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Smokers with serious mental illness and requests for nicotine replacement therapy post-hospitalisation

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ABSTRACT

Background and aims Smoke-free psychiatric hospitalisation provides opportunity for initiating tobacco cessation treatment. The current study reports on psychiatric patients' interest in continuing nicotine replacement therapy (NRT) posthospitalisation and examines patient predictors of NRT requests, quit attempts and abstinence at 1-week follow-up.

Methods Daily smokers were recruited and interviewed on locked psychiatric units at three smoke-free San Francisco Bay Area hospitals. Intent to quit smoking was not required to participate and 73% of eligible smokers enrolled. Analyses focused on 816 participants (49% female) randomised to interventions providing counselling tailored to readiness to quit with availability of NRT posthospitalisation. Logistic regressions tested demographic, smoking and psychiatric factors predictive of NRT requests, quit attempts and abstinence 1-week postdischarge.

Results Participants averaged 17 (SD=10) cigarettes/day for an average of 19 (SD=14) years. Most (88%) requested study-provided NRT (74% right at discharge). Participants preparing to quit and those with more severe psychiatric symptoms were more likely to request NRT at discharge ($p<0.01$). Those with more severe psychiatric symptoms also were more likely to request NRT refill, as were older participants ($p<0.05$). Participants who requested NRT at discharge were more likely to make a 24 h quit attempt and self-report abstinence at the 1-week follow-up (54% quit attempt, 14% abstinent) than participants who did not (25% quit attempt, 4% abstinent) ($p<0.05$).

Conclusions The great demand for NRT and the association between NRT use with quit attempts and abstinence at 1-week posthospitalisation supports adoption of tobacco treatment in acute psychiatric settings.

Trial registration number # NCT00968513.

Over the past six decades, tobacco use has declined among US adults, but not appreciably so among individuals with serious mental illness (SMI).[1 2] Among psychiatric inpatients, the prevalence of cigarette smoking is two-to-three times greater (45–60%)[3 4] than in the general population (19%).[1] The impact of smoking on people with psychiatric issues is reflected in increased risk of tobacco-related heart and lung disease and cancer.[5 6] In the US, people with SMI die on average 25 years prematurely compared to people without SMI. Leading causes of death are chronic diseases, many tobacco-related.[7] Cigarette smoking also can induce the metabolism of some psychiatric medications leading to lower therapeutic blood levels and the need for higher doses.[8]

Psychiatric hospitals are increasingly voluntarily implementing smoke-free policies.[9] To manage nicotine withdrawal during smoke-free hospitalisation, the American Psychiatric Association recommends use of nicotine replacement therapy (NRT).[10] When NRT is used in psychiatric hospitals, less disruption in patient care due to a smoking ban has been found.[11]

Several studies have reported equal interest in quitting among smokers with SMI relative to the general population,[12–14] and a few studies have examined interest in or use of cessation medications. In an online survey, 78% of 685 smokers with bipolar disorder expressed a desire to use cessation pharmacotherapy to quit smoking,[15] and in two treatment studies with psychiatric outpatients interested in quitting, over 80% of participants randomised to intervention used study-provided[16] and clinic-provided[17] NRT. In a treatment study in which desire to quit was not required to enrol, 34% of depressed outpatients entered cessation treatment that included a behavioural component plus NRT.[18]

Research has not examined use of NRT in the transition from inpatient to outpatient psychiatric care. This is a critical period as research has found few patients are provided NRT at discharge (4% in one study) and most return to smoking within 5 min of leaving.[19] In our prior studies, we have heard reports of patients being advised by the discharge nurse to remove their hospital-provided nicotine patches as they are likely to return to smoking once they leave. Yet, dependent on patient interest, provision of NRT on hospital discharge could be a key component in delaying or preventing return to smoking posthospitalisation. Also, prior concerns about adverse cardiac events from smoking while on the patch have not born out in practice.[20]

The Joint Commission recommends inpatient smokers be offered cessation medications as well as counselling both while hospitalised and also on discharge.[21] A Cochrane review concluded that smoking cessation interventions, including NRT, initiated during medical hospitalisation and continued after discharge for at least 1-month increased abstinence rates.[22] None of the 50 hospital-based trials in the Cochrane review, however, were conducted in psychiatric units.

In smoke-free psychiatric settings, hospitalisation has been associated with increases in self-efficacy and goal setting to reduce or quit smoking,[23] and

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use of NRT during hospitalisation was more likely among heavier smokers, those reporting greater nicotine withdrawal and depressive symptoms, those offered NRT directly on admission, those with prior patch use and those who believed NRT was beneficial for quitting and easing withdrawal.[24]

Predictors of NRT use posthospitalisation have not been examined. While our earlier research has demonstrated efficacy of initiating tobacco treatment during psychiatric hospitalisation,[25] the study protocol restricted NRT availability to participants intending to quit and, as a result, NRT was used by only 49% of intervention participants. Given recent evidence for the use of NRT with smokers unmotivated to quit, both for smoking reduction and abstinence,[26–28] the current investigation focused on NRT requests for use posthospitalisation among patients who smoke, regardless of intention to quit. We examined correlates of the timing of patients' first request for NRT (at discharge vs postdischarge) and the likelihood of requesting a second supply, as well as examined whether receiving study-provided NRT at discharge was related to patients' reports of their attempts to quit and their smoking status 1-week posthospitalisation.

METHOD

Design

The current data were collected within the context of a 3-group longitudinal randomised controlled trial (N=956) initiated in inpatient psychiatry. Participants were randomised to usual care (n=132) or one of two treatment conditions (n=824). Participants in both treatment conditions received computer-assisted, stage-tailored counselling and had the option of receiving NRT in the form of nicotine patch, gum and/or lozenge. The 'brief' treatment group was offered up to 3 months of NRT; the 'extended' group was offered up to 6 months. The extended group also had the option to participate in 10 smoking cessation counselling sessions. The randomisation was unequal due to prior evidence of efficacy[25] and to maximise power to detect a difference between the two treatment conditions. As the current study focused on provision of NRT, only those participants randomised into a treatment arm were included in analyses. The trial's long-term follow-up data up to 18-months are still being collected; the current analysis examined whether requesting and receiving study-provided NRT at discharge was related to participants' attempts to quit and their smoking status 1-week posthospitalisation.

Participants

Participants were adult inpatients recruited from seven psychiatric units at three San Francisco Bay Area hospitals. The first hospital had four locked units and was community-based, serving insured or Medi-Care/Cal clients. The other two hospitals were part of academic medical centres, one with a locked unit and the other with one locked and one unlocked unit; both academic hospitals served patients largely insured or self-pay.

A study inclusion criterion was smoking at least 5 cigarettes/day due to the provision of NRT; intention to quit smoking was not required. To recruit a sample representative of the psychiatric population, exclusion criteria were minimal (figure 1). Patients were excluded if they had serious medical contraindications to NRT (eg, recent heart attack, active stomach ulcer, pregnancy); were overly aggressive throughout their hospital stay; were planning on moving out of the area in the next 18 months; were non-English speaking; or had severe cognitive impairments based on failure to pass a capacity to consent screener.[29]

Procedure

Study procedures were standardised across sites and approved by the participating hospital and university Institutional Review Boards. Study staff identified newly admitted smokers by review of hospital admission records and requested a clinical introduction. Patients who met inclusion criteria, demonstrated capacity to consent[29] and provided informed consent, next completed a baseline assessment on the unit and were randomised into either usual care or a treatment group (figure 1). Participants were told before completing the baseline assessment that there was a 13.6% chance they would not be randomised to receive study intervention. Participants were compensated $10 at the baseline and 1-week assessments. Baselines were completed face-to-face in the hospital; over 95% of 1-week assessments were completed over the phone.

All patients were offered NRT during hospitalisation as part of usual care. Participants randomised to a treatment condition received a transtheoretical-model tailored computer intervention,[30] a stage-tailored manual, a brief (15–30 min) on-unit counselling session (with an optional 10 sessions of cognitive behavioural cessation counselling for extended participants) and optional study-provided NRT posthospitalisation (up to 3 months for brief participants, 6 months for extended). The NRT offered was any combination of patch (7, 14 or 21 mg), gum and lozenge (both in 2 or 4 mg), the latter two available in a variety of flavours (original, mint, cherry, fruit, cinnamon). NRT was provided in 1-month supplies (to prevent misuse or loss) and was available to participants at hospital discharge through their trial end date. Participants received the study-provided NRT from the nursing staff at discharge or, if posthospitalisation, could pick up their NRT in-person or receive it by mail. Study staff offered NRT to participants during reminder calls, follow-up assessments, rehospitalisations, counselling sessions (available to those in extended treatment) and via mailed holiday/new year's cards.

Assessments

Participants in all three study groups were asked to complete all assessments. The current analyses focus on data collected at baseline and the 1-week phone follow-up.

Baseline: The baseline assessment included demographics, smoking habits and mental and physical health measures. Tobacco history questions assessed usual cigarettes/day prior to hospitalisation, 24 h quit attempts and prior use of NRT. The 3-item Stage of Change scale categorised participants into precontemplation (no intention to quit in the next 6 months), contemplation (intending to quit in the next 6 months) and preparation (intending to quit in the next 30 days with at least one 24 h quit attempt in the past year).[31] The Fagerström Test for Cigarette Dependence (FTCD)[32] assessed tobacco dependence. Two self-efficacy single items from the Thoughts About Abstinence (TAA)[33] questionnaire assessed expected success with quitting and perceived difficulty with avoiding relapse once having quit, each rated from 1 to 10. Diagnostic and Statistical Manual-IV-TR (DSM IV-TR) psychiatric diagnoses of unipolar and bipolar depression (type I and II), psychotic disorders, substance abuse and dependence, eating disorders and antisocial personality disorder were obtained using the electronic Mini Diagnostic Neuropsychiatric Interview (eMINI)[34] and by medical chart review when the eMINI was not conducted. Mental health functioning was assessed using the Behaviour and Symptom Identification Scale (BASIS-24), with possible scores ranging from 0 to 4[35]; perceived physical health was assessed

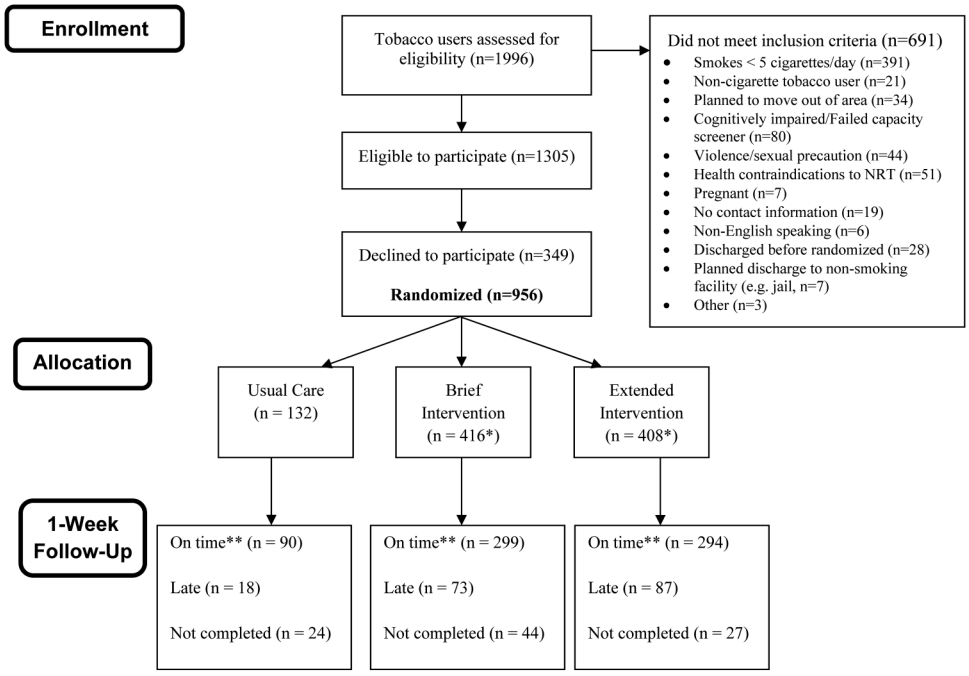

Figure 1 Participant Recruitment, Enrollment, and Follow-up.

using the 12-item Short Form Health Survey (SF-12) Physical Health Composite Scale score, with possible scores ranging from 0 to 100 and population mean of 50 (SD=10).[36]

Follow-up: The 1-week follow-up call assessed reported 24 h quit attempts and reported use of any type of tobacco since leaving the hospital.

Data analysis

The frequency of NRT requests was calculated. Logistic regression models were calculated to identify factors associated with participant: (1) requests for NRT at hospital discharge; (2) if not requested at discharge, requests for NRT at a later point; (3) requests for NRT refill; (4) attempts to quit 1-week post-discharge; and (5) reported cigarette abstinence at the 1-week follow-up. Predictors in all models were: gender (8 transgender participants were excluded from analyses due to low numbers), ethnicity (non-Hispanic Caucasian, African-American, mixed/other), age, diagnosis (psychosis, bipolar vs unipolar depression, other (eg, eating or anxiety disorder)), substance abuse (yes, no), FTCD, stage of change, prior NRT use (yes, no) and expected success with quitting and anticipated difficulty with staying quit. Cigarettes/day was not included due to high correlation with FTND (r=64). For models predicting discharge NRT request, use of on-unit NRT was added as a predictor, and for models predicting 1-week smoking behaviour, NRT request at discharge was added as a predictor. For each outcome, a single full model was tested, and for each predictor, the full model was compared to a restricted model in which the coefficient(s) for that predictor were constrained to 0. Hypotheses were tested using Likelihood Ratio Tests (on difference in deviance, D, between models). For significant effects, odds ratios were calculated for each regression coefficient. As expected, no models revealed a significant effect of condition (brief vs extended treatment, p >0.12). This predictor was therefore not included in the models reported below. Models were estimated and tested using R (V.2.15.2).

RESULTS

Participant demographic, psychiatric and smoking characteristics

Of all eligible inpatient smokers, 73% agreed to participate (see figure 1). The treatment sample (N=816 (reflects the exclusion of the transgender participants)) averaged 39 (SD=14) years of age and was 49% female. Participants met criteria for a variety of psychiatric diagnoses with high comorbidity; 68% had problems with alcohol and/or drug abuse/dependence (table 1). Participants averaged a score of 2 (SD=.78) on the BASIS-24 symptom severity scale, slightly higher (more severe), than published values for an inpatient sample (34), and a physical health functioning score of 47 (SD=13) on the SF-12.

The sample smoked a mean of 17 (SD=10) cigarettes/day for a mean of 19 (SD=14) years, scored a mean of 4.7 on the FTCD (SD=2.2) and reported a median of 3 (IQR 1–10) lifetime quit attempts that lasted at least 24 h; 30% of the sample was in precontemplation, 47% in contemplation and 24% in preparation. About a third (33%) reported using NRT during a prior quit attempt and 75% reported NRT use during their current hospitalisation.

Participant requests of study-provided NRT

Most participants requested NRT during the study: 74% of participants requested NRT at hospital discharge, while another 14% who did not request NRT at discharge requested it at a later point. Of those who made an initial NRT request, 55% requested a second supply. Among participants who requested NRT, 72% requested patches, 66% gum and 47% lozenges. The most common combination of NRT was patch plus gum (34% of those receiving any type of NRT), followed by patch plus gum and lozenge (28%), patch plus lozenge (16%) and gum plus lozenge (4%).

Predictors of requesting NRT at hospital discharge: Of the 816 treatment participants, 757 had complete observations for the chosen set of independent variables. Being in a later stage of

Table 1 Sample descriptive characteristics

Age: M (SD)	38.8 (13.6)
Gender: n (%)	
Women	398 (48.8)
Men	418 (51.2)
Ethnicity: n (%)	
African-American	195 (23.9)
Non-Hispanic Caucasian	386 (47.4)
Other	235 (28.8)
Income: n (%)	
<$10 000	396 (48.5)
$10 000–20 000	214 (26.2)
$20 000–30 000	63 (7.8)
$30 000–40 000	31 (3.8)
>$40 000	112 (13.7)
Housing stability: n (%)	
Own/rent	452 (55.4)
Unstable, not homeless	282 (34.6)
Homeless	82 (10)
Meets diagnostic criteria: n (%)	
Bipolar depression	348 (42.7)
Unipolar depression	259 (31.7)
Psychotic disorder	355 (43.5)
Eating disorder	53 (6.5)
Antisocial personality	159 (19.5)
Substance use disorder	558 (68.4)

change (D (2)=30.05, p<0.001) and having more severe mental health symptoms as measured by the BASIS-24 (D (1)=6.73, p=.009) predicted request for NRT at discharge (table 2). NRT requests at discharge were made by 84% of those in preparation, 80% of contemplators and 57% of precontemplators.

Predictors of making the first NRT request after discharge: Of the 210 participants who did not request NRT at discharge, 192 had complete observations for the chosen set of independent variables. Among those who did not request discharge NRT, women (D (1)=14.01, p<0.001; 67% of women, 41% of men), those who scored as more nicotine dependent on the FTCD (D (1)=4.74, p=.029) and older participants (D (1) =8.27, p=.004) were more likely to make a later request for NRT (table 2). Participants aged 18–36 who did not request NRT at discharge were least likely to get NRT later.

Predictors of requesting a second supply of NRT: Of the participants who received NRT at some point in the study, 665 had complete observations for the chosen set of the independent variables. Symptom severity (D (1)=4.25, p=.039) and older age (D (1)=4.17, p=.041) predicted requesting an NRT refill (table 2).

Requesting NRT at discharge and smoking characteristics at 1-week: The following analyses were conducted using the data from those who completed the 1-week follow-up until 2 weeks post-discharge (see figure 1). Compared on all predictor variables using t tests and Pearson χ^2 tests, participants who completed the 1-week follow-up within 2 weeks of discharge did not differ significantly from participants who completed it late or not at all (p >0.87, using Holm's[37] method for adjusting p values for multiple comparisons; unadjusted p >0.11). Complete data on smoking status at 1-week follow-up and the predictor variables of interest were available for 550 participants and 11% reported abstinence. Requesting NRT at discharge (D (1)=7.29, p=0.007), being in a later stage of change (D (2)=15.89, p<0.001), and greater expected success with quitting at baseline (D (1)=4.92, p=0.027) predicted abstinence (table 3).

Of those who received NRT at discharge, 14% reported not smoking since hospital discharge compared to 4% of participants who did not receive discharge NRT; 23% of those in preparation at baseline reported abstinence, as opposed to 9% who were in contemplation and 3% who were in precontemplation; those who had a baseline expectancy rating higher than 7 were more likely to report abstinence (17%) than those with a rating of 7 or lower (7%).

Data for all predictors and quit attempts at 1-week were obtained for 497 participants, and 46% reported making at least one 24 h quit attempt. Significant predictors of making a quit attempt by the 1-week follow-up were: discharge NRT request (D (1)=21.00, p<0.001; 54% of those who requested discharge NRT vs 25% of those who did not), ethnicity (D (2) =12.03, p=0.002; 60% of African-Americans as opposed to 43% of Caucasians and 39% of other ethnicities), baseline stage of change (D (2)=25.54, p<0.001; 69% of those in preparation, 44% in contemplation and 27% in precontemplation) and greater expected success with quitting at baseline (D (1) =4.87, p=.027; 58% of those with an expectancy rating over 7, as opposed to 44% of those with a score between 4 and 7 and 29% for those with a score less than 4; table 3).

DISCUSSION

The findings of this study indicate great interest in using NRT post-hospitalisation among smokers with SMI: 74% requested NRT at discharge and another 14% within 6-months of hospitalisation, and this in a sample where 30% of participants at recruitment expressed no desire to quit in the near future (ie, precontemplation stage).

The intervention was tailored to stage of change, and provision of NRT was permitted even if participants were not ready to quit. Notably, request for NRT in the current study was nearly twice that seen in our earlier trials with depressed outpatients[18] and psychiatric inpatients,[25] which had protocols restricting NRT use to participants who expressed intention to quit in the next 30 days. Relaxing NRT requirements is supported by recent evidence in the literature citing the benefits of NRT use with smokers unmotivated to quit.[26–28] The current findings indicate interest in NRT use among smokers with SMI, including among those unmotivated to quit.

The brief, on-unit, stage-tailored counselling included information on NRT, which was presented as an available option from the hospital while an inpatient and posthospitalisation to participants through the study. This approach may have encouraged participants with a less concrete plan of abstinence to request NRT and to use it to stay-off smoking posthospitalisation. We found here that provision of NRT at discharge was related to abstinence at the 1-week follow-up even after controlling for baseline stage of change.

Readiness to quit was a major predictor of NRT requests. In the model predicting receipt of NRT at hospital discharge, which is when most participants made their initial request, the strongest predictor was stage of change, with those in precontemplation less likely to request NRT than those in later stages. Yet, over half of those in precontemplation requested NRT at discharge, possibly impacted by the brief stage-tailored counselling and 40% of those in precontemplation at baseline requested another supply of NRT, likely reflecting movement. Also, related to both NRT request at discharge and receipt of a second supply, was having more severe psychiatric symptoms. Those struggling with more severe psychiatric symptoms appear more

Table 2 Significant predictors of NRT requests

	First request at discharge (n=757) OR (95% CI)	First request after discharge (n=192) OR (95% CI)	Request of additional supply (n=665) OR (95% CI)
Stage of change			
Contemplation	Ref	Ref	Ref
Precontemplation	0.40 (0.27 to 0.59)***	NS	NS
Preparation	1.36 (0.83 to 02.42)	NS	NS
Psychiatric symptom severity (BASIS-24)	1.35 (1.08 to 1.70)*	NS	1.26 (1.01 to 1.57)*
Gender			
Women	Ref	Ref	Ref
Men	NS	0.26 (0.12 to 0.54)***	NS
Age	NS	1.04 (1.01 to 1.07)**	1.01 (1.00 to 1.03)*
Nicotine dependence (FTCD)	NS	1.21 (1.02 to 1.44)*	NS

*=p<0.05, **=p<0.01, ***=p<0.001.
NRT, nicotine replacement therapy; NS, not significant.

willing to want and/or accept pharmacological treatment for quitting smoking. This finding refutes the notion that those with SMI are uninterested in quitting or in using cessation aids.

Of clinical importance are those variables that predicted a delayed initial request for NRT *after* hospital discharge: gender, age and nicotine dependence. Women, older adults and those more nicotine dependent who initially seemed *uninterested* in NRT (ie, they did not make a request at discharge) were more likely than others to request NRT at a later point. Special attention to these groups is warranted, given that repeated contact regarding smoking cessation after discharge from a psychiatric hospitalisation is not guaranteed. Also notable was the finding that younger adults were *least* likely to change their mind about receiving NRT if they did not request it at discharge; this is consistent with research that has reported difficulties, in non-psychiatric samples, engaging young adults in tobacco treatment.[38 39]

While stage of change, expected success with quitting, and requesting NRT at discharge all predicted both making a quit attempt as well as abstinence status at the 1-week follow-up, the impact of requesting discharge NRT is striking: those who received NRT were over three times (14% vs 4%) more likely to have not smoked cigarettes since leaving the hospital and over twice as likely to have made a quit attempt (54% vs 25%). The findings support The Joint Commission's new tobacco treatment standards and Rigotti *et al*'s[22] Cochrane review recommendation to provide cessation treatment, including NRT, following hospitalisation. As stage of change was related to requesting NRT, and NRT use was related to quitting, it would be beneficial for clinicians and hospital staff to employ brief, stage-tailored motivational counselling to patients before discharge. If patients are offered NRT after such counselling, they may be more willing to accept it and thus more likely to try to stop smoking when out of the hospital.

A limitation of the current study was restriction of analyses to short-term outcomes of NRT receipt, such as quit attempts and quit status at 1-week. Future investigation is needed with regard to long-term outcomes. The current study analysed 1-week follow-ups and, given the difficulty of reaching people within a week after a psychiatric hospitalisation, only 72% of participants were able to be included in these analyses (figure 1). Additionally, quit attempts and abstinence were self-reported. Future studies should use biological verification of quit status (eg, a carbon monoxide test) to mitigate the limitations of self-report. It is also unknown whether results would generalise to regions outside the Bay Area. Certain findings also warrant further exploration, such as the finding that African-Americans were more likely to report a quit attempt in the week following hospitalisation. Despite these limitations, the findings—both with regard to patient interest and quitting behaviour—from

Table 3 Significant predictors of smoking behavior at 1-week follow-up

	Smoking status (n=550) OR (95% CI)	Quit attempts (n=497) OR (95% CI)
Requesting NRT @ Discharge	0.32 (0.13 to 0.80)*	2.99 (1.84 to 4.85)***
Ethnicity		
African-American	Ref	Ref
Non-Hispanic Caucasian	NS	0.50 (0.30 to 0.83)**
Other ethnicity	NS	0.38 (0.22 to 0.67)**
Stage of change		
Contemplation	Ref	Ref
Precontemplation	2.18 (0.79 to 6.06)	0.73 (0.44 to 1.20)
Preparation	0.39 (0.21 to 0.72)**	2.94 (1.78 to 4.86)***
Expected success with quitting	0.88 (0.78 to 0.99)*	1.09 (1.01 to 1.17)*

*=p<0.05, **=p<0.01, ***=p<0.001.
NRT, nicotine replacement therapy.

What this paper adds

This paper reports on a study in which an often overlooked population—smokers hospitalised in smoke-free inpatient psychiatry units—were counselled to quit and offered no-cost nicotine replacement therapy on hospital discharge. Though the study recruited participants with significant psychopathology and at all stages of change for quitting, we found an overwhelming interest in using nicotine replacement after leaving the hospital. Receiving nicotine replacement right at discharge was related to reported abstinence and quit attempts at 1-week post-hospitalisation. The findings support the treatment of tobacco dependence with smokers hospitalised for mental illness and provision of post-hospitalisation pharmacotherapy.

this large, diverse sample of smokers with SMI, supports initiation of tobacco treatment in inpatient psychiatry and provision of NRT in the transition to outpatient care.

Contributors RKS was involved in data collection; manuscript design, drafting and design of data analysis. AD was involved in design, execution of data analysis and manuscript draft revisions. SMH took part in overall study design and manuscript draft revisions. KD was involved in overall study design, data analysis consultation and manuscript draft revisions. CF took part in overall study design, manuscript design and manuscript draft revisions. SEH and TB were clinical site collaborators and were involved in manuscript draft revisions. JP was involved in overall study design, manuscript design, manuscript draft revisions and study supervisor. All authors gave their approval of the final draft.

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