; Maclean, Popovici, & French, 2016; Ruskin et al., 2018; Schwartz et al., 2016a; Schwartz et al., 2015, 2018; Schwartz, Gillezeau, Liu, Lieberman-Cribbin, & Taioli, 2017; Schwartz, Rothenberg, Kerath, Liu, & Taioli, 2016b; Thienkrua et al., 2006). Exposure to a natural disaster has also been found to be correlated with increased suicidal ideation and attempts as well as substance use (Fergusson et al., 2014; Stein et al., 2010).

The mental health impacts of natural disasters have been found to be directly related to the intensity of individual exposure and types of exposure experienced by an individual (Fergusson et al., 2014; Neria & Shultz, 2012; Norris, 1992; van Griensven et al., 2006). In New York, individuals exposed to Hurricane Sandy were found to be at greater risk of developing symptoms of PTSD and depression (Boscarino, Hoffman, Adams, Figley, & Solhkhah, 2014; Gruebner, Lowe, Sampson, & Galea, 2015; Lieberman-Cribbin et al., 2017 ; Schwartz et al., 2015), and elevated symptoms of mental health difficulties among individuals exposed to Hurricane Sandy remained years after the storm (Schwartz et al., 2015; Schwartz et al., 2016b).

Intervention in the wake of natural disasters often focuses on ensuring the physical safety and well-being among survivors (Katz, Pellegrino, Pandya, Ng, & DeLisi, 2002; North & Pfefferbaum, 2013). When mental health in a postdisaster context is addressed, interventions tend to be short term and use psychological first aid, psychological debriefing, or crisis counseling to address acute mental health concerns and such interventions often lack empirical evaluation (North & Pfeffernaum, 2013). Few existing interventions focus on long-term mental health care, and of those interventions that do (Contreras et al., 2018; Hamblen et al., 2009), engagement in those programs has not been evaluated. As such, this present study aimed to evaluate Project Restoration's Linkage to Care (L2C) program's success in linking individuals with mental health care and to better understand the participant characteristics associated with acceptance of and attendance at mental health treatment in the wake of Hurricane Sandy.

2 | METHODS

2.1 | Participants and procedure

Project Restoration (PR) participants are 1,011 adult residents of the Rockaways area of Queens County, New York. Recruitment for PR took place from June 5, 2014 to August 9, 2016. Approval for PR was given by the Institutional Review Board of Northwell Health (no. 13–499B). Using convenience sampling, study team members recruited

participants at local community events such as church events, health fairs, job fairs, and craft shows as well as community-specific locations such as pharmacies, libraries, and grocery stores. Recruitment efforts were monitored to ensure representation of the demographics of the region as reported by the census (Rasul et al., 2017).

After recruitment, participants were asked to complete a 30-minute baseline questionnaire to assess demographics, behavioral health and mental health status (including PTSD), anxiety, perceived stress, and depression. Participants were compensated for completion of the baseline survey. Participants who met screening criteria on mental health burden (alcohol abuse, recreational drug abuse, family substance abuse, anxiety symptoms, depression symptoms, or PTSD symptoms) were offered a linkage to mental health care. Study staff outlined the L2C process, which included a referral to a local mental health care provider, assistance in reducing barriers to attending mental health treatment appointments, and follow-up contact with study staff. If a participant indicated interest, the study coordinator collected his/her contact information, insurance provider information, and current mental health provider status when applicable and arranged a time and date to discuss the L2C process in detail over the telephone.

The study project coordinator communicated with eligible participants in two stages to provide linkage to mental health care. In the initial stage, participants were briefed on the services PR had to offer. The coordinator called each participant individually and gave detailed information regarding PR's linkage to mental health care component as it applied to each specific participant's situation. The coordinator obtained all necessary medical release forms and made phone contact up to five times, unless a participant requested additional follow-ups, for each participant after the initial phone conversation.

In the second stage, research staff assessed each participant's barriers to care to facilitate their attendance at treatment appointments. For example, if transportation was a barrier, then public transportation cards were provided to the participant, and participants who required childcare to attend appointments were reimbursed for childcare expenses incurred. This assistance was also provided to participants who screened into care but were already receiving treatment. Finally, participants were linked to appropriate mental health providers in the community. After completing the L2C referral process, the coordinator reached out a maximum of 10 additional attempts, unless a participant requested additional follow up, to assist the participant in attending at least one appointment for treatment or to confirm continued attendance among those participants who were already receiving treatment. Participants who attended at least one appointment were considered linked into care.

In addition to linkage to care and addressing barriers that PR provided, the study partnered with Northwell Health's Far Rockaway Treatment Center (FRTC), a substance use and mental health clinic in the Rockaways, to assist participants who had substance use difficulties or family members with such difficulties. PR increased provider capacity at FRTC by hiring an additional social worker specialized in trauma therapy, to provide individual and group therapy services to reduce trauma symptoms. The study project coordinator routinely followed up with participants linked into care to ensure that barriers to care were addressed throughout the 6-month study period.

2.2 | Measures

2.2.1 | Questionnaire

The self-report survey was completed by the participant. If a participant had literacy or visual concerns, the questionnaire was read aloud to the participant by a study staff member in a confidential setting. The survey included questions regarding demographics (age, gender, race, ethnicity, and education) and behavioral health (alcohol abuse, recreational drug abuse, current smoking, history of mental illness, mental health treatment status, anxiety symptoms, depression symptoms, PTSD symptoms, and posttraumatic growth). The survey also included hurricane specific measures (elapsed time since Hurricane Sandy and number of hurricane exposures).

2.2.2 | Independent variables

Eligibility for the L2C program was based on a screening rubric containing criteria to measure mental health burden (Table 1). A participant was eligible if he or she had elevated mental health symptoms scores, substance abuse, or a

TABLE 1 Screening criteria to determine eligibility for project restoration

Mental health outcomes	Measure used	Description	Screen-in criteria
Problem alcohol use	NIAAA USDHHS guidelines on binge drinking		Usage response of **"Monthly"** or more frequently
Recreational drug use	NIDA guidelines		Usage response of **"Monthly"** or more frequently
Family substance abuse			Answer of **"Yes"** to Are you currently being impacted by the substance use of a family member?
Perceived stress	Perceived Stress Scale	10 items (range 0–4)	Minimum of FIVE items with a **3** or **greater** response
Depression	Patient Health Questionnaire-4 (items 1–2)	2 items (range 1–4)	Average score of **2 or above**
Anxiety	Patient Health Questionnaire-4 (items 3-4)	2 items (range 1–4)	Average score of **2 or above**
Posttraumatic stress disorder	Posttraumatic Stress Disorder Checklist- Specific	17-items (range 1–5)	Minimum of EIGHT items with a 3 or greater response or Minimum or FOUR items with a 5 response

Note. NIAAA = National Institute on Alcohol Abuse and Alcoholism; NIDA = National Institute on Drug Abuse.

family member with substance use. Cut-points for eligibility for the L2C program were below diagnostic standards, to provide a potential linkage to care for as many participants as possible. Following any linkage to care, further assessment was done by clinicians to determine what, if any, treatment was needed on an individual basis.

Alcohol misuse was defined using criteria for excessive drinking. If in the past year a male drank five or more drinks in a day (four drinks for a female) on a monthly basis or drank 15 or more drinks a week ($\geq$ eight drinks for a female), then he or she was categorized as engaging in alcohol misuse (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). Illicit drug use was defined as using drugs monthly or more frequently within the last year according to the National Institute on Drug Abuse (2013).

Mental health symptom scores evaluated were PTSD, stress, anxiety, and depression symptoms. PTSD symptoms were measured using the self-reported Post-Traumatic Stress Disorder Checklist Specific, a validated 17-item checklist widely used in previous disaster studies (Weathers, Litz, Herman, Huska, & Keane, 1993). Each item in the checklist asked if participants experienced a certain PTSD symptom specifically when thinking about Hurricane Sandy ($\alpha = 0.96$).

Anxiety ($\alpha = 0.85$) and depression ($\alpha = 0.82$) symptoms were measured using the first two questions and the last two questions of the Patient Health Questionnaire, respectively (Kroenke, Spitzer, Williams, & Löwe, 2009).

Perceived stress was defined using the 10-item Perceived Stress Scale ($\alpha = 0.74$), which is validated and has been used in previous disaster studies (Cohen, Kamarck, & Mermelstein, 1983; Hyre et al., 2008). Participants may have been eligible for linkage to care on multiple criteria.

Mental health symptom burden (MHSB) was defined as a dichotomous variable by collapsing number of screening criteria (range 1–6) met by a participant into one criteria versus two or more criteria.

2.2.3 | Outcome variables

Acceptance of linkage to care

Participants who met screening criteria on a mental health difficulty (alcohol abuse, recreational drug abuse, family substance abuse, anxiety symptoms, depression symptoms, PTSD symptoms) were offered linkage to mental health care. Acceptance of linkage to care was dichotomized as yes or no.

2.2.4 | Attendance at first appointment

Participants who agreed to being linked to mental health care were followed by research staff. During follow-up phone calls, participants confirmed if they had attended at least one mental health care appointment. Attendance at first appointment was dichotomized as yes or no.

2.2.5 | Study covariates

Demographics included age, gender, race (White, Black, or other), ethnicity (Hispanic or Non-Hispanic), and level of education (completed high school or above, or some HS or below). Current smokers were assessed based on a question asking for current smoking status (Global Adult Tobacco Survey Collaborative Group, 2011). Those who indicated having been diagnosed with a mental health condition before the hurricane were categorized as having a history of mental illness. Current mental health treatment status was measured with a yes or no question. Elapsed time since Sandy was the time in months from Hurricane Sandy to the survey date.

Hurricane exposure was measured using a checklist for hurricane exposure, which included 30 check-off items (Harville et al., 2011; Norris, Perilla, Riad, Kaniasty, & Lavizzo, 1999) of possible hurricane experiences. These items included personal exposure measures such as injury or death of a friend or family member and property exposure such as a damaged or destroyed home (Schwartz et al., 2015). This measure was derived from Hurricane Katrina (Harville et al., 2011) and Hurricane Andrew (Norris et al., 1999) exposure tools and has been used in previous research (Schwartz et al., 2016a; Schwartz et al., 2015, 2018).

2.3 | Analysis

Frequency and percent of categorical study variables were compared by acceptance of linkage to care and attendance at first appointment. Differences were assessed using chi-square tests. For continuous variables, mean and standard deviation (SD) or median and interquartile range (IQR) were calculated and differences were assessed using Mann-Whitney rank-sum test.

A multivariable logistic regression model was used to assess the association between MHSB and acceptance while adjusting for demographics, history of mental illness, current mental health treatment status, and elapsed time since Hurricane Sandy. The model was then rerun with hurricane exposure to determine if it moderated the effect of MHSB on acceptance. For those who accepted services (N = 315), a multivariable logistic regression was also fitted to evaluate the association between MHSB and attendance at first appointment using the same adjustments. Total exposure was also tested as a moderator.

Model discrimination was assessed using the c-statistic, which measures how well the model differentiates the observed data at different levels of the outcome. A c-statistic of 0.7 or above is considered acceptable. Adjusted odds ratios (aOR), 95% confidence intervals (95% CI), c-statistic, and P values are reported. Significance is considered $p < 0.05$. All analyses were conducted using Stata (version 15.1) statistical software.

3 | RESULTS

3.1 | Sample statistics

Of the 488 study participants who met screening criteria for linkage to care, 54.1% were female and 39.12% identified as White, 52.72% as Black, and the majority identified as non-Hispanic (82.22%). Mean age among participants was 44.63 years (SD = 14.52). About 200 (42.15%) participants reported having previously been diagnosed with a mental health difficulty and 31.77% were currently in mental health treatment.

Almost half (48.35%) of the participants screened in on substance abuse, 16.43% screened in on substance abuse of a family member, 38.52% screened in on perceived stress, 217 (44.47%) screened in on anxiety, 197 (40.37%) screened in on depression, and 226 (46.31%) screened in on PTSD. A total of 298 (60.04%) participants screened in on two or more criteria. It is important to note that community partnerships may have contributed to the high proportion of participants who screened in on substance abuse and who were already in mental health treatment. PR and the L2C program partnered with FRTC and several recruitment events took place in the FRTC lobby.

3.2 | Univariate analysis

3.2.1 | Agreeing to linkage to care

Overall, 315 (64.55%) participants accepted at the time of screening to being linked into mental health care. Percent acceptance was lower for males compared with females (58.93% vs. 69.32%) and those identifying as non-Hispanic compared with Hispanics (62.09% vs. 75.29%; Table 2). Those who accepted linkage to care had a significantly shorter median time since Hurricane Sandy than those who did not (31.84 [22.86–41.48] months versus 38.39 [28.65–43.39] months).

Having a history of mental health difficulties and currently being in mental health treatment were also significantly associated with acceptance to participate in services. There were significant associations between screening in on perceived stress, anxiety, depression and/or PTSD, and acceptance of being linked to services. Screening positive on substance abuse and substance abuse of a family member were not significantly associated with acceptance of services. Finally, those who had a higher MHSB (e.g. screened in on two or more criteria; 75.84%) had a higher rate of acceptance compared with those who screened in on one criteria (46.84%).

3.2.2 | Attending first appointment

Of the 315 participants who agreed to be linked to care, 143 (45.40%) reported attending their first mental health treatment appointment (Table 3). Their report of attendance was verified by the provider. No association was found between demographics and attendance of first appointment. Screening in on substance abuse was associated with an increased rate of attending a first appointment (51.95% vs. 39.38%, p = 0.025); however, no other screening criteria were associated with attendance. Having a history of mental health difficulties and currently being in mental health treatment were significantly associated with appointment attendance.

3.3 | Multivariable analysis

Individuals who screened in on more than one criteria vs. only one criterion had 2.68 greater odds of accepting services (95% CI [1.68, 4.26]; Table 4). No association was found between demographics and acceptance. Those with a history of mental illness (aOR = 2.17, 95% CI [1.30, 3.60]) and those currently in mental health treatment (aOR = 3.47, 95% CI [1.89, 6.37]) had increased odds of acceptance. Hurricane exposure was not independently associated with acceptance (aOR = 1.00, 95% CI [0.94, 1.04]). Hurricane exposure also did not moderate the effect on mental health burden, measured by including the interaction between the two factors in the model (interaction p = 0.56).

In the multivariable model performed on participants who accepted to participate in services (N = 283, 89.6%), mental health burden was not significantly associated with attending a first appointment (p = 0.80). Those currently in mental health treatment had an increased odds of attending their first appointment than those not in treatment (aOR = 4.92, 95% CI [2.77, 8.73]). Total hurricane exposure was not significantly associated with attendance. No association was found between demographics and attendance.

TABLE 2 Acceptance (%) to linkage to care according to demographics and screening criteria

Variable	Category	Sample N (%)	Acceptance to Linkage to Care Yes (N = 315) n (%)	No (N = 173) n (%)	P value[a]
Age (years), mean (SD)		44.63 (14.52)	44.84 (13.79)	44.24 (15.79)	0.58
Gender	Male	224 (45.9)	132 (58.93)	92 (41.07)	0.017[*]
	Female	264 (54.1)	183 (69.32)	81 (30.68)	
Race	White	187 (39.12)	124 (66.31)	63 (33.69)	0.784
	Black	252 (52.72)	159 (63.10)	93 (36.90)	
	Other	39 (8.16)	25 (64.10)	14 (35.90)	
Ethnicity	Non-Hispanic	393 (82.22)	244 (62.09)	149 (37.91)	0.021[*]
	Hispanic	85 (17.78)	64 (75.29)	21 (24.71)	
Education	HS or less	119 (25.27)	85 (71.43)	34 (28.57)	0.062
	Above HS	352 (74.73)	218 (61.93)	134 (38.07)	
Hurricane Exposure Score, median (IQR)		6 (3–10)	6 (3–10)	6 (3–9)	0.36
Elapsed time since Hurricane Sandy (months), median (IQR)		34.62 (24.21–41.56)	31.84 (22.86–41.48)	38.39 (28.65–43.39)	0.002[*]
History of mental health illness	Yes	204 (42.15)	167 (55.30)	37 (12.25)	< 0.001[**]
	No	280 (57.85)	146 (87.43)	134 (80.24)	
Current mental health treatment	Yes	149 (31.77)	131 (87.92)	18 (12.08)	< 0.001[**]
	No	320 (68.23)	171 (53.44)	149 (46.56)	
Screening Criteria					
Substance abuse	Yes	235	154 (65.53)	81 (34.47)	0.681
	No	251	160 (63.75)	91 (36.25)	
Substance abuse–family member	Yes	80	54 (67.50)	26 (32.50)	0.564
	No	407	261 (64.13)	146 (35.87)	
Perceived stress symptoms	Yes	188	143 (76.06)	45 (23.94)	< 0.001[**]
	No	300	172 (57.33)	128 (42.66)	
Anxiety symptoms	Yes	217	168 (77.42)	49 (22.58)	< 0.001[**]
	No	271	147 (54.24)	124 (45.76)	
Depression symptoms	Yes	197	154 (78.17)	43 (21.83)	< 0.001[**]
	No	291	161 (55.33)	130 (44.67)	
PTSD symptoms	Yes	226	166 (73.45)	60 (26.55)	< 0.001[**]
	No	262	149 (56.87)	113 (43.13)	
Mental health symptom burden	1	190 (38.93)	89 (46.84)	101 (53.16)	< 0.001[**]
	>1	298 (61.07)	226 (75.84)	72 (24.16)	

Note. HS = high school; SD = standard deviation; IQR = interquartile range; PTSD = posttraumatic stress disorder.
Numbers may not add to total due to missing values in each characteristic.
[a]p-value from chi-square tests for categorical variables, Mann-Whitney rank-sum test for age, elapsed time since Hurricane Sandy, and Hurricane Exposure score.
[*]p < .05. [**]p < .01. [***]p < .001.

TABLE 3 Attending first appointment (%) according to demographics and screening criteria

| | | | Attended first appointment | | |
| | | | Yes (N = 143) | No (N = 172) | |
Variable	Category	Sample N (%)	n (%)	n (%)	P value[a]
Age (years), mean (SD)		45.43 (12.71)	45.43 (1.07)	44.35 (1.12)	0.461
Gender	Male	132	62 (46.97)	70 (53.03)	0.634
	Female	183	81 (44.26)	102 (55.74)	
Race	White	124	66 (53.22)	58 (46.77)	0.086
	Black	159	66 (41.51)	93 (58.49)	
	Other	25	9 (36.00)	16 (64.00)	
Ethnicity	Non-Hispanic	244	108 (44.26)	136 (55.74)	0.297
	Hispanic	64	33 (51.56)	31 (48.44)	
Education	HS or less	85	46 (54.12)	39 (45.88)	0.084
	Above HS	218	94 (43.12)	124 (56.88)	
Hurricane Exposure Score, median (IQR)		6 (3–9)	6 (3–9)	7 (3–10.5)	0.3712
Elapsed time since Hurricane Sandy (months), median (IQR)		31.84 (24.67–40.86)	32.51 (24.67–40.86)	31.78 (21.21–43.39)	0.74
History of mental health illness	Yes	167	92 (55.09)	75 (44.91)	< 0.001[**]
	No	146	50 (34.25)	96 (65.75)	
Current mental health treatment	Yes	131	91 (69.47)	40 (30.53)	< 0.001[**]
	No	171	50 (29.24)	121 (70.76)	
Screening Criteria					
Substance abuse	Yes	154	80 (51.95)	74 (48.05)	0.025[*]
	No	160	63 (39.38)	97 (60.62)	
Substance abuse–family member	Yes	54	28 (51.85)	26 (48.15)	0.295
	No	261	115 (44.06)	146 (55.94)	
Perceived stress symptoms	Yes	143	67 (46.85)	76 (53.15)	0.636
	No	172	76 (44.19)	96 (55.81)	
Anxiety symptoms	Yes	168	81 (48.21)	87 (51.79)	0.283
	No	147	62 (42.18)	85 (47.82)	
Depression symptoms	Yes	154	71 (46.10)	83 (53.90)	0.805
	No	161	72 (44.72)	89 (55.28)	
PTSD symptoms	Yes	166	80 (48.19)	86 (51.81)	0.293
	No	149	63 (42.28)	86 (57.72)	
Mental health symptom burden	1	89	36 (40.45)	53 (59.55)	0.268
	>1	226	107 (47.35)	119 (52.65)	

Note. HS = high school; SD = standard deviation; IQR = interquartile range; PTSD = posttraumatic stress disorder.
Numbers may not add to total because of missing values in each characteristic.
[a]p-value from chi-square tests for categorical variables, Mann-Whitney rank-sum test for age, elapsed time since Hurricane Sandy, and Hurricane Exposure score.
[*]p < .05. [**]p < .01. [***]p < .001.

TABLE 4 Multivariable logistic regression modeling of the association between mental health symptom burden and acceptance to link to care program and attendance to an appointment

Effect	Acceptance aOR [95% CI]	Attendance aOR [95% CI]
Mental health symptom burden, > 1 vs. 1 criteria	2.68 [1.68, 4.26]	0.92 [0.49, 1.72]
Age (years)	1.00 [0.98–1.01]	1.00 [0.98, 1.02]
Female vs. male	1.42 [0.91, 2.21]	0.83 [0.48, 1.41]
Race		
Black vs. White	0.89 [0.51, 1.55]	0.55 [0.28, 1.10]
Other vs. White	0.89 [0.36, 2.17]	0.33 [0.12, 0.96]
Hispanic vs. Non-Hispanic	1.27 [0.64, 2.51]	0.83 [0.39, 1.81]
≥ HS vs. < HS education	1.02 [0.58, 1.8]	0.61 [0.33, 1.13]
History of mental illness, yes vs. no	2.17 [1.30, 3.60]	1.50 [0.86, 2.64]
Current treatment, yes vs. no	3.47 [1.89, 6.37]	4.92 [2.77, 8.73]
Time from Hurricane Sandy (months)	0.98 [0.95, 1.00]	1.00 [0.97, 1.03]
Hurricane Exposure Score	1.00 [0.94, 1.04]	0.95 [0.89, 1.01]

Note. HS = high school; aOR = adjusted odds ratio; CI = confidence interval.

4 | DISCUSSION

The present analysis examines the demographic and mental health characteristics associated with engagement in mental health services, conceptualized as acceptance and attendance, in the wake of Hurricane Sandy. Overall, of 1,011 participants in PR, 488 (48.27%) screened in to linkage to mental health program, and of those who screened in, 315 (64.55%) accepted to be linked to mental health care at the time of screening. After acceptance to be linked to care, 143 (45.40%) reported attending their first mental health treatment appointment.

A large proportion of individuals living with mental health concerns in the United States are not engaged in mental health treatment or are receiving inadequate care (Wang et al., 2005). Stigma surrounding mental health and mental health care is well established in the literature (Corrigan, Druss, & Perlick, 2014) and may prevent individuals from seeking care (Corrigan et al., 2014; Mojtabai, Olfson, & Mechanic, 2002). However, research suggests that stigma may be moderated by knowledge of mental illness (Corrigan et al., 2014), including in the context of a natural disaster (Price, Gros, McCauley, Gros, & Ruggiero, 2012). Among participants, those with a history of mental health concerns and those who were currently in treatment had a greater likelihood of accepting but not attending services. Our results support earlier findings that individuals who are already in contact with the mental health care system may experience less stigma and in turn be more receptive to linkage to care, though they still may face barriers to attending services (Corrigan et al., 2014; Wang et al., 2005).

A lack of knowledge regarding how to access and the location of mental health care resources has been identified as a common barrier to seeking mental health care (Henderson, Evans-Lacko, & Thomicroft, 2013; Mackenzie, Pagura, & Sareen, 2010; Sareen et al., 2007; Wells, Robins, Bushnell, Jarosz, & Oakley-Browne, 1994; Wetherell et al., 2004). The association between history of mental health concerns and acceptance of services in our sample may reflect a greater understanding of the mental health care system among individuals previously in contact with that system. In this way, earlier mental health treatment may increase self-efficacy (i.e., knowing where to go or who to see) in obtaining treatment; however, barriers to eventual attendance may still hinder treatment.

Greater MHSB (i.e., screening in on more than one mental health screening criteria) was associated with acceptance of a L2C program, after controlling for previous contact with the mental health care system, but was not associated with attendance at first appointment. Because study staff spoke with participants who screened in about the possible connection between Hurricane Sandy and their MHSB, participants may have experienced less stigma

accepting services related to a specific, external cause (i.e., Hurricane Sandy) of their mental health issues (Corrigan et al., 2014).

Previous studies have found certain subgroups including ethnic minorities and low-resourced individuals (e.g., those without health insurance) to be more vulnerable to the mental health impacts of natural disaster; this was due in part to barriers to mental health care (Schwartz et al., 2016a; Wang et al., 2008). Our L2C program incorporated measures to increase engagement in services tailored to groups that may experience increased barriers to mental health care including having a bilingual Project Coordinator (English-Spanish) present at recruitment events. Although the literature suggests that Hispanic individuals are less likely to seek mental health services (Keyes et al., 2012; G. Kim et al., 2011; Kouyoumdjian, Zamboanga, & Hansen, 2006) and to receive adequate mental health care (Alegría et al., 2008; Simpson, Krishnan, Kunik, & Ruiz, 2007; Stockdale, Lagomasino, Siddique, McGuire, & Miranda, 2008), in our study sample, Hispanic ethnicity was significantly associated with the acceptance of linkage to mental health care, though not appointment attendance. These findings not only highlight the importance of culturally competent outreach but they also underline the continued challenges to actual engagement in services for underserved groups.

4.1 | Limitations

The findings should be interpreted in the context of the study limitations. Participants were recruited through convenience sampling, which may have led to selection bias favoring individuals more receptive to mental health treatment. However, the sample's demographics do closely match to the larger Rockaway's population with the exception of a larger proportion of African American individuals in the study sample, possibly because of heavier recruitment on the eastern end of the peninsula, which is predominately African American (see Appendix). In addition, the study's cross-section design precludes causal inferences. Finally, mental health symptomology was collected via self-report using validated measures. Future research could establish mental health burden through diagnosis by a mental health professional in order to reduce potential reporting bias.

4.2 | Conclusions and Implications for future research

Despite these limitations, the present study has important implications for mental health treatment in a postdisaster context. Our findings underscore the importance of the dissemination of the well-established, long-term effects of mental health impacts of natural disasters (Schwartz et al., 2015, 2017, 2018; Schwartz et al., 2016b) to reduce stigma and increase engagement in mental health treatment in a postdisaster context. In addition, our results suggest that a familiarity with the mental health care system may facilitate continued or future engagement in mental health care. As such, future mental health interventions in postdisaster contexts may require additional resources to increase knowledge about the mental health care system. Future research may focus on the impact of the dissemination of such information on a wider scale on engagement in mental health services postdisaster.

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APPENDIX

Demographic distribution of study sample and the Rockaway's population based on 2015 census

Variable	Category	Sample (%)	Population of Rockaways (%)
Gender	Male	45.9	45.26
	Female	54.1	54.66
Race	White	39.12	48.48
	Black	52.72	38.33
	Other	8.16	13.23
Ethnicity	Non-Hispanic	82.22	76.11
	Hispanic	17.78	23.89
Education	< HS less	25.27	22.82
	HS or more	74.73	77.18

Note. HS = high school.

Rockaways population data based on the American Community Survey 2015 for Rockaways zip codes. Percents were weighted to represent the size of the population in each zip code. For gender and education, the population comprised residents aged 18 years or older. For race and ethnicity, the entire population was used.