ORIGINAL ARTICLE

The New York City Mental Health Needs Assessment Study (MHNAS): Objectives, design, and methods

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Abstract

Objectives: This paper describes the objectives, design, and methods of the Mental Health Needs Assessment Study (MHNAS). The objective of the MHNAS was to assess the needs of individuals transitioning to the community following psychiatric hospitalization and again 3–5 months later to inform community service planning. Needs were defined broadly to include domains like housing, employment, treatment, and social support.

Methods: The MHNAS used a 2-stage clustered sampling approach where the primary sampling units were hospitals and secondary sampling units were patients. The study included an in-person patient interview, an assessment of need from a key hospital worker, and a follow-up telephone interview 3–5 months after discharge.

Results: One thousand one hundred twenty-nine patients from 8 randomly selected hospitals participated. The overall response rate was 54.3% with a cooperation rate of 71.8%. The sample was similar to the overall population of psychiatric patients with respect to several key demographics.

Conclusion: The MHNAS demonstrates the feasibility of conducting a needs assessment with a random sample of psychiatric inpatients in a large urban setting. Results from this study may improve community service planning to better meet individuals' needs, with the ultimate goal of reducing rehospitalization and promoting recovery.

KEYWORDS

mental health needs assessment, mental health service needs, psychiatric epidemiology, psychiatric hospitalization, social needs

1 | INTRODUCTION

Discharge from a psychiatric hospitalization presents an opportunity to connect individuals with services needed for a successful transition to the community. Yet nearly one-quarter of individuals discharged from a psychiatric hospitalization in New York City (NYC) will be readmitted within 90 days; the majority of these within the first 30 days (Wojas, Meausoone, & Norman, June 2016). High rates of rehospitalization are seen as a negative indicator of the quality of care and suggest inadequate capacity of the mental healthcare system to meet consumer

needs after transition to the community (Vigod et al., 2013). Treatment and wrap-around community services, like supported housing, family support services, and assertive community treatment, have been shown to significantly reduce rehospitalization rates, lower costs, and improve quality of life for individuals with serious mental illness (Culhane, Metraux, & Hadley, 2002; Greene et al., 2014; Kreyenbuhl, Buchanan, Dickerson, & Dixon, 2010; Nelson, Aubry, & Lafrance, 2007).

Recent policy initiatives and fiscal incentives in New York State are shifting the behavioral health system to ensure care is well coordinated and specialized recovery-oriented services are accessible, with an end goal of reducing psychiatric hospitalization. Statewide efforts to address access to behavioral health care include Medicaid Redesign, the Delivery System Reform Incentive Payment, and Value-Based

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Payments. These efforts are driving major changes in the delivery of healthcare and behavioral health services in NYC.

An assessment of the needs for treatment and wrap-around services of hospitalized individuals is required in order to design community mental health services that are more responsive to consumer needs and reduce acute care use (Greene et al., 2014; Lasalvia et al., 2007). Such “needs-led” service planning is considered exemplary because services are designed and coordinated to meet the explicit needs of the population being served (McCrone & Strathdee, 1994; Phelan et al., 1995).

A review of the literature for needs in a psychiatric population indicates few representative needs assessments of individuals approaching discharge from a psychiatric hospitalization (Joska & Flisher, 2005). Studies that do sample from a hospitalized population assess needs prior to hospital admission (e.g., Cleary, Hunt, Walter, & Freeman, 2006) or several weeks post-discharge (e.g., Simons & Petch, 2002), rather than at the point of discharge to the community. These studies do not include a longitudinal component to examine if needs are met in the first few months after an individual returns to the community, a time when individuals are at risk for early rehospitalization (Wojas et al., June 2016). Further, these studies are based on non-U.S. populations and may not be generalizable to a U.S. urban population such as NYC.

Limited information on adults being discharged from a psychiatric hospitalization in NYC is available through administrative databases (e.g., State Planning and Research Cooperative System [SPARCS] data and Medicaid claims data). These provide information on treatment services received but do not assess unmet need, nonclinical services, barriers to care, or detailed patient characteristics that may be associated with post-discharge needs (e.g., housing, employment services, and social support).

There are three key gaps in the literature on the needs of individuals hospitalized for psychiatric conditions that significantly limit a full understanding of their needs and the development of approaches to address these needs: (a) the lack of information on individuals being discharged from an acute psychiatric hospitalization and their needs as they transition back to the community; (b) the absence of information in U.S. populations on needs beyond mental health treatment (such as housing support, employment support, and family support services); and (c) the absence of short-term follow-up to identify if needs have been met once the individual returns to the community.

The Mental Health Needs Assessment Study (MHNAS), conducted by the New York City Department of Health and Mental Hygiene's (NYC DOHMH) Bureau of Mental Health begins to fill these gaps in order to inform service planning and policies that promote recovery and reduce rehospitalization.

The MHNAS aims to

1. Describe the population of individuals with an acute psychiatric hospitalization in NYC being discharged to a community setting in terms of their sociodemographic characteristics, service needs in the 12 months prior to hospitalization, and health comorbidities.
2. Assess prevalence of service needs for individuals being discharged from an acute psychiatric hospitalization. Specifically,

the individual's perception of what they need, as well as needs based on a normative standard and needs assessed by a professional healthcare worker.

3. Assess services received and prevalence of service needs within 3–5 months following hospital discharge to identify which needs have been addressed, which needs remain unmet, and if new needs have emerged since discharge.
4. Identify factors related to met and unmet needs both at the time of discharge and 3–5 months after returning to the community setting.
5. Identify risk and protective factors associated with rehospitalization within 3–5 months of discharge.

This paper describes the objectives, design, and methods of the MHNAS.

2 | METHODS

The MHNAS included baseline and follow-up components (Table 1). Baseline data were collected near the time of the patient's discharge from the hospital (mean = 3.9 days before discharge) and included an in-person patient interview, a checklist of the patient's needs completed by a hospital staff member, and data extraction from the patient's hospital records. A follow-up telephone interview was completed 3 to 5 months after the patient was discharged. The MHNAS was approved by the NYC DOHMH Institutional Review Board (IRB), the City University of New York IRB, and each participating hospital's IRB.

2.1 | Sample design

The MHNAS used a two-stage clustered sampling approach with probability proportionate to size (PPS) sampling without replacement. The primary sampling units were hospitals, and the secondary sampling units were discharged patients within hospitals. PPS sampling was used because it allows for equal probability of selection of individual units (i.e., discharges) into the study across hospitals despite variation in the total number of discharges at each hospital. In the first sampling stage, a sample of hospitals was selected from all hospitals with psychiatric units in NYC on the basis of total number of psychiatric discharges per year at each hospital, such that hospitals with a greater number of discharges (larger hospitals) had a larger probability of being selected compared to hospitals with fewer discharges (smaller hospitals). The second stage systematically sampled the same number of individuals from each hospital, giving discharges in larger hospitals a smaller probability of being selected (and discharges in smaller hospitals a larger probability of being selected), compensating for the first stage of sampling where larger hospitals had a greater probability of being sampled. Subsequently, each discharge has an equal probability of selection. (Steps in Applying PPS and Calculating Basic Probability Weights, n.d.; Kalton, 1983).

Diagnosis codes (International Classification of Disease Ninth Revision codes 295–302, 306–309, and 311–314) were used to estimate the annual number of NYC residents discharged from adult psychiatric units at acute care hospitals using 2007 SPARCS data, the

TABLE 1 Description of the Mental Health Needs Assessment Study assessment components

Assessment	Brief description	Primary outcomes
MHNAS-B	60 min, CAPI administered to participants in the hospital ~1 week before expected discharge date	All background characteristics, risk, and protective factors Services received Patient self-perceived needs Needs based on a normative standard
Discharge Needs Checklist (The Checklist)	Self-administered questionnaire completed by a hospital staff member within 2 weeks of the patient's discharge date	Services received Needs based on expert opinion (hospital worker)
Hospital record	Data elements collected from participants' hospital records after discharge	Hospital admission and discharge dates Diagnosis
MHNAS-F	25 min, CATI administered to participants 3 to 5 months after discharge	Background characteristics, risk, and protective factors that may have changed since baseline (e.g., housing status, employment, and social support) Services received Patient self-perceived needs Needs based on a normative standard

Note. CAPI = computer-assisted personal interview; CATI = computer-assisted telephone interview; MHNAS-B = Mental Health Needs Assessment Baseline Interview; MHNAS-F = Mental Health Needs Assessment Follow-Up Interview.

most recent year of data available during the initial design phase of the study. One hospital was excluded because it reported only 14 discharges from psychiatric hospitalizations; the other 39 hospitals reported a range of 190 to 2,687 discharges in 2007, with a mean of 1,020 discharges and 39% of total discharges coming from municipal hospitals. Of the 10 selected hospitals, one declined participation and one announced an impending closure. The eight participating hospitals reported a range of 372 to 1,820 discharges, with a mean of 1,151 and 34% of discharges coming from municipal hospitals. Study hospitals represented all five NYC boroughs.

2.1.1 | Patient eligibility

Eligibility criteria for the baseline survey included (a) having an inpatient hospitalization on a participating psychiatric unit during the study period; (b) ability to complete the interview in English, Spanish, or Mandarin Chinese (the most common languages spoken by patients in the selected hospitals); (c) age 18 years or older at the time of interview; (d) ability to consent to the interview based on a cognitive assessment; (e) expected discharge to a community setting in NYC within the next 7 days; and (f) patients who hospital staff deemed could safely participate. Community settings included private residences, supported housing, adult homes, group homes, halfway or three-quarters houses, substance abuse housing, residential drug/alcohol treatment facilities, shelters, or the street. Patients who were expected to be discharged to institutional settings (e.g., hospitals, skilled nursing facilities, jails, or prisons) were not eligible because they would not be served by the community mental health system. Cognitive ability to consent was evaluated using a modified version of the University of California, San Diego Brief Assessment of Capacity to Consent (Jeste et al., 2007). Respondents who were previously interviewed for the MHNAS (e.g., during a prior hospitalization or during the pilot phase of the study) were considered ineligible. Patients with lengths of stay less than 4 days were also considered ineligible and excluded during analysis.

All respondents who participated in the follow-up survey were required to have completed a partial or full baseline interview, been physically and mentally able to participate in the interview, and were living in NYC at the time of the follow-up interview. Follow-up

interviews were conducted over the telephone in English and Spanish. Due to few respondents completing the baseline interview in Mandarin Chinese, the follow-up survey was not administered in that language.

2.1.2 | Sample size calculation

The minimum sample size required for a margin of error not exceeding 4.5% for prevalence estimates of 50% in the baseline survey was 500, given a simple random sampling design. Given the clustered sampling in this study, the sample size was then inflated by a design effect of 1.5 to allow for correlation between responses within the same cluster (hospital), increasing the target sample size to 750. Assuming 70% follow-up (Fischer, Dornelas, & Goether, 2001), we planned a baseline sample size of 1,070 or 135 patients at each hospital.

2.1.3 | Patient selection

Because hospitals discharged patients at varying rates and we aimed to conduct the same number of interviews at each hospital (see description of PPS sampling above), and over the same time period, we systematically selected every *n*th discharge from each hospital, depending on the discharge rate of that hospital. We calculated the fraction of eligible patients to select at each hospital on the basis of the expected number of eligible discharges from SPARCS 2010, the most recent year of data available to us prior to the start of data collection. All eligible patients were enumerated, and every *n*th patient was systematically selected to achieve the sampling fraction for that hospital. The initial sampling fractions ranged from 0.2 to 1.0. In the implementation of the study, the sampling fractions were gradually increased to accelerate the rate of data collection. Final sampling fractions varied from 0.75 to 1.0 by hospital, and the proportion selected overall was 0.86 across all hospitals over the course of the study.

2.2 | Assessments and data collection

All baseline data were collected on inpatient psychiatric units of participating hospitals. Data were entered into a tablet and transmitted to the NYC DOHMH server using a secured and encrypted network.

2.2.1 | Baseline patient interview

The Mental Health Needs Assessment Baseline Interview (MHNAS-B) was a structured hour-long computer-assisted personal interview. The MHNAS-B was designed to collect sociodemographic data and information about patients' unmet needs and receipt of services in the 12 months prior to hospitalization and their needs as they prepared to transition back to the community after discharge.

Various dimensions of 17 needs were assessed, including individuals' perception of their own needs and needs based on a normative standard (Bradshaw, 1972; Wright, Williams, & Wilkinson, 1998). For example, recent living situation was assessed to determine housing stability prior to hospitalization (i.e., respondents who report being homeless have a need for housing assistance based on the normative standard that all individuals require adequate housing), and the individual was also asked directly if they perceived a need for help with housing upon discharge. Similarly, patients responded to a standardized measure of social support and assessment of satisfaction with relationships, but we also asked the patient directly if they need help improving their relationships. Service utilization was also considered an indicator of need in that individuals participating in a service had an implicit need for that service (Bradshaw, 1972; Wright et al., 1998). This was assessed for 14 types of services. A detailed description of the items assessed by the MHNAS-B are included in Figure 1.

Over 30 cognitive interviews with psychiatric inpatients were conducted to test and revise the survey instrument (Drennan, 2003; Willis, 2005). The final interview was translated into Spanish and Mandarin by an independent professional translation company. Spanish and Mandarin were chosen because hospital staff identified these as the most frequently spoken non-English languages on the participating units.

Baseline data were collected from January 2013 to June 2014. One or two interviewers were assigned to each hospital or unit and visited their assigned unit two or three times a week. Interviewers ($n = 22$) worked with hospital staff to complete the initial eligibility screen based on the staff's knowledge of each patient and then systematically selected eligible patients using the sampling fractions described above. Interviewers met with interested patients, further assessed eligibility, obtained consent, and conducted the baseline interview. At the end of the interview, interviewers provided a \$25 gift card incentive to respondents and collected primary and secondary contact information for respondents interested in participating in the follow-up interview. The secondary contact was a person identified by the patient who would be able to reach them if the patient could not be reached by the study team.

2.2.2 | Discharge needs checklist

The Discharge Needs Checklist (The Checklist) was a brief paper-and-pencil self-administered questionnaire completed by hospital staff familiar with each patients' needs and discharge plan (e.g., a unit social worker or discharge planner who had worked with the patient). The Checklist provided an assessment of need from the perspective of the mental healthcare provider as well as information on services that will be in place to address need. Hospital staff were asked to indicate if the patient currently had each of 27 needs. Items included the 17 clinical and nonclinical needs that patients were directly asked about, as well as additional need related to specific mental health services (e.g., assertive community treatment, assisted outpatient treatment, day treatment program, and case management/care coordination). For each item endorsed, the hospital staff was asked to indicate if a service had been in place prior to hospitalization to address the need and if a

FIGURE 1 Primary constructs and variables assessed by the mental health needs assessment baseline interview. BMI = body mass index; PROS = Personalized Recovery Oriented Services

service or referral would be in place after discharge. Hospital staff were also asked to indicate if they faced any of eight barriers in obtaining the service for the individual (e.g., service does not exist, no current service opening, patient or family does not want service, insurance or cost, and patient not eligible for service).

2.2.3 | Hospital records

Data extracted from patients' hospital records included the admission and discharge dates of the baseline hospitalization and the patients' primary and secondary diagnoses.

2.2.4 | Follow-up interview

The Mental Health Needs Assessment Follow-Up Interview was a 25-min computer-assisted telephone interview administered to baseline participants approximately 3 to 5 months after they were discharged from the baseline hospitalization. The follow-up interview was designed to evaluate the types of services respondents engaged in after discharge from the hospital, barriers faced in accessing needed services, and the met and unmet needs after hospital discharge. The needs assessed at follow-up were the same needs assessed at baseline. The 3- to 5-month follow-up period was chosen because it allowed us to identify services received and needs remaining during the period of transition from inpatient hospitalization to community living, when individuals are at risk for early rehospitalization.

Follow-up interviews were conducted from June 2013 to October 2014 by 10 interviewers who had completed 8 hr of training. If a participant could not be contacted via the address, email, or phone number they provided, we attempted to reach their secondary contact to update their contact information. Participants received a \$75 gift card incentive for participation in the follow-up interview.

2.3 | Data weighting

Our study design ensured an equal probability of selection for all potential participants assuming that an equal number of interviews were conducted per hospital. However, due to variability across facilities in discharge rates, ability to identify or recruit eligible patients before discharge (i.e., last minute discharges), and interviewer access to the unit and interview space, the actual number of interviews in our final dataset varied from 88 to 164 per hospital. To account for oversampling or undersampling, a sampling weight was applied to each interview on the basis of the hospital of interview with a value of $(N_{\text{tot}}/8)/N_{\text{hosp}}$, where N_{tot} is the total number of interviews and N_{hosp} is the number of interviews for that hospital. Similarly, a weight was created for The Checklist with a value of $(N_{\text{totcl}}/8)/N_{\text{hospcl}}$, where N_{totcl} is the total number of checklists and N_{hospcl} is the number of checklists for that hospital.

Follow-up data were further weighted to minimize potential bias due to study attrition. Specifically, follow-up cohort participants were weighted by the inverse of their propensity to complete the follow-up interview (Hernán, Hernández-Díaz, & Robins, 2004). To formulate these weights, a logistic regression model was used to model the propensity of completing the follow-up interview for each baseline participant (Rosenbaum & Rubin, 1983). In building the model, the Rao-Scott chi-squared test was initially used to identify baseline covariates most strongly associated with follow-up completion (at the .25 level

of statistical significance). Various subsets of these covariates were then selected for multivariate regression using automated and ad hoc model building procedures. Candidate regression models were evaluated for maximal goodness of fit. Baseline covariates in the final model included gender, housing stability, subjective needs at discharge, and mental health treatment history. (final model $R^2 = .214$, c -statistic = .772, Hosmer-Lemeshow goodness-of-fit chi-squared test statistic $p = .978$). The inverse of the predicted probability to follow-up derived from the final model was used as a response weight for follow-up participants. Inverse probabilities greater than 7 ($n = 9$) were trimmed to 7 to minimize variance and ensure outlier weights did not destabilize follow-up estimates (Elliott & Little, 2000). The response weight was multiplied by the sampling weight to produce the final analytic weight for the follow-up sample. Final follow-up weights ranged from 0.91 to 7.68.

2.4 | Analysis

Data analysis was conducted using SURVEY procedures in SAS 9.2 (Cary, NC) clustering on hospital, weighted as described above, and applying a finite population correction option to adjust the standard error to account for the limited number ($n = 39$) of primary sampling units. These survey procedures were used to provide correct estimation of variances and standard errors given the study's complex sample design. Calculation of outcome rates (e.g., response rate) for the MHNAS followed standards developed by the American Association of Public Opinion Researchers (AAPOR, 2011). Representativeness of the baseline sample was assessed by comparing the MHNAS sample to the population of all NYC psychiatric inpatients with a length of stay (LOS) >3 days using SPARCS data from our baseline collection period (January 2013–June 2014).

3 | RESULTS

3.1 | Selection, participation, and outcome rates

3.1.1 | Baseline sample

Of 2,920 eligible patients, 2,512 were randomly selected to participate in the baseline study using the hospital-specific sampling fraction described above. Of the selected patients, 205 were found to be "no longer eligible" at the time of the interview, often because they were no longer being discharged to a community setting within NYC, or because they were found to be cognitively unable to participate during the "capacity to consent" module administered at the beginning of the interview. During analysis, 18 patients were excluded because they were hospitalized for fewer than 4 days (Figure 2).

The final sample size for the baseline data was 1,129. Forty-nine of these were considered partial interviews because the interviews were terminated after 40% of the interview had been completed but before the final question was administered. Per AAPOR guidelines, eligible patients who were not interviewed were classified as refusals and break offs, noncontacts, and others. Refusals and break offs included cases where contact was made with the selected patient and she or he either declined the interview ($n = 475$) or the interview was terminated prior to the 40% completion point ($n = 16$). Noncontacts consisted of cases in which the selected patient was not contacted because they were

^a Other defined as cases where the selected respondent did not refuse the interview but no valid interview was obtained (e.g., the interviewer had to terminate the interview, the interview was interrupted by hospital staff, etc.).

^b Other defined as cases where a call-taker reported that the respondent was deceased (n=3), or was physically or mentally unable to complete the interview (n=1).

^c Other defined as cases where the interviewer felt the respondent was too agitated or upset to complete the interview (n=2); the interview was conducted out of range (i.e. before the respondent had been discharged for 75 days (n=10) or after the respondent had been discharged for 150 days (n=43); or the interview was not obtained because of system errors (n=5).

FIGURE 2 Flowchart detailing sampling and recruitment procedures and final disposition classifications. NYC = New York City

discharged from the hospital before they met with a study interviewer (n = 537). In “other” cases, the selected patient did not refuse the interview, but a valid interview was not obtained (n = 35).

Outcome rates for the baseline interview using AAPOR standards were response rate, 54.3%; cooperation rate, 71.8%; refusal rate, 21.3%; and contact rate, 76.2% (Table 2). Response rates varied by hospital ranging from a low of 38.4% in Hospital 3 to a high of 81.8% in Hospital 8.

The Checklist was obtained for 911 baseline participants. Checklists that were not submitted within 90 days of the patient's discharge date (n = 4) were excluded, leading to a final sample size of 907 (80.3%). Completion rates for The Checklist varied by hospital from a low of 66.7% in Hospital 2 to 100% in Hospital 8 (Table 2). Admission and discharge dates were obtained from hospital records for all but 16 respondents.

3.1.2 | Follow-up sample

Of 1,129 eligible baseline respondents with partial or complete interviews, 24 respondents were ineligible for the follow-up interview.

The most frequent reason for ineligibility was that the respondent was not living in NYC at the time of the interview (n = 20). Additional reasons for ineligibility are shown in Figure 2.

Five hundred nineteen individuals participated in the follow-up interview. As with the baseline interview, there were three categories of eligible noninterviews: refusal and break offs, noncontacts, and others. Fifty-five respondents declined to participate in the follow-up interview at baseline. Noncontacts made up the largest proportion of eligible noninterviews for follow-up sample (n = 396). Because the follow-up interview was substantially shorter, all partial interviews (n = 7) were excluded from the final analytic sample and coded as “break offs.”

During analysis, the follow-up analytic sample was limited to patients who completed the interview 75–150 days after discharge (mean: 99 days). Of the 53 cases excluded because they fell outside the range, 10 were excluded because they occurred before 75 days (range: 36–73 days; mean: 59 days), and the remaining 43 were excluded because they occurred after 150 days (range: 151–524 days; mean: 197 days). Individuals were interviewed too early because (a) they were discharged later than expected, (b) they called the study line

TABLE 2 Outcome rates for baseline and follow-up interviews and The Checklist

	Baseline and follow-up interviews					Checklist
	No. of interviews	Response rate	Cooperation rate	Refusal rate	Contact rate	Response rate ^c
Baseline total ^a	1,129	54.3	71.8	21.3	76.2	80.3
Hospital 1	143	53.8	75.8	17.1	72.8	83.2
Hospital 2	159	56.7	71.0	23.1	81.2	66.7
Hospital 3	154	38.4	58.3	27.5	66.4	79.2
Hospital 4	88	66.8	73.7	23.8	90.6	95.5
Hospital 5	164	56.1	75.9	17.8	73.9	79.3
Hospital 6	139	51.6	74.4	17.7	69.7	74.1
Hospital 7	127	51.1	64.4	28.3	79.3	69.3
Hospital 8	155	81.8	88.0	11.1	92.9	100.0
Follow-up total ^b	519	47.0	80.0	11.8	59.8	NA

Note. Because AAPOR does not specify standards for an inpatient hospital sample with a telephone follow-up survey, we based our calculations on AAPOR recommendations for in-person household surveys (baseline) and random digit-dial phone surveys (follow-up), with modifications made as needed to adjust the calculations for our study design

^aFormulas used to calculate baseline rates: Response Rate 4: $(I + P)/(I + P) + (eR + eNC + O)$; Cooperation Rate 4: $(I + P)/((I + P) + eR)$; Refusal Rate 2: $eR/((I + P) + (eR + eNC + O))$; and Contact Rate 2: $(I + P) + eR + rO/(I + P) + eR + O + eNC$.

^bFormulas used to calculate follow-up rates: Response Rate 1: $I/(I + R + NC + O)$; Cooperation Rate 3: $I/(I + R)$; Refusal Rate 3: $R/(I + R + NC + O)$; and Contact Rate 3: $(I + R + O)/(I + R + rO + NC)$, where I = complete interviews, P = partial interviews, R = refusal and break off, NC = noncontact, O = other, and e = estimated proportion of cases of unknown eligibility that are eligible. For NC , e = .879. For R , e depends on the number of respondents who completed the understanding of consent and differs slightly by hospital with a total value of .902; rO = subset of "other" cases where the respondent was definitively contacted. rO differs by hospital with a total value of 12. AAPOR = American Association of Public Opinion Researchers.

^cFormula used to calculate response rates for The Checklist: no. of checklists/no. of baseline interviews.

requesting an interview, or (c) they were contacted in the course of calling their secondary contact to obtain a valid phone number. There were many reasons participants were interviewed after the target period had ended, including subsequent hospital and jail stays, residential instability, inconsistent access to phone service, and lack of availability during study hours. Interviews conducted outside of the acceptable range were coded as "other noninterviews" for the purposes of disposition classifications. The follow-up survey response rate was 47.0%; cooperation rate, 80.0%; refusal rate, 11.8%; and contact rate, 59.8% (Table 2).

3.2 | Characteristics of MHNAS participants

The MHNAS sample was 56% male, with a mean age of 39.5 years [standard error (se) = 1.19]. Respondents were predominately Hispanic, white, or black. Half reported a household income below the federal poverty level, and nearly 30% had not graduated from high school. Nearly 38% of MHNAS participants had a discharge diagnosis of schizophrenia or psychosis, 31% had a bipolar or mania disorder, and 15% had major depressive disorder. Nearly 30% reported prior hospitalization within the past 6 months (Table 3).

Although the MHNAS sample was similar to the overall population of NYC psychiatric patients with respect to age, gender, and neighborhood poverty level, people ages 65 and older and those with short LOS were somewhat underrepresented. Other key demographic characteristics were not compared with the overall NYC psychiatric patient population because they were not available (e.g., education, employment status, and marital status) or were considered unreliable (i.e., race and ethnicity) in SPARCS data (New York State Department of Health, 2014).

4 | DISCUSSION

To the best of our knowledge, this is the first study to examine the needs of psychiatric patients in a large urban setting as they transition back to the community. Important strengths of this study include a study design with random selection of hospitals and patients to provide a representative sample of individuals in NYC hospitalized for at least 4 days for psychiatric conditions, and a follow-up interview to re-assess needs of individuals approximately 3 months after their discharge to the community. The large sample size allows for in-depth analysis of patterns and predictors of need including analysis by patient characteristics including demographics, social factors, and prior service use. The broad definition of needs allows us to investigate measures of needs across many life domains and from many perspectives (self-perceived, normative standard, and healthcare provider perspective) providing a thorough and comprehensive understanding of patients' needs. Lastly, because our sample is representative of the larger population of psychiatrically discharged individuals, these results can be used for system planning and resource allocation.

Several limitations should be noted. Patients with very short lengths of stay (less than 4 days) were often discharged before they could be enumerated and selected for study participation. Because psychiatric patients with shorter LOS may be less likely to receive discharge planning and are clinically distinct from patients hospitalized for longer periods (Appleby, Desai, Luchins, Gibbons, & Hedeker, 1993; Yohanna et al., 1998), we assumed our sample could not adequately represent those with lengths of stay less than 4 days. For this reason, these patients were excluded from the final sample.

We also had a significant number of baseline refusals (21.3%), although this rate was similar to the 22% refusal rate reported by

TABLE 3 Comparison of selected characteristics from SPARCS, MHNAS-B, and MHNAS-F samples

	SPARCS ^a n = 34,822 %	MHNAS-B sample Unweighted, n = 1,129 % 95% CI	MHNAS-B sample Weighted for sample design, n = 1,129 % 95% CI	MHNAS-F sample Weighted for sample design, n = 519 % 95% CI	MHNAS-F sample ^d Combined weighting, n = 519 % 95% CI
Gender					
Male	55.1	56.8 [49.0, 64.6]	56.3 [48.6, 64.0]	49.3 [41.3, 57.3]	56.2 [47.8, 64.7]
Female	44.9	43.2 [35.4, 51.1]	43.7 [36.0, 51.4]	50.7 [42.7, 58.7]	43.8 [35.3, 52.2]
Age (in years)					
18–24	16.0	18.0 [14.0, 21.9]	17.5 [13.2, 21.8]	17.4 [12.1, 22.7]	17.6 [11.8, 23.4]
25–29	12.0	13.6 [11.1, 16.2]	13.0 [9.8, 16.3]	13.0 [8.8, 17.2]	14.1 [10.9, 17.4]
30–44	30.1	31.9 [27.5, 36.2]	31.3 [26.9, 35.7]	32.3 [25.7, 39.0]	31.6 [23.9, 39.4]
45–64	34.6	33.5 [27.5, 39.4]	34.9 [27.2, 42.6]	34.2 [23.3, 45.1]	33.4 [22.9, 43.9]
>65	7.3	3.0 [1.0, 5.0]	3.3 [1.2, 5.4]	3.1 [0.9, 5.3]	3.3 [0.7, 5.8]
Length of (baseline) psychiatric hospitalization (in days)					
4–7	25.4	16.2 [11.2, 21.1]	16.6 [11.7, 21.5]	18.2 [11.8, 24.5]	16.3 [10.5, 22.0]
8–14	36.9	40.3 [37.1, 43.4]	39.9 [36.6, 43.2]	43.3 [38.4, 48.2]	41.5 [36.7, 46.3]
15–30	26.2	32.1 [27.3, 36.8]	32.2 [27.8, 36.5]	29.0 [23.2, 34.7]	31.4 [24.6, 38.2]
>30	11.5	11.5 [8.5, 14.5]	11.4 [8.3, 14.5]	9.6 [5.4, 13.8]	10.8 [6.6, 15.0]
Neighborhood poverty level ^b					
Low (<10% below FPL)	10.4	11.9 [2.6, 21.2]	13.1 [3.4, 22.7]	14.4 [4.2, 24.5]	14.5 [3.8, 25.2]
Medium (10% to <20% below FPL)	32.2	30.2 [15.3, 45.1]	31.9 [16.8, 46.9]	32.2 [15.5, 48.9]	30.9 [15.2, 46.6]
High (20% to <30% below FPL)	27.0	27.5 [13.8, 41.2]	26.4 [13.4, 39.4]	28.6 [14.2, 43.1]	28.6 [15.1, 42.0]
Very high (30–100% below FPL)	30.4	30.4 [6.4, 54.4]	28.7 [5.4, 52.0]	24.8 [2.3, 47.3]	26.0 [3.9, 48.2]
Household income (2012 FPL)					
<100% FPL		50.8 [41.1, 60.6]	50.7 [40.4, 61.0]	47.2 [36.9, 57.6]	50.8 [40.8, 60.9]
≥100% FPL		49.2 [39.4, 58.9]	49.3 [39.0, 59.6]	52.8 [42.4, 63.1]	49.2 [39.1, 59.2]
Race/Ethnicity					
White non-Hispanic		25.8 [10.2, 41.4]	27.6 [11.8, 43.4]	28.3 [12.8, 43.9]	25.9 [10.9, 40.9]
Black non-Hispanic		26.7 [16.6, 36.8]	25.6 [15.8, 35.3]	24.6 [15.8, 33.4]	27.5 [17.5, 37.5]
Hispanic		31 [22.1, 39.9]	30.6 [21.7, 39.5]	31.8 [23.3, 40.2]	30.2 [22.6, 37.8]
Asian		4.6 [2.3, 6.9]	4.7 [2.5, 7.0]	5.3 [1.9, 8.6]	5.8 [2.3, 9.4]
Other ^c		11.9 [9.2, 14.5]	11.6 [9.0, 14.2]	10 [6.8, 13.2]	10.6 [6.9, 14.4]
Education					
Did not graduate high school		30.6 [21.2, 40.0]	29.7 [20.1, 39.4]	24.9 [14.9, 34.9]	27.3 [15.4, 39.2]
High school graduate		26 [21.3, 30.6]	25.5 [20.9, 30.2]	23.4 [18.3, 28.4]	25.5 [18.4, 32.5]
Some college		26.1 [22.6, 29.7]	26.8 [22.4, 31.2]	30.2 [25.4, 35.1]	28.1 [24.2, 32.1]
College graduate or higher		17.3 [6.2, 28.5]	17.9 [6.3, 29.5]	21.6 [8.2, 34.9]	19.1 [8.1, 30.1]
Employed		35.6 [30.9, 40.2]	35.3 [30.6, 40.0]	36.5 [29.6, 43.4]	35.3 [27.4, 43.1]
Relationship status					
Married or member of an unmarried couple		19.9 [18.0, 21.9]	20.1 [18.3, 21.9]	21.8 [18.9, 24.8]	20.2 [16.5, 23.9]
Divorced, widowed, separated, or never married		80.1 [78.1, 82.0]	79.9 [78.1, 81.7]	78.2 [75.2, 81.1]	79.8 [76.1, 83.5]
Diagnosis at discharge					
Bipolar disorder or mania		30.1 [20.9, 39.3]	30.9 [21.9, 39.9]	32.2 [22.8, 41.6]	31.6 [19.6, 43.6]
Major depressive disorder		14 [7.6, 20.3]	15.2 [8.2, 22.2]	18.6 [12.3, 25.0]	15.5 [9.2, 21.8]
Schizophrenia or psychosis NOS		39.7 [28.8, 50.5]	37.9 [26.6, 49.2]	32.2 [22.1, 42.3]	36.6 [24.3, 48.8]
Other		16.3 [11.5, 21.1]	16 [10.7, 21.4]	17 [10.4, 23.6]	16.3 [9.5, 23.2]

(Continues)

TABLE 3 (Continued)

	SPARCS ^a	MHNAS-B sample		MHNAS-B sample		MHNAS-F sample		MHNAS-F sample ^d	
	<i>n</i> = 34,822 %	Unweighted, <i>n</i> = 1,129 %	95% CI	Weighted for sample design, <i>n</i> = 1,129 %	95% CI	Weighted for sample design, <i>n</i> = 519 %	95% CI	Combined weighting, <i>n</i> = 519 %	95% CI
Slept in shelter or on street—past 12 months		15.3	[7.7, 22.9]	14.7	[7.7, 21.7]	8.9	[3.8, 14.0]	13.4	[6.2, 20.6]

Note. CI = confidence interval; FPL = federal poverty line; MHNAS-B = Mental Health Needs Assessment Baseline Interview; MHNAS-F = Mental Health Needs Assessment Follow-Up Interview; NOS = not otherwise specified; NPL = neighborhood poverty level; SPARCS = State Planning and Research Cooperative System.

^aSPARCS 01/2013–06/2014 data represent adult NYC residents discharged from NYC hospitals to community settings following a hospital stay of at least 4 days with a primary diagnosis in the range 295–298, 300–302, 307–309, and 311–314.

^bNPL was calculated from American Community Study (2000–2014) data on the percentage of households in a given zip code with incomes below the FPL. For MHNAS, NPL was calculated using the zip code respondents expected to be living at when they were discharged from the hospital, which was available for 80% of respondents in baseline sample (*n* = 898) and 87% of follow-up sample (*n* = 452).

^cOther racial category included American Indian, Alaska Native, and respondents endorsing more than one racial category.

^dFollow-up data weighted for both study design features and probability of participation in follow-up as described in Section 2.

Cleary et al. (2006) and in line with study expectations. Patients who did not agree to participate may have differed systematically from those who were interviewed. Because we did not collect information on nonparticipants, we are not able to assess the extent of the bias this may have caused. However, we are able to compare our sample to SPARCS data for hospitalizations that occurred during the time of our baseline data collection. On the basis of this, our sample appears to be representative on key demographics such as age, gender, neighborhood poverty level, and LOS for individuals with a LOS greater than 3 days. Although this does not rule out the possibility that the specific needs of the sample population differ from those in the target population, this does address some concerns regarding representativeness of the study findings. There are limitations of using SPARCS data to assess representativeness, for example, SPARCS does not collect information about spoken language or cognitive ability. As a result, our study eligibility criteria could not be replicated in the SPARCS data. Further, because those who participated in both waves of the study may have less severe illness and more stable environments (and could therefore be reached for follow up), it is possible that the burden of specific needs more common in more vulnerable patients would be underestimated in this study.

Loss to follow-up between the baseline and follow-up surveys may have also introduced selection bias. We implemented multiple best practices to reduce loss to follow-up (Robinson, Dennison, Wayman, Pronovost, & Needham, 2007), including sending reminder letters to participants prior to the target interview date, making multiple call attempts (up to 25 attempts) on multiple numbers, and contacting secondary contacts to update contact information when respondents could not be reached. With these efforts, the contact rate for follow-up was about 60%, though once contacted, we did have a high cooperation rate (80%). The representativeness of the follow-up sample may have been biased further by the exclusion of 53 interviews completed outside of the target range of 75–150 days after discharge. Yet in most cases, differences between baseline and follow-up samples were small (Table 3). To correct bias due to these factors, the follow-up sample was weighted by the inverse of the respondent's propensity to complete the follow-up interview. Additionally, follow-up rates seen in our study were similar to rates reported in similar studies. For instance,

Simons and Petch (2002) reported an initial response rate of only 46% six weeks after psychiatric discharge.

5 | CONCLUSION

The MHNAS demonstrates the feasibility of conducting a structured needs assessment with a representative sample of psychiatric inpatients in a large urban setting and following up with the sample in the months after hospital discharge. The study provides much needed data on the characteristics of the psychiatrically hospitalized and the needs of these individuals as they transition back to the community. In order to promote recovery and reduce rehospitalizations, the mental health system needs to be able to respond to all of their needs, including housing, employment, and social needs. MHNAS data can better inform the development, implementation, and oversight of ongoing and new mental health initiatives to ensure access to quality community-based, recovery-focused care that individuals need.

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DECLARATION OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

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