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Attitudes about smoking cessation treatment, intention to quit, and cessation treatment utilization among young adult smokers with severe mental illnesses

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Abstract

Significance: Young adults with schizophrenia, bipolar disorder and other severe mental illnesses (SMI) have high rates of smoking, but little research has evaluated predictors of cessation activity and treatment utilization in this group.

Methods: We assessed attitudes, beliefs, social norms, perceived behavioral control, intention, quit attempts, treatment utilization, and cessation among 58 smokers with SMI, age 18-30, enrolled in a randomized pilot study comparing a brief interactive/motivational vs. a static/educational computerized intervention. Subjects were assessed at baseline, post intervention, and 3-month follow-up.

Results: Over follow-up, one-third of participants self-reported quit attempts. Baseline measures indicating lower breath CO, greater intention to quit, higher perceptions of stigma, psychological benefits of smoking, and symptom distress were associated with quit attempts, whereas gender, diagnosis, social support, attitudes about smoking, and use of cessation treatment were not. In the multivariate analysis, lower breath CO, higher intention to quit and symptom distress were significantly related to quit attempts.

Only 5% of participants utilized verified cessation treatment during followup. Consistent with the Theory of Planned Behavior, attitudes, social norms and perceived behavioral control regarding cessation treatments correlated significantly with intention to use treatment. Norms and beliefs about treatment were somewhat positive and some improved after intervention, with a pattern

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significantly favoring the interactive intervention, but intentions to use treatments remained low, consistent with low treatment utilization.

Conclusions: Perceptions of traditional cessation treatments improved somewhat after brief interventions, but most young adult smokers with SMI did not use cessation treatment. Instead, interventions led to quit attempts without treatment.

Keywords

Smoking cessation; Technology-delivered intervention; Young adult; Serious mental illness

1. Introduction

Although public health efforts have resulted in a dramatic reduction in the number of young people who initiate smoking, young adults with mental health symptoms or distress are more likely to smoke than those without mental health issues (Griesler, Hu, Schaffran, & Kandel, 2008; Hu, Davies, & Kandel, 2006; Jamal et al., 2016). Rates of smoking are even higher (50-80%) among young adults whose mental illness is severe, chronic or disabling, including those with schizophrenia and bipolar disorders (serious mental illness; SMI (Barnes et al., 2006; Correll et al., 2014; Vanable, Carey, Carey, & Maisto, 2003; Wade et al., 2006)). Because the negative health effects of toxins in tobacco smoke build over time (U.S. Department of Health and Human Services, 2014), helping young smokers quit prior to many years of exposure can prevent disease and early mortality (Doll, Peto, Boreham, & Sutherland, 2004; Taghizadeh, Vonk, & Boezen, 2016).

Although many young adults wish to quit (Pirie, Murray, & Luepker, 1991; Tucker, Ellickson, Orlando, & Klein, 2005) and are more likely than older adults to make quit attempts (CDC, 2011), they are less likely to report using cessation treatment counseling or medications that have the potential to increase the likelihood of success in their quit attempt (2011; DeBernardo et al., 1999; Hines; Kahende et al., 2017; Solberg, Boyle, McCarty, Asche, & Thoele, 2007). Further, some studies indicate that young adults are the age group least likely to achieve abstinence (Agrawal, Sartor, Pergadia, Huizink, & Lynskey, 2008; Chen & Kandel, 1995). Young adults with SMI show similar patterns of quit attempts (Brunette et al., 2017; Catchpole, McLeod, Brownlie, Allison, & Grewal, 2017; Morris et al., 2011) and lack of interest in traditional evidence-based cessation treatment (Brunette et al., 2017; Catchpole et al., 2017; Grana, Ramo, Fromont, Hall, & Prochaska, 2012; Leatherdale & McDonald, 2007) compared to young adults without SMI, but further information is needed about quit attempts as one step in the process towards reaching permanent abstinence.

The Theory of Planned Behavior (TPB) can be used to understand health behavior and to design effective interventions to improve it (Webb, Joseph, Yardley, & Michie, 2010). Under this theory, attitudes, subjective norms, and perceived behavioral control over the behavior (e.g. using smoking cessation treatment) lead to intention or motivation to enact the behavior (Figure 1)(I. Ajzen, 1991). These constructs have predicted intention to quit smoking (Godin & Gerjo, 1996; Norman, Conner, & Bell, 1999) and to change other health behaviors in the

general population. The subjective beliefs that underlie attitudes, social norms and perceived behavioral control may be unique within different populations.

In relation to social norms, research in the general population has shown that social stigma, or the perception of being discriminated against, influences smoking and quitting behavior (Hammett et al., 2017; O'Connor, Rees, Rivard, Hatsukami, & Cummings, 2017; Stuber, Galea, & Link, 2008). Among smokers with mental illness, greater levels of self-stigma regarding smoking were associated with greater readiness to quit (Brown-Johnson et al., 2015), but we are not aware of research that has evaluated perceptions of smoking-related stigma among young adult smokers with SMI.

Additionally, although many studies have described middle-aged smokers with SMI (e.g. (Aschbrenner et al., 2017; Lucksted, McGuire, Postrado, Kreyenbuhl, & Dixon, 2004; Wehring et al., 2012)), few studies have described the beliefs, attitudes, social context and perceptions of social norms related to smoking among young adults with mental illness (Grana et al., 2012; Morris et al., 2011), and research on beliefs about smoking cessation and use of cessation treatment among young smokers with SMI is also sparse (Catchpole et al., 2017; Leatherdale & McDonald, 2007; Morris et al., 2011). A fuller understanding of the characteristics, beliefs, attitudes, social norms and perceived behavioral control about cessation treatment, to is needed to inform health communications and intervention development for groups that have not yet responded robustly to tobacco control efforts, such as young adults with SMI.

This study includes secondary analyses of data obtained in a randomized pilot study comparing two brief, web-based interventions for smoking cessation among young adult smokers with SMI. In order to better understand pathways to quitting, we explored data predicting two intermediate outcomes, self-reported quit attempts and intention to use cessation treatment. First, we explored associations between smoker characteristics and their quit attempts after intervention over the 3-month follow-up. Second, guided by the Theory of Planned Behavior, we explored whether smoker beliefs about cessation treatment, attitudes, social norms, and perceived behavioral control over using cessation treatment changed after intervention and whether they were related to intention to use cessation treatment. We assessed these relationships for each of three treatment types: nicotine replacement therapy, cessation medications, and cessation counseling.

2. Methods

2.1. Enrollment and Study Participants

The parent study methods and primary outcomes are described elsewhere (Brunette et al., 2017). Potential participants were recruited from four treatment programs serving young adults with SMI. We enrolled English-speaking, daily smokers with SMI, age 18-30 years, who were psychiatrically stable in outpatient treatment for mental illness and who were willing and able to give informed consent. For this analysis, we included participants who were assigned to a treatment intervention – 65 participants were consented and assessed for eligibility; 58 were eligible, randomized and received an intervention, and, overall, 50

(86.2%) were assessed at the three-month follow-up (23 (82.1%) in the NCI Education group, and 27/30 (90%) in the Let's Talk About Smoking group).

2.2. Study procedures

After baseline assessment, participants were randomized to receive one of two brief interventions within 2 weeks. After either intervention, participants completed questions regarding cessation treatment beliefs and attitudes (exploratory outcomes). Research staff then provided participants referral information to available cessation treatment (cessation medications and counseling, Quitline). All participants completed the intervention to which they were assigned in a single office visit. Three months later, research interviewers assessed participants for use of cessation treatment (main outcome), smoking characteristics, quit attempts and biologically verified abstinence (secondary outcome). All participants were paid \$50 for each research assessment visit.

2.2.1. Interventions

2.2.1.2. Electronic decision support system for smoking cessation: This interactive/motivational web-based computer program, *Let's Talk About Smoking*, is tailored for smokers with SMI and designed to increase motivation to quit smoking using evidence based treatment. Its initial development and content have been described previously (Ferron et al., 2011). It is a linear, modularized, interactive program that takes 30-60 minutes to complete. A young adult video program host, who identifies herself as an ex-smoker with mental illness, guides users through modules, each with assessments and exercises used in motivational interviewing and health decision aid systems. For this study, we further tailored the content to enhance its relevance for young adults. This version provided less emphasis on health and more emphasis on the financial and social impacts of smoking and quitting.

2.2.1.2. Computerized National Cancer Institute Patient Education: A reproduced version of the National Cancer Institute (NCI) patient educational handout ("Cigarette Smoking: Health Risks and How to Quit (PDQ®)–Patient Version,") provided static information about smoking-related diseases and smoking cessation treatments. The content was provided to participants via laptop computer in a format similar to the decision support system: large black font on a white background with no distracting images; one concept per page in bulleted sentences; and automated audio that read the content to users if they wished. By providing the handout in a similarly-produced, computerized format with audio, this control condition was designed to provide a contrast for the tailored, interactive and motivational content of the electronic decision support system.

2.3. Measures

Demographics and smoking history were assessed with a structured interview. Physician-completed DSM-IV-TR psychiatric diagnoses and Global Assessment of Functioning (GAF) were obtained from clinic chart review. Psychiatric symptom distress was assessed at baseline with the 14-item modified Colorado Symptom Index (Conrad et al., 2001; Shern et al., 1994). General social support was assessed with the Multidimensional Scale of Perceived Social Support, a 12-item scale that measures perceived support from family, friends and significant others.

2.3.1. Smoking characteristics—We assessed participants for level of nicotine dependence with the Fagerström Test for Nicotine dependence, a 5-item measure, at baseline and three months (Fagerström, 1978; Weinberger et al., 2007). Attitudes about smoking were assessed with the Attitudes Towards Smoking Scale, an 18-item instrument with three subscales (adverse effects, psychoactive benefits, pleasure) (Etter, Humair, Bergman, & Perneger, 2000). A smoking stigma scale (Stuber, Galea, Link, & Xa, 2009) was used that includes 11 questions assessing attitudes and beliefs regarding social discrimination related to smoking, such as “Because of smoking, I have had difficulty renting an apartment” with True and False or 4-point Likert scale answer options (strongly disagree to strongly agree).

For attitudes about cessation treatment, participants were assessed at baseline and after the intervention according to the five components of the Theory of Planned Behavior (i.e. beliefs, attitudes, subjective social norms, perceived behavioral control for the cessation treatment, intention to quit and to use cessation treatment) using a questionnaire the authors developed using Ajzen’s method (Ajzen, 2006). Since the scale is under development, single items were used to represent constructs from the theory for each type of smoking cessation treatment.

2.3.2. Use of smoking cessation treatment and social support for quitting—

The smoking cessation treatment checklist was used to obtain all self-reported use of cessation treatment (including nicotine replacement therapy) and use of other supports to quit (e.g. friends, family, clergy). Use of cessation treatment (defined as at least one day of use) was verified via clinic record review, phone calls to clinicians, and viewing bottles of medications and nicotine replacement at the three-month assessment.

2.3.3. Quit Attempts and Abstinence—

Biologically verified abstinence was assessed at three months, when self-reported one-week abstinence was verified with expired carbon monoxide (CO) (Smokelyzer Breath Carbon Monoxide Monitor, Bedfont Scientific) (Benowitz et al., 2002; Jarvis, Russell, & Saloojee, 1980). A quit attempt was defined as an attempt to quit with at least 24 hours of abstinence. Self-reported quit attempts with at least one day of abstinence were captured with the Timeline Follow-back method at three months (Brown et al., 1998; Sobell & Sobell, 1992; Sobell & Sobell, 1996). With this well-validated method, trained research staff assessed amount and frequency of smoking and abstinence week-by-week using a calendar to cue memories of smoking and abstinence (Drake, Mueser, & McHugo, 1996).

2.4. Statistical analyses

We used descriptive statistics to depict the study groups and Chi-Square, Fisher’s Exact or t-tests to assess baseline differences between the two intervention groups and to assess intervention group differences on the main outcome, verified abstinence at three months, with missing conservatively set as smoking.

The first set of analyses included models using logistic regression to evaluate which smoker characteristics and attitudes predicted quit attempts. The next set of analyses addressed Theory of Planned Behavior treatment constructs in relation to intention to use cessation treatment. We conducted exploratory analyses to characterize the average beliefs, attitudes,

perceived behavioral control and intentions to use each cessation treatments (i.e. nicotine replacement therapy, cessation medication, counseling) of our sample. We then conducted t-tests for average post-intervention between group differences, and paired t-tests to assess changes in total average group scores after the interventions. Finally, we looked at the relationships between the Theory of Planned Behavior constructs using correlations. In these exploratory analyses, missing observations were left as missing.

3. Results

Baseline demographic and clinical characteristics of the 58 young adults (mean age 24.2 years SD=3.6) are reported in Table 1. The mean Fagerstrom nicotine dependence score for the sample was moderate/low, at 4.3 (SD=2). Over a third of the group (37.9%) was thinking about quitting right now or within the next month. Over half of the group lived with family. The vast majority of the group reported receiving generic social support from family and also from friends. The majority of the group also reported having family members who had ever smoked. The group spent time with 4.11±6.3 smokers and 3.45±3.9 non-smokers in the past week. Most participants reported that smoking was not allowed inside where they lived. Over half the group endorsed that they kept their smoking a secret from friends, family, employers or their doctor. Endorsement of experiences of devaluation, social withdrawal and differential treatment due to smoking were moderately low.

3.1. Abstinence and use of cessation treatment

As previously reported (Brunette et al., 2017), at three-month followup, over one third of the group reported that they had tried to quit and achieved at least one day of self-reported abstinence (not different between intervention groups). Four of the 50 participants assessed at follow-up had verified abstinence at that assessment (significantly greater in the interactive/motivation intervention group than in the static/education group (4 [14.8%] vs. 0, $\chi^2=4.0$, $p<.05$).

Although we previously hypothesized that cessation treatment would be an important avenue to quit attempts and abstinence, only 5% of participants used verifiable nicotine replacement therapy, and none used any other verifiable treatment. Additional participants used cessation treatment that was not verified. Almost 14% of participants self-reported use of nicotine replacement therapy, 6.9% self-reported talking with a counselor about quitting, and 5.2% self-reported talking to a doctor about quitting. Additionally, 19% self-reported that talking with a friend helped with quitting (not different between intervention groups).

3.2. Predictors of quit attempts and abstinence

Logistic regression assessed whether smoker characteristics predicted self-reported quit attempts with at least one day of abstinence. Predictors of self-reported quit attempts included: lower breath CO (OR=0.92, 95% CI=.85-.99; $p=.03$), greater intention to quit (OR=5.25, 95% CI=1.66-16.59; $p=.005$), higher symptom distress (CSI, OR=1.07, 95% CI = 1.0-1.1, $p=.02$), greater perceptions of the benefits of smoking (OR=1.28, 95% CI=1.03-1.59, $p=.03$), and greater perceptions of smoking stigma (social withdrawal scale scores OR= 1.49, 95% CI=1.02-2.16, $p=.04$). Gender, diagnosis, use of verified cessation

treatment, social support for quitting, and generic social support were not associated with self-reported quit attempts. In a multivariate analysis including significant variables, baseline lower breath CO, intention to quit, and higher symptom distress remained significant predictors of quit attempts.

The overall small proportion of abstinent participants precluded valid analyses predicting confirmed abstinence. Of participants who were abstinent at follow-up, none used verifiable cessation treatment. Abstinent participants also self-reported cessation supports that were not verifiable. One participant self-reported talking with a counselor, and two self-reported that talking to a friend about quitting assisted with cessation.

3.3. Theory of Planned Behavior predictors of intention to use cessation treatment: Beliefs, attitudes, social norms, perceived behavioral control over cessation treatment

Mean perceived social norm beliefs (indirect norms) and direct social norms for cessation treatment are shown in Table 2. Mean beliefs about family and friend approval for quitting cold turkey and also for using cessation treatment were somewhat positive (between 4 and 6 on a scale of 1 to 7). Three of the six social norm beliefs significantly improved after intervention, but were not different between intervention groups. Most people did not know someone who had used cessation treatments (direct social norms).

Beliefs, attitudes, perceived behavioral control, and intention to use cessation treatment are shown in Table 3. Mean belief scores about the efficacy of medication cessation treatments were slightly positive (between 4 and 5 on a scale of 1 to 7). On average, this group did not endorse that they would feel embarrassed by using cessation treatment, nor did they endorse other potential barrier beliefs. There was a pattern of mean efficacy belief scores improving or being more positive in the interactive/motivational intervention group compared to the static/educational intervention group post-intervention.

In contrast to beliefs, attitudes about quitting with cessation medication treatment were positive, whereas attitudes about cessation counseling were negative, and treatment attitudes did not increase after intervention (Table 3). Mean overall attitudes about quitting cold turkey were neutral and did not change after intervention.

Mean perceived behavioral control (over using cessation treatment) scores were slightly positive on average (about 5 on a scale of 1 to 7) and improved after intervention for perceived control over attending cessation counseling (not different by intervention group; Table 3).

Despite somewhat improved beliefs and positive attitudes about cessation treatments, mean intention to use cessation treatment scores remained somewhat low after the interventions (between 3 and 4 on a scale of 1 to 7; Table 3), corresponding with low actual use of cessation treatment described above. As predicted by the Theory of Planned Behavior, overall treatment attitude scores for NRT, cessation medications, and counseling correlated significantly with intention scores ($r=0.30, p=.02$; $r=0.32, p=.02$; & $r=0.32, p=.02$, respectively); perceived social norms for cessation medications and counseling had trend correlations with intentions ($r=0.25, p=.06$ & $r=0.22, p=.09$; respectively); and perceived

behavioral control for NRT, counseling and medications correlated significantly with intentions ($r=0.46$, $p=.0004$; $r=0.63$, $p=.0001$; & $r=0.51$, $p=.000$; respectively). Low numbers of participants reporting actual use of cessation treatment precluded valid predictive analyses for use of cessation treatment.

4. Discussion

The descriptive and exploratory analyses from this pilot study provide an in-depth picture of the social context, beliefs, attitudes and intentions of these young adult smokers with SMI, as well as their smoking and cessation behavior after brief interventions. These data suggest that the social context of many young adult smokers with SMI includes potential supports for cessation in terms of the presence of non-smokers and smoking restrictions, as well as the presence of general social support. Treatment-related beliefs, perceived social norms, and perceived behavioral control were slightly positive, and there was some evidence of improvement after intervention. As predicted by the Theory of Planned Behavior, beliefs about cessation treatment were correlated with intention to use cessation treatment. The rather lukewarm treatment beliefs in this group did not engender the use of smoking cessation treatments in the three months following intervention. Rather, in line with the more positive attitudes about cessation in general, the interventions stimulated quit attempts without treatment. Although prospective, population-based studies indicate that only about a fifth of quit attempts result in longer-term abstinence (Cooper et al., 2010), better understanding factors that contribute to quit attempts within particular populations can inform tailoring of future interventions and provide hypotheses for future testing. Although participants in this study did not experience large changes in beliefs and attitudes about cessation treatment after these brief interventions, improving perceptions about cessation treatment may lay the groundwork for future use of cessation treatment among those who do not quit.

Young people in particular are influenced by the behavior of their peers and role models (Cengelli, O'Loughlin, Lauzon, & Cornuz, 2012; LaRose, Leahey, Hill, & Wing, 2013; MacArthur, Harrison, Caldwell, Hickman, & Campbell, 2016). Indirect norms for cessation and using cessation treatment, represented here as "people would approve," were mildly positive, improved after the interventions, and exhibited a trend for correlation with intention to use cessation medications and counseling. Notably, however, direct norms were not strong for using cessation treatment - less than half of participants reported that they knew someone who had used the three types of cessation treatments. Although baseline social support did not predict quitting activity, using social support was the most frequently reported quit aid, and 50% of those who attained verified abstinence did so by talking to a friend as a support to quit smoking. These data point to the potential for harnessing social norms and support to increase motivation and cessation activity among young adults with SMI - for example, by connecting young people to others who have successfully used cessation treatment.

Consistent with previous research in smokers with mental health conditions, higher feelings of stigma were associated with intention to quit and quit attempts in these young adult smokers with SMI (Brown-Johnson et al., 2015). While stigma is not a desired outcome of

public health tobacco control activities, de-normalizing smoking may lead to perceived stigma, which in turn may stimulate cessation activity.

Although the brief, interactive, motivational intervention we developed was designed to motivate smokers to quit by using cessation treatment, very few of these young adult participants used verifiable treatment. This result aligns with previous studies in this population (Prochaska et al., 2015; Thrul & Ramo, 2017) demonstrating low engagement into cessation treatment after motivational intervention in young adults with and without SMI. Notably, participants who received this intervention were significantly more likely to become abstinent, and did so without using verified cessation treatment, as we have previously reported (Brunette et al., 2018). Due to the generally lower level of nicotine dependence and shorter history of smoking compared to older smokers (Brunette et al., 2017), brief interventions may stimulate effective quitting activity without additional formal cessation treatment. Such interventions warrant further study.

4.1. Limitations

This pilot study included small numbers by design, thus the results are exploratory, must be interpreted with caution and require replication. Although structural equation modeling would be ideal to test the relationship between Theory of Planned Behavior constructs, this study was not powered to use this statistical method. Additionally, while quit attempts may be one step in the process of quitting, quit attempts are not the same as sustained abstinence. However, we were able to provide a novel description of a geographically and racially diverse group of 58 young adult smokers with SMI, including their social context, predictors of quit attempts, and attitudes about cessation treatment, that have not previously been described.

4.2. Conclusion

These results confirm and extend previous work indicating that young adults with SMI have only modestly positive perceptions of evidence-based smoking cessation treatments. Brief interventions improved treatment beliefs somewhat, and beliefs were related to intentions to use cessation treatments, as predicted by the Theory of Planned Behavior. However, a substantial proportion of these young adults attempted to quit without formal evidence-based treatment, and a significant minority quit smoking completely after receiving the interactive/motivational intervention.

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Highlights:

- After brief intervention, a third of young adult smokers with SMI reported quit attempts.
- Breath CO, intention to quit and symptom distress were related to quit attempts.
- Attitudes and perceived behavioral control correlated with cessation treatment intention.
- Beliefs about cessation treatment improved after the interactive intervention.
- Intentions to use treatment remained low, in line with low use of treatment.

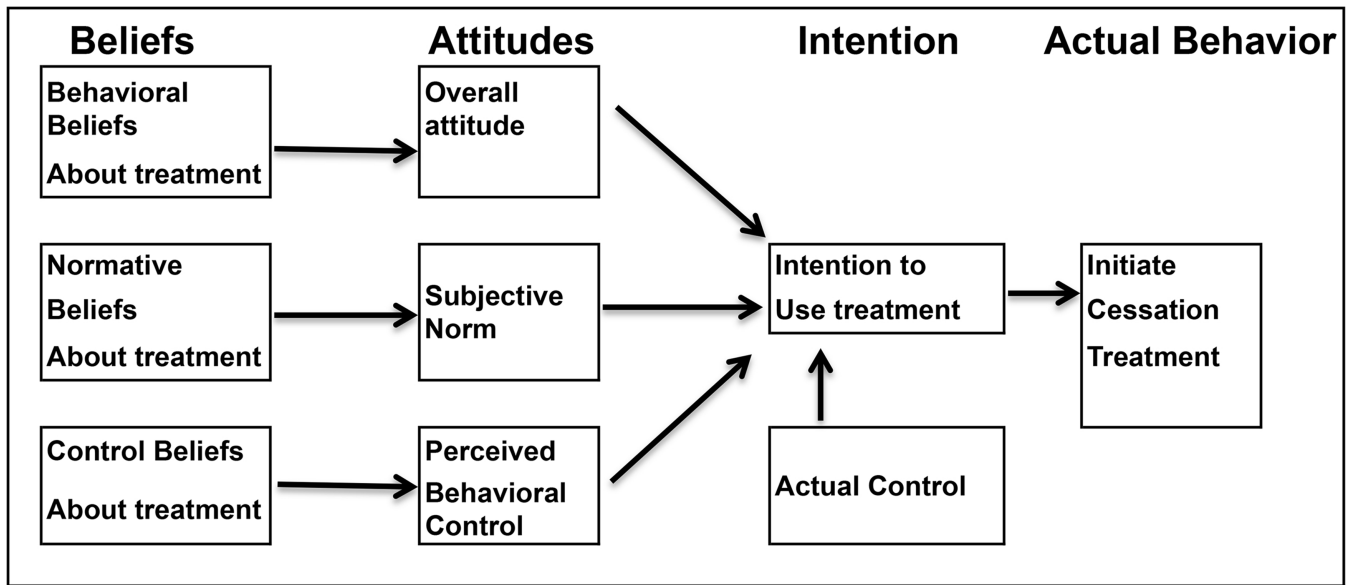


Figure 1.
Theory of Planned Behavior.

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Table 1.

Baseline demographics and characteristics of 58 study participants

	Motivational Decision Support (LTAS) N=30	Computerized NCI Education (NCI) N=28
Demographics		
Age, Mean (SD)	23.53 (3.9)	24.96 (3.2)
Gender, N men (%)	20 (66.7%)	19 (67.9%)
Years education, Mean (SD)	11.70 (1.4)	11.57 (2.0)
Race		
White, N (%)	17 (56.7%)	16 (57.1%)
Black, N (%)	10 (33.3%)	10 (35.7%)
Other, N (%)	4 (13.3%)	2 (7.14%)
Ethnicity, N Hispanic, (%) [*]	6 (20.0%)	0 (0.0%)
Lives with Family, N (%)	16 (53.3%)	17 (60.7%)
Unmarried, N (%)	27 (90%)	26 (92.9%)
Clinical characteristics		
Schizophrenia/affective diagnosis, N (%)	12 (40%)	14 (50%)
Mood/anxiety diagnoses, N (%)	18 (60%)	14 (50%)
Colorado Symptom Index Score, Mean (SD)	17.2 (11.5)	19.0 (9.3)
Global Assessment of Functioning, Mean (SD)	44.7 (6.6)	47.3 (5.7)
Lifetime hospitalizations, Mean (SD)	4.6 (4.9)	7.4 (10.3)
Smoking characteristics and Attitudes		
Cigarettes/day, Mean (SD)	10.9 (8.6)	13.9 (9.4)
Fagerstrom dependence score, Mean (SD)	4.3 (1.9)	4.3 (2.1)
Smokes menthol, N (%)	20 (69%)	17 (60.7%)
Used e-cigarettes past 3 months, N (%)	11 (36.7%)	8 (28.6%)
Attitudes Towards Smoking		
Benefits Subscale, Mean (SD)	13.6 (3.5)	12.75 (3.8)
Pleasure Subscale, Mean (SD)	14.5 (2.9)	15.21 (3.2)
Adverse Subscale, Mean (SD)	40.33 (6.7)	37.54 (8.2)
Total Attitudes Towards Smoking Scale, Mean (SD)	-12.23 (8.6)	-9.57 (9.4)
Thinking of quitting in next month, N (%)	10 (33.3%)	12 (42.9%)
Social Context		
Parent ever smoked, N (%)	22 (78.6%)	20 (68.7%)
Sibling ever smoked, N (%)	15 (55.6%)	19 (63.3%)
Smoking allowed inside at residence, N (%)	9 (32.1%)	6 (20.7%)
Mean # people smoked with past week, (SD)	3.07 (6.47)	5.22 (6.02)
Mean # non-smokers spent time with past week, (SD)	3.64 (3.41)	3.26 (4.41)
Social Support Scale		
Social Support from Friends, N (%)	23 (76.7%)	20 (71.4%)

	Motivational Decision Support (LTAS) N=30	Computerized NCI Education (NCI) N=28
Social Support Scale Score - among those endorsing friends ¹ , mean (SD)	19.26 (5.9)	19 (6)
Social Support from Family, N (%)	27 (90%)	25 (89.29%)
Social Support Scale Score among those endorsing family, ¹ mean (SD)	20.0 (6.0)	20.6 (5.4)
Social Support from Special Person, N (%)	21 (70%)	16 (57%)
Social Support Scale Score-among those endorsing Special Person, ¹ mean (SD)	22.86 (4.8)	22.25 (6.5)
Smoking Stigma Scale		
Devaluation Subscale Score (Range 1-8), Mean (SD)	3.1 (1.3)	2.7 (1.2)
Social Withdrawal Subscale Score (Range 1-12), Mean (SD)	4.9 (1.6)	4.8 (1.6)
Endorses Secrecy, N (%)	16 (60.7)	17 (53.3)
Endorses Differential Treatment, N (%)	6 (21.4)	6 (20.0)

NCI=National Cancer Institute, LTAS=Let's Talk About Smoking Website, N = number, SD=Standard Deviation

* P<.05; ($\chi^2=6.42$, p=.01)

¹ Social support subscale range 4-28

Table 2.

Social norms for cessation treatment before and after intervention among young adult smokers with SMI

Indirect Social Norm Beliefs	Baseline Mean (SD)	Post Intervention Mean (SD)
Quitting without medication assistance	Range 1-7	Range 1-7
People in my family would approve of me quitting cold turkey.	5.22(1.85)	5.41(1.91)
My friends and boyfriend/girlfriend would approve of me quitting cold turkey.	4.81(1.91)	4.78(1.89)
Nicotine Replacement Therapy		
People in my family would approve of me using nicotine replacement therapy	5.62(1.35)	5.86(1.33)
My friends and boyfriend/girlfriend would approve of me using nicotine replacement therapy to quit smoking.	5.28(1.51)	5.62(1.42)
Cessation Medications		
People in my family would approve of me taking quit smoking medications. ^{*1}	5.36(1.52)	5.71(1.40)
My friends and boyfriend/girlfriend would approve of me taking quit smoking medications.	4.93(1.72)	5.09(1.77)
Cessation Counseling		
People who are close to me believe that going to quit smoking counseling would help me. ^{*2}	4.67(1.67)	5.34(1.53)
Most people who are important to me would go to quit smoking counseling if they tried to quit. ^{*3}	4.10(1.66)	4.71(1.71)
Direct Social Norm		
	Baseline N (%)	-
I know someone who used nicotine replacement therapy, N (%)	25 (43.1)	-
I know someone who took a quit smoking medication, N (%)	27 (46.6)	-
I know people who have used quit smoking counseling, N (%)	10 (17.2)	-

Attitudes scores: 1=Strongly disagree, 7=Strongly agree

* Pre-post paired t-test for combined group significantly different, $p < .05$ ^{*1} $t = -2.05$; $p = .04$;^{*2} $t = 3.21$, $p = .002$;^{*3} $t = 2.74$, $p = .008$

Table 3.

Beliefs, attitudes, and intention to use cessation treatment among young adult smokers with SMI

	Baseline Mean (SD)	Post Intervention Mean (SD)	Mean Change
Generic smoking cessation attitude²			
Quitting smoking is...	5.43(1.37)	5.71(1.20)	0.28
Nicotine Replacement Therapy			
Beliefs¹			
Taking nicotine replacement therapy quit medication will help me cut down and quit smoking.	4.86(1.41)	5.22(1.43)	0.36
Taking nicotine replacement therapy quit medication will help reduce my urges to smoke. ^{a1}	4.93(1.36)	5.19(1.29)	0.26
Taking nicotine replacement therapy quit medication will help me deal with my moods while quitting. ^{a2}	4.36(1.62)	4.5 (1.49)	0.14
Nicotine replacement therapy may interact with my mental health medications.	3.71(1.49)	3.88(1.58)	0.17
Taking nicotine replacement therapy would be embarrassing. ^{b1}	2.24(1.54)	1.83(1.08)	-0.41
Attitude²			
Overall, I think NRT is...	5.55(1.20)	5.57(1.08)	0.02
Quit Smoking Medications			
Beliefs¹			
Taking a quit medication will help me cut down and quit smoking. ^{a3}	4.81(1.48)	5.05(1.56)	0.24
Taking a quit medication will help reduce my urges to smoke. ^{b2}	4.67(1.73)	5.21(1.48)	0.53
Taking a quit medication will help me deal with my moods while quitting. ^{a4b3}	4.38(1.76)	5.05(1.16)	0.67
I don't want to take quit medication because it may interact with my mental health medications.	4.02(1.49)	4.23(1.75)	0.21
Taking a quit medication would be embarrassing.	2.21(1.17)	2.26(1.42)	0.05
Attitude²			
Overall, I think taking medications to help me cut down and quit smoking is...	4.84(1.55)	5.11(1.42)	0.30
Cessation Counseling			
Beliefs¹			
Going to quit smoking counseling will help me get support to cut down and quit.	#	5.03(1.89)	
Going to quit smoking counseling will be a good place to learn ways to cope with stress without smoking.	#	5.66(1.31)	
I don't have enough time to attend quit smoking counseling each week for 2 months.	4.09(1.56)	3.90(1.75)	-0.19
There's too much stress in my life to attend quit smoking counseling.	3.52(1.76)	3.78(1.79)	0.26
Attitude²			
Overall, going to quit smoking counseling is...	#	3.26(1.76)	

	Baseline Mean (SD)	Post Intervention Mean (SD)	Mean Change
Cold turkey attitude ¹			
I would prefer to quit smoking without medications (cold turkey).	4.34(2.12)	4.16(2.27)	-0.19
Perceived behavioral control ¹			
If I wanted, I could use nicotine replacement therapy to quit smoking.	5.59(1.23)	5.69(1.44)	0.10
If I wanted to quit, I would take a quit smoking medication.	4.57(1.84)	4.76(1.85)	0.19
Going to counseling to help me quit smoking each week for 2 months is under my control. ^{b4}	5.03(1.57)	5.59(1.69)	0.55
Intention to use cessation treatment ¹			
I have decided to use nicotine replacement therapy to help me quit smoking.	3.69(1.65)	3.65(1.94)	-0.02
I have decided to take a medication to help me quit smoking.	#	3.64(1.89)	
I have decided to attend counseling each week for 2 months to help me quit smoking	3.17(1.58)	3.40(1.92)	0.22

¹ 1=totally disagree, 7=totally agree

² 1=extremely bad, 7 = extremely good # Question omitted from baseline interview in error

^a Differences between intervention groups post intervention significant $p < .05$

^{a1} $t = -2.40, p = .02$;

^{a2} $t = -2.16, p = .05$;

^{a3} $t = -1.96, p = .03$;

^{a4} $t = -2.47, p = .02$

^b Pre-post paired t-test for combined group significantly different, $p < .05$

^{b1} $t = -2.12, p = .04$;

^{b2} $t = 2.59, p = .01$;

^{b3} $t = 3.24, p = .002$;

^{b4} $t = 2.51, p = .02$