



Rate and correlates of tobacco treatment during a primary care visit for a largely urban and African American sample of smokers

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ABSTRACT

Introduction: Evidence-based treatments for tobacco use are under-utilized and primary care visits may be an opportune time to address this gap. This study examined the rate at which primary care visits included tobacco use treatment and examined patient demographics, smoking characteristics, attitudes about tobacco use treatments, and comorbidities as correlates of treatment provision.

Methods: This prospective study assessed demographics, smoking characteristics, attitudes about tobacco use treatments, and comorbidities via interview prior to a primary care visit among 105 patients. One week following the appointment, 85 patients were reassessed for the tobacco use treatments they received during their appointment (i.e., asked about their tobacco use, advised to quit, and provided with a referral to a tobacco use treatment program or an FDA-approved tobacco use medication).

Results: 93% of patients were asked about their tobacco use, 74% were advised to quit, 37% were provided with a referral for tobacco use treatment, and 27% received an FDA-approved medication (16% NRT, 11% varenicline or bupropion). Patients with higher quit motivation and who endorsed that medications can reduce cravings were more likely to report receiving tobacco use medication. Patients with a self-reported substance abuse history were less likely to report receiving tobacco use medications.

Conclusions: The provision of tobacco use medications within primary care remains low. Strategies to increase patient quit motivation and help patients understand that tobacco use medications can mitigate cravings may increase use. Strategies may also be needed to ensure that patients with comorbid substance abuse still receive tobacco use treatments.

1. Introduction

Despite a significant reduction in the rate of smoking since 1960, about 14% of US adults are current smokers, a figure that has remained relatively stable for the past decade (Creamer et al., 2019). In the United States, smoking remains the greatest cause of disease morbidity and mortality, responsible for about 500,000 annual deaths (U.S. Department of Health and Human Services 2014). Evidence-based treatments for tobacco use, including behavioral interventions and medications, are widely available and can double the chances of successful smoking cessation (Kathuria et al., Jul; Hartmann-Boyce et al., 2018; Cahill et al., 2013; Cahill et al., 2016). Unfortunately, less than 10% of smokers who make a serious attempt to quit smoking use these evidence-based treatments (Ku et al., 2016; Fix et al., 2011).

Primary care physician (PCP) visits can be a vital time to access evidence-based tobacco use treatments. More than 70% of all smokers see a PCP at least once per year, with patients reporting that they value and respect cessation advice from physicians (Fiore et al., 2008; Aveyard et al., 2012). A large proportion of patients in primary care settings are ready to make a quit attempt, and physician smoking cessation interventions can increase patient quit rates (Stead et al., 2013). However, several studies indicate that the PCP visit is inadequately used to provide nicotine dependence treatments to patients: a large national survey showed that less than 8% patients were provided a prescription for nicotine dependence during clinic visits (Jamal et al., 2012). Thus, despite the well-demonstrated effectiveness and safety of treatments for tobacco use and the potential for physician visits to be an opportunity

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to facilitate treatment engagement, there remains a significant practice gap.

In this study, we examined in a prospective fashion the rate at which primary care patients received tobacco use treatments and evaluated correlates of treatment provision, including patient demographics, smoking characteristics, attitudes about tobacco use treatments, and comorbidities. The development of strategies to shrink this practice gap and to realize greater use of tobacco use treatments within primary care settings depends on greater understanding of such factors, which could be targeted using implementation science approaches as done in other clinical settings (Jenssen et al., 2019).

2. Methods

2.1. Design

This was a prospective study that assessed a sample of primary care patients two weeks prior to, and one week following, their medical appointments with their physician. Patients scheduled to meet with their physician were screened for eligibility at least two weeks before their appointment. Eligible patients were interviewed in person prior to their appointment (e.g., smoking history, medical comorbidities, attitudes towards medications for tobacco use; see below) and then by telephone one week following their appointment. The university Institutional Review Board provided approval. The study was completed prior to the June 2021 recall of varenicline (trade name Chantix®).

2.2. Participants

To be eligible, patients had to have an appointment scheduled with a primary care physician, report currently smoking ≥ 5 cigarettes per day for the past six months, be age 18 or older, have the ability to provide informed consent and communicate in English, and have no medical contraindications for the use of medications for tobacco use. Eighty-five participants (81%) completed the follow-up assessment.

2.3. Measures

Prior to the medical appointment, patients provided demographic (e.g., age, gender, race) and smoking history (e.g., cigarettes per day, age started, interest in quitting) information, including the Fagerström Test for Nicotine Dependence (FTND) (Heatherton et al., 1991). General medical data were also collected, including how long the patient has been with their primary care physician, the number of visits in the past year, the patient's perceived health (from 1 = excellent to 5 = poor), and if they have a history of diabetes, hypertension, cancer, cardiovascular disease, psychiatric illness, or substance abuse (yes/no). Patients also responded to surveys that assessed their perceived quitting self-efficacy (Etter et al., 2000), quit motivation (Boudreaux et al., 2012) and expectancies associated with smoking cessation medications, which were characterized as: reducing negative affect, having stimulating effects, reducing craving, assisting with weight control, helping to facilitate cessation, and having health risks (Juliano and Brandon, 2004).

One week following the patient's appointment, patients completed surveys by phone to determine if they were asked about their tobacco use, if they were advised to quit, if they received a referral (the site of this trial has access to a tobacco use treatment program to which patients can be referred through the electronic health record), and if they received an FDA-approved tobacco use medication (yes/no).

2.4. Statistical analyses

We used descriptive statistics to characterize the sample and the rate at which patients were asked about their smoking, advised to quit, referred for tobacco use treatment, and provided with a tobacco use medication. Using the sample of 85 participants who completed the baseline

and post-medical visit assessment ($N = 85$), we used ANOVA and chi-square to examine correlates of being advised to quit smoking, receiving a referral for cessation treatment, and receiving a tobacco use medication. Variables associated with these outcomes ($p < 0.05$) were entered into separate multiple linear regression models and were evaluated for statistical significance using standardized coefficients or odds ratios, as well as probabilities ($p < 0.05$) and 95% confidence intervals.

3. Results

3.1. Sample characteristics

One-hundred and forty patients were approached for the study and 105 (75%) enrolled. The sample was comprised primarily of African American patients (83%), who were female (63%), had an average age of 57.4 years ($SD = 11.6$), and 66% reported an annual family income of $< \$35,000$. On average, patients reported their relationship with their current primary care physician had been in place for 128.5 months ($SD = 92.1$) and had made 5.34 visits in the past year ($SD = 7.1$). Comorbidities included diabetes (33%), hypertension (29%), cardiovascular disease (20%), cancer (8%), psychiatric illness (59%), and substance abuse (34%). On average, participants reported smoking 12.5 cigarettes each day ($SD = 7.6$), have been smoking for 36.1 years ($SD = 13.6$), and had an FTND score of 3.0 ($SD = 2.0$).

3.2. Rate of tobacco use treatment

Almost all patients assessed at one week after their medical appointment indicated that they were asked about their tobacco use (93%); 74% were advised to quit, 37% were provided with a referral for tobacco use treatment, and 27% received an FDA-approved medication (16% received an NRT [6% combination NRT] and 11% received either varenicline or bupropion).

3.3. Correlates of tobacco use treatment

As shown in Table 1, patients who expressed greater interest in quitting smoking were more likely to be advised to quit ($p < 0.05$). Patients who expressed greater motivation to quit and endorsed that medication can reduce their nicotine craving and help them quit were more likely to report using a smoking cessation medication ($p < 0.05$). Patients with a history of substance abuse were less likely to report using a smoking cessation medication ($p < 0.05$). No factors were associated with reports of a smoking cessation referral and correlates of being asked about tobacco use were not examined since so few patients reported not being asked. Since only reported medication use had multiple covariates, only this variable was used in a multiple regression model. Higher quit motivation ($OR = 1.73$, 95% CI: 1.11–2.71, $p < 0.05$) and greater endorsement that medications can reduce craving ($OR = 1.46$, 95% CI: 1.04–2.04, $p < 0.05$) were associated with greater reported use of smoking cessation medications, and the association between a greater reported substance abuse history and a lower reported use of smoking cessation medication approached significance ($OR = 3.36$, 95% CI: 0.93–12.01, $p = 0.06$).

4. Discussion

In this study, we followed a sample of primary care patients to assess the degree to which they received tobacco use treatments from their clinicians and to assess patient characteristics associated with treatment. While almost all patients had their tobacco use status assessed, only a small proportion of patients were provided with evidence-based tobacco use treatments. Patients with higher quit motivation and who endorsed that medications can reduce cravings were more likely to report receiving tobacco use medication. Patients with a self-reported substance abuse history were less likely to report receiving tobacco use medications. Overall, these results indicate that new approaches are still needed to engage primary care patients in tobacco use treatment.

Table 1
Rates and Correlates of Tobacco Use Treatment (N = 85).

Variable	Advise		Refer		Medication	
	Yes	No	Yes	No	Yes	No
Age (M/SD)	58.29 (10.4)	59.1 (14.1)	57 (11.1)	59.3 (11.6)	59.2 (12.3)	58.2 (11.1)
Duration as patient (M/SD)	130.3 (90.2)	138.0 (106.8)	140.7 (78.9)	127.4 (102.2)	153.2 (103)	124.5 (90.3)
Visits in past year (M/SD)	5.5 (7.6)	5.0 (3.3)	4.6 (4.1)	5.8 (8.0)	4.3 (3.4)	5.8 (7.7)
General health (M/SD)	3.4 (1.0)	3.6 (0.9)	3.7 (1.0)	3.3 (1.0)	3.3 (0.8)	3.5 (1.1)
Functional level (M/SD)	2.3 (1.4)	2.5 (1.4)	2.4 (1.4)	2.3 (1.4)	2.5 (1.6)	2.3 (1.3)
Cigarettes per day (M/SD)	13.0 (8.2)	12.8 (6.9)	12.9 (7.1)	13 (8.3)	13.1 (8.9)	12.9 (7.5)
Years smoked (M/SD)	36.8 (12.9)	37.1 (15.3)	34.7 (13.1)	38.1 (13.6)	36.1 (14.9)	37.1 (13)
FTND (M/SD)	3.2 (2.1)	2.8 (1.7)	3.3 (1.6)	3 (2.2)	2.9 (2)	3.2 (2.1)
Quit interest (M/SD)	1.8 (0.9)	2.3 (0.9)*	1.9 (1.1)	1.9 (0.8)	1.8 (0.9)	2 (0.9)
Quit motivation (M/SD)	6.7 (1.5)	6.5 (1.5)	6.6 (1.3)	6.7 (1.6)	7.4 (1.1)	6.4 (1.5)*
Quit self-efficacy (M/SD)	29.3 (9.4)	26.9 (11.6)	28.9 (8.8)	28.5 (10.7)	32.2 (9.8)	27.4 (9.8)**
Meds Negative Affect Relief (M/SD)	16.4 (5.6)	15.5 (5.6)	16.8 (5.4)	15.8 (5.7)	17.1 (7.3)	15.8 (4.8)
Meds stimulate (M/SD)	4.9 (2.1)	4.6 (1.9)	4.9 (2.3)	4.8 (1.9)	5.3 (2.6)	4.6 (1.7)
Meds reduce craving (M/SD)	6.6 (2.3)	5.8 (2.2)	6.7 (2.2)	6.2 (2.4)	7.6 (2.6)	5.9 (2)*
Meds reduce weight (M/SD)	7.5 (3.3)	7.4 (2.8)	7.8 (3.2)	7.2 (3.1)	7.3 (3.6)	7.5 (3)
Meds have risks (M/SD)	12.2 (4.4)	12.7 (4.0)	12.8 (4.1)	12.1 (4.4)	12.3 (4.7)	12.4 (4.2)
Meds help quit (M/SD)	10.5 (3.5)	9.8 (3.1)	10.7 (2.9)	10.1 (3.7)	11.7 (3.5)	9.8 (3.2)*
Income ≤35k (Number/%)	43 (72)	13 (62)	23 (76.7)	33 (64.7)	14 (66.7)	42 (70)
Married (Number/%)	17 (27)	8 (36.4)	6 (19.4)	19 (35.2)	15 (65.2)	45 (72.6)
Education ≤HS (Number/%)	28 (44.4)	10 (45.5)	14 (45.2)	24 (44.4)	10 (43.5)	28 (45.2)
Sex female (Number/%)	40 (63.5)	14 (63.6)	21 (67.7)	33 (61.1)	18 (78.3)	36 (58.1)
Race Black (Number/%)	53 (88)	17 (81)	28 (93.3)	42 (82.4)	20 (90.9)	50 (84.7)
Reason annual (Number/%)	31 (49)	15 (68.2)	16 (51.6)	30 (55.6)	13 (56.5)	33 (53.2)
Diabetes (Number/%)	22 (35)	8 (36.4)	14 (45.2)	16 (29.6)	8 (34.8)	22 (35.5)
Hypertension (Number/%)	17 (27)	9 (41)	11 (35.5)	15 (27.8)	7 (30.4)	19 (30.6)
Cardiovascular (Number/%)	13 (20.6)	5 (22.7)	7 (22.6)	11 (20.4)	4 (17.4)	14 (22.6)
Cancer (Number/%)	4 (6.3)	3 (13.6)	4 (12.9)	3 (5.6)	0	7 (11.3)
Psychiatric Dx (Number/%)	33 (52.4)	17 (77.3)*	21 (67.7)	29 (53.7)	13 (56.5)	37 (59.7)
Substance Use Dx (Number/%)	23 (36.5)	8 (38.1)	13 (43.3)	18 (33.3)	4 (17.4)	27 (44.3)*

Note. * $p < 0.05$; ** $p < 0.10$.

These study results identifying the low rates at which patients reported receiving tobacco use treatments from their physicians are similar to previous studies. (Park et al., 2015; Williams et al., 2014) Further, these results underscore the need for additional support to ensure the consistent delivery of evidence-based care for tobacco users. While the present and past studies show that in the primary care setting, there is a high level of proficiency for identifying tobacco users – a critical part of treating tobacco use – these studies also show that rates of referral to tobacco use treatment programs and rates of prescribing of medications remain unacceptably low. Innovative approaches that leverage the electronic health record to facilitate utilization of tobacco use treatments are showing promise (Satterfield et al., 2018; Bae et al., 2017) and could be explored in future studies.

In developing potential EHR-based approaches as a conduit to help support the treatment of tobacco use in the context of primary care, efforts may be needed to engage patients by addressing patient motivation to quit. The importance of quit motivation as a factor predictive of engagement in, and success with, tobacco use treatment is widely acknowledged (Ussher et al., 2016; Vangeli et al., 2011). Motivational interviewing, which is a behavioral counseling approach to support tobacco use cessation by focusing on empathy, self-efficacy, and helping the patient understand discrepancies between their smoking and their goals and values, is an evidence-based approach to treating tobacco use which can be delivered by physicians in brief formats (Lindson-Hawley et al., 2015). Likewise, craving for nicotine plays an important role in maintaining tobacco use and can undermine response to treatment. (Robinson et al., 2019; Serre et al., 1) FDA-approved medications for tobacco use are effective at mitigating craving. Patient-facing messaging utilizing the EHR to address tobacco use treatment engagement should emphasize the capacity for these medications to help smokers manage abstinence-inducing tobacco cravings. Lastly, capitalizing on the potential for primary care visits to be leveraged to enhance engagement with tobacco use treatments may require strategies that ensure patients with a history of comorbid substance use receive equitable treatment. While there is the widespread belief that tobacco use treatments are not suited for

smokers with comorbid substance use conditions, the available data indicate that tobacco use treatments are safe and at least moderately effective for these smokers (Leeman et al., 2007; Hurt et al., 2018; Vlad et al., 2020; Fucito et al., 2011). As such, when designing an EHR-based approach to promote tobacco use treatment in primary care as a conduit to deliver patient-facing information, strategies should ensure that even patients with a history of substance abuse receive appropriate treatment.

The study should be considered in the context of limitations. The sample was small and retention was 81%. A small range of potential correlates was examined and data were self-reported. Provider- and system-level factors were not assessed and could influence tobacco use treatment. Asking patients ahead of their appointment about smoking behaviors and attitudes could have influenced what occurred during the clinic visit. The directionality of effects cannot be discerned. Lastly, the sample was ascertained from two primary care practices in an urban setting, so it may not generalize to the broader population.

Nevertheless, the study findings are consistent with accumulating data underscoring the need for innovations in how primary care is leveraged to promote access to, and use of, treatments for tobacco use. In particular, the present results, which are based on prospective assessment of tobacco use treatment among a largely African American and under-resourced urban community, can help guide future studies that explore novel ways to use the EHR to help address the persistent practice gap concerning the use of evidence-based treatments for tobacco use.

Declarations of Competing Interests

Dr. Schnoll has received varenicline and placebo free from Pfizer and has provided consultation to Pfizer. Dr. Schnoll has provided consultation to GlaxoSmithKline and Palliatech.

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Contributors

Anna-Marika Bauer helped conceptualize this paper, analyze the data, and draft the manuscript. Tucker Rogers, Nathaniel Stevens, Janelle Purnell, Mackenzie Hosie Quinn and Michelle An helped with participant recruitment and edited the manuscript. Colin Wollack compiled electronic medical record data and edited the manuscript. Frank Leone ensured participant safety, helped with participant recruitment, and edited the manuscript. Brian Jenssen edited the manuscript Robert Schnoll served as the overall study Principal Investigator, conceptualized the present study, analyzed the data, and co-drafted the manuscript. All authors reviewed the manuscript for content and have approved the final version.

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