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Stage Movement Following a 5 A's Intervention in Tobacco Dependent Individuals with Serious Mental Illness (SMI)

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Abstract

Smoking among the Seriously Mentally Ill (SMI) creates significant health problems. This study explored stage of change transitions over time among smokers with serious mental illness (SMI) and how dose of a brief intervention and other psychosocial variables were related to stage transitions. Participants were a subsample of 110 patients who participated in a larger controlled trial (Dixon, et al., 2009) examining whether psychiatrists in mental health clinics implementing the “5 A’s” (Ask, Advise, Assess, Assist, Arrange) significantly reduced smoking among persons with SMI. Participants were classified into one of the Transtheoretical Model (TTM) stages of change for smoking cessation as well as classified into groups based upon the pattern of stage status transitions over time (i.e., Regressors, Stable, Inconsistent, Progressors with and without a successful quit). Modest quit rates for this brief intervention were found at one-year (6.4%) and the dose of the intervention was meaningfully related to positive stage transitions. Cessation outcomes from the controlled trial (Dixon, et al., 2009) indicated a small effect on smoking cessation, which is confirmed in this stage transition secondary analysis with a subset of these smokers. However, these results suggest that a brief intervention delivered by psychiatrists in a mental health treatment setting does seem to make an impact on these smokers.

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Contributors

Author DiClemente participated in study design and execution and writing and revision of the manuscript. Author Delahanty designed and completed the statistical analyses, composed the methods and results sections of the manuscript, and participated in reviewing the manuscript. Author Garay Kofeldt conducted literature searches and participated in writing and reviewing the manuscript. Dr. Dixon is the Principal Investigator of the parent study and Drs. Dixon, Goldberg, and Lucksted participated in the parent study design and execution and contributed to and reviewed the final manuscript.

Conflicts of Interest

All authors declare that they have no conflicts of interest.

Keywords

smoking cessation; serious mental illness; 5A's; behavior change process; stages of change

1. Introduction

1.1. Background

Individuals with serious mental illness (SMI) continue to smoke at alarming rates, with prevalence rates as high as 90% among individuals with schizophrenia (de Leon et al., 1995; Ziedonis & Williams, 2004), compared to smoking rates of only 20–25% in the general population. Moreover, Kelly and McCreadie (1999) found that more than two-thirds of smokers with schizophrenia smoked 25 or more cigarettes daily compared to only 11% in the general population. Smokers with psychiatric illnesses and substance abuse disorders are estimated to consume about 44% of cigarettes smoked in the United States (Lasser et al., 2000), which may lead to approximately 200,000 deaths per year (Williams & Ziedonis, 2004).

Cessation rates are low in this population, interventions are under-utilized, and encouragement to quit is infrequent, even by health professionals (Addington, 1998). Despite lower cessation rates, over half of the SMI smokers want to quit (Forchuk et al., 2002). Increasing motivation to quit is a key element for successful cessation (DiClemente et al., 1991; DiClemente, Schlundt, & Gemmell, 2004) and essential to protect the health of this vulnerable population. A best-practice, brief intervention designed to increase motivation to change smoking behavior involves having health care providers Ask, Advise, Assess, Assist and Arrange for Follow-up for all smokers (5A's) in healthcare settings (Fiore et al., 2008). One of the few studies to evaluate efficacy of the 5A's with SMI smokers examined physician-delivered 5A's in public mental health clinics and reported modest effects of the 5A's for reducing tobacco use and increasing cessation rates 12 months after the intervention phase (Dixon et al., 2009). Specifically, the number of individuals who reported smoking in the past seven days and the number of cigarettes typically smoked in a week differed significantly, but abstinence confirmed by CO ppm <10 did not. These modest changes are significant since the intervention was low-impact and patients were not chosen based on readiness to change. In addition, by implementing the intervention with most of their patients who smoked, psychiatrists demonstrated the acceptability and feasibility of integrating 5A's, or at least 3A's (Ask, Advise, Assess) into treatment.

Stages and other process of change variables from the Transtheoretical Model of Behavior Change (TTM) have predicted the likelihood of quit attempts and cessation outcomes (DiClemente et al., 1991) and could be related to progress toward cessation in SMI smokers as well. Theoretically, smokers in more advanced stages (i.e., Contemplation or Preparation) would be more likely than those in Precontemplation to quit smoking. Processes of change, engaging in appropriate coping activities at the right time, decisional considerations and both self-efficacy and temptation to smoke are also related to the probability of cessation success. Specifically, in the early stages, such as Contemplation and Preparation, experiential processes appear more salient with behavioral processes usually increasing in

later action stages (DiClemente, 2003). In addition, when quitting an addictive behavior, it is generally expected that abstinence self-efficacy would increase and levels of temptation drop (Velicer, DiClemente, Rossi, & Prochaska, 1990).

1.2. Aims of the Current Study

This study examined how changes in stage status and how other process dimensions (coping processes of change, abstinence self-efficacy, temptation to smoke as well as the pros and cons of smoking) were associated with changes in stage transitions over time for individuals with SMI. We evaluated stage of change transitions over time among a sample of SMI smokers who had participated in a larger study examining a provider-based implementation of the 5A's for the smoking cessation intervention during their outpatient psychiatric care (Dixon et al., 2009). The study examined how stage transitions were related to process of change variables.

2. Methods

2.1. Study Setting and Sample

This study analyzed data from a subsample of the original 304 smokers who were in treatment at six community mental health centers in the greater Baltimore area, had a diagnosis of schizophrenia or other psychotic illness, and had participated in the original study. The subsample for analyses included only participants who were assessed at baseline, 6 months and 12 months and who had complete baseline data for stages of change ($n = 110$). A full description of the sample, methodology, and smoking cessation intervention for the larger study has been published (Dixon et al., 2009).

2.2. Assessments / Measures

Smoking History—Participants self-reported cigarettes smoked per day and per week, past smoking patterns, quitting history, and prior use of smoking-related treatments and services.

Processes of Change (POC)—This study used a shortened 20-item (10 experiential and 10 behavioral) processes of change scale (Prochaska, Velicer, DiClemente, & Fava, 1988), representing the covert and overt activities people appear to use to progress through the stages of change.

Self-Efficacy / Confidence & Temptation to Smoke—Smoking Abstinence Self-efficacy was measured using a 9-item self-reported confidence on a scale of 1 (not at all) to 5 (extremely) that assessed the smoker's confidence to abstain from cigarettes in a variety of situations. A second set of questions assessed their Temptation to Smoke by asking how tempted to smoke an individual was in the same 9 situations (Velicer, DiClemente, Rossi, & Prochaska, 1990).

Decisional Balance—A shortened 6-item scale assessed decisional considerations related to smoking, evaluating the smoker's pros and cons of smoking on a scale of 1 (not at all

important) to 5 (extremely important) for their decision to smoke (Velicer, DiClemente, Prochaska, & Brandenburg, 1985).

Stages of Change for Smoking Cessation (SOC)—A standard algorithm (DiClemente et al., 1991) classified current smokers into one of three pre-action Stages of Change for Smoking Cessation (SOC): Precontemplation, Contemplation, or Preparation based on 4 items (1. currently smoking cigarettes; 2. intention to quit in the next 6 months; 3. intention to quit in the next 30 days; and 4. quit smoking for at least 24 hours in the past year). There were 119 participants eligible for our study; however, some were missing key measures: 89 (75%) had complete data, nine were missing SOC at baseline and eliminated from further consideration, and for the other 21 participants, we used a conservative imputation process to preserve power and keep as many of these individuals in this study as possible. In cases where the items that assessed intentions to quit (in the next 6 months and in the next 30 days) were missing, the strategy of last value carried forward (LVCF) was used; thus conservatively assuming no change. In cases where valid data for only one of the two intention items were present, we classified the individual into the lower (i.e., more conservative) stage. Stage status was imputed only for individuals in pre-action stages. Analyses conducted between those with and without imputation revealed no differences on socio-demographic or smoking characteristics.

2.3. Stage of Change Transition Categories

Transitions were assessed between baseline (BL) stage of change and each follow-up time point (6 and 12 months), yielding 5 different patterns: 1.) stability (i.e., no transitions between stages at any of the 3 assessments); 2.) progression (i.e., forward progression but not including a successful quit); 3.) progression with quit (i.e., forward progression with a successful quit, Action stage at 6 months and at 12 months, or moved to the Action stage at 12 months); 4.) regression (i.e., transition back to an earlier stage); and 5.) inconsistent (i.e., forward transition BL to 6 months followed by transition to earlier stage from 6 to 12 months; or vice-versa). Since staying in precontemplation seemed to capture continued lack of interest in quitting, smokers who made no transitions (stability group) were separated into Stable Precontemplation (PC) and Stable Contemplation (C) or Preparation (P).

2.5. Statistical analysis

Demographic characteristics across transition groups were examined using Chi-Square Analyses. Repeated Measures ANOVAs assessed stage $\times$ time interactions for the dependent variables over the three time periods (baseline, 6 and 12 months) across stage transition patterns (stable PC, stable C or P, progression, progression with quit, regression and inconsistent).

3. Results

3.1. Description of Sample

The analysis sample ($n=110$) was balanced with respect to gender (53, 48.2% male; 57, 51.8% female) and race (49, 44% White; 54, 49% African-American; 7, 6% other) with a mean age of 44.1 ($SD = 6.2$) years. Three-quarters of these SMI smokers were diagnosed

with schizophrenia (n=81); the remainder (26%) with affective psychoses. Most (81%) had been smoking for over 20 years and began smoking on average at 15.3 (SD = 5.9) years of age. As required by eligibility criteria, all participants had smoked in the last month; all but one in the last 7 days. Thirty percent smoked fewer than 10 cigarettes per day (n=33), 44% 11–20 cigarettes per day (n=48), 13% 21–30 cigarettes per day (n=14), and 14% more than 31 cigarettes per day (n=15). Mean number of cigarettes smoked per week was 128 (SD = 82) and modal number per week was 140, or about 20 per day. Self-reported smoking status was consistent with Expired Carbon Monoxide data.

3.2. Stage of Change (SOC)

Current smokers (i.e., within the past week) with no intention of quitting smoking within the next 6 months were classified in Precontemplation (n = 55; 50.0%). Current smokers who intended to quit within the next 6 months but not within the next 30 days were classified in the Contemplation stage (n = 24; 21.8%). An additional 13 (11.8%) who indicated that they intended to quit within the next 6 months and specifically in the next 30 days, but did not report a quit attempt in the past year, also were classified in the Contemplation stage. Thus, 37 (33.6%) participants were considered to be in Contemplation. Finally, current smokers who reported that they intended to quit within the next 6 months, specifically within the next 30 days, and reported a past year quit attempt were classified into the Preparation stage (n=17; 15.5%). One (.9%) individual reported smoking in the past month but not in the past week (i.e., our criteria for current smoker) and was classified as being in the Action stage at baseline, but was in the regression group after moving back to smoking in the preparation stage both at 6 and 12 month follow-ups.

3.3. Stage Transition Groups: Description and Analyses

Movement in stage status from baseline to 6 and from 6 to 12 month follow-up periods was assessed by comparing stage status at all time points. More than one-quarter of participants reported being in Precontemplation at all three time points (n=31, 28.2%). Nine participants (8.2%) remained either in Contemplation or Preparation at all time points. One-fifth of participants progressed over the course of the study (n=23; 20.9%), while 20 participants (18.5%) regressed to an earlier stage and another 20 (18.5%) had inconsistent patterns of movement forward and backward at different time points. Seven of the participants (6.4%) were classified in the Action Stage at 12 months.

3.4. Stage Transitions and Socio-Demographic Characteristics

Stage transition patterns across the three assessments were significantly related to gender but not ethnicity or diagnosis. Males were significantly more likely to have progressed (34.0%) or progressed with a quit (11.3%), compared to females (8.8% and 1.8% respectively), $X^2 = 22.8$, $df = 1$, $p < .001$. Females, on the other hand, were significantly more likely to report an inconsistent transition pattern (29.8% vs. 5.7% for Males).

3.5. Smoking Characteristics by Stage Transition Groups

At baseline, the stage transition groups differed significantly in the average number of times smokers in these groups had made a serious quit attempt ($F=2.76$, $df = 108$, $p < .05$). Those

in the Stable PC group reported the fewest serious quit attempts ($M=.9$) compared to those who Progressed ($M=4.0$) and those who Regressed ($M=4.5$). However, post-hoc comparisons were not significant. Transition groups also differed significantly on the number of years smoking ($F = 3.69$, $df = 109$, $p < .01$), with those who progressed to a quit reporting significantly fewer years smoking ($M=16.6$) than all other groups (Regression [$M=26.5$], Inconsistent [$M=28.8$], Stable Other [$M=29.0$], Stable PC [30.7], and Progression [$M=32.9$]).

3.6. Stage Transitions over Time and Change Process Dimensions

Although not significantly different, smokers with stable Precontemplation, Regression, and Inconsistent patterns had lower levels of process activity, and Progression groups reported higher experiential and behavioral coping processes of change scores. Moreover, significant time $\times$ stage transition interactions were found with temptation to smoke, self-efficacy to abstain and decisional balance considerations. Smokers who progressed to Action (progress with Quit) reported significantly lower levels of temptation over time (interaction, $F = 2.56$, $p < .01$) and significantly higher levels of self-efficacy to abstain from smoking (interaction, $F = 5.05$, $p < .001$) relative to all other stage transitions groups (see Figures 1 & 2). Smokers who regressed and those with inconsistent patterns reported the highest levels of temptation and the lowest levels of self-efficacy, possibly related to an unsuccessful quit attempt. All other groups had demonstrated flat or slightly linear patterns over time. There was a significant time $\times$ stage transition interaction for pros of smoking ($F = 2.06$, $p < .05$), but not for the cons. Although not as clear as with temptation and self-efficacy, smokers who were quit at 12 months (i.e., progress with Action) reported significantly lower pros to smoking relative to the other groups, with the direction most pronounced during the 6 to 12 month follow-up.

3.7. Transition Groups and Exposure to the 5 A's Intervention Dose

Although comparisons between Progressors and Regressors revealed no significant differences in the number of sessions attended during the two follow-ups, individuals who progressed reported being asked and assessed significantly more often compared to the regressors when we analyzed the frequency of chart-documented delivery of each of the 3A's (Asked, Advised and Assessed) during any of the treatment sessions. In addition, there was a trending relation for the number of times participants were advised ($p = .06$). Cohen's d for these effects indicated a moderate effect size.

4. Discussion

Stage of change transitions for SMI smokers over the one year follow-up indicated variable patterns of movement through the stages of change as reported in prior studies of smoking (Kohler, Schoenberger, Tseng, & Ross, 2008; Martin, Velicer, & Fava, 1996; Prochaska, Velicer, DiClemente, Guadagnoli, & Rossi, 1991) and other behaviors (Feldman et al., 2000). Although movement into the action stage and abstinence at one year was modest (6.4%) during this low intensity intervention, it is on par with self-change success estimates (Cohen et al., 1989). Although SMI smokers are often seen as being very resistant to quitting, only a little over one-quarter of this sample remained in Precontemplation at each

of the three assessments. Almost 60% of the sample made some movement in terms of their self-reported stages at the follow-up time points, with equivalent numbers progressing, regressing and moving back and forth in an inconsistent pattern.

Although the small numbers of smokers in each of the transition groups posed a significant limitation in this study, the results related to the process of change are instructive. Women seem to have more difficulty with the tasks of the stages and moving forward toward success. However, ethnicity and diagnosis do not seem to be related to transitions. The most salient findings are that progression is accompanied by significant drops in temptation and increases in abstinence self-efficacy. These variables seem to be involved in achieving successful cessation with large differences indicated for smokers who achieved and sustained cessation success. Decisional considerations and processes of change were not as clearly related to the transition patterns. However, smokers with progressing patterns did seem different from those stuck in Precontemplation across time.

The majority of these smokers were in Precontemplation (50%) with little or no consideration of change in the near term. Only 15% expressed a more immediate intention to quit and made a recent quit attempt, and were classified in the Preparation stage. Not only is smoking among the SMI population more prevalent, these smokers often find it more difficult to quit (Siru, Hulse, & Tait, 2009).

The results of this study support implementation of the 5A's in mental health settings. A brief intervention delivered by psychiatrists did make an impact on these smokers and their movement through the stages of change. The key is consistency and coverage. Sustained efforts in psychiatric settings to provide smoking interventions are needed to enable SMI smokers to make stage transitions, recycle through the stages, and achieve cessation success.

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Figure 1.

Stage Movement Group × Time for Temptation

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Figure 2.

Stage Movement Group $\times$ Time for Smoking Abstinence Self-Efficacy

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