Short communication

The natural history of efforts to stop smoking: A prospective cohort study

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ABSTRACT

Background: In a prior study, we found changing tobacco use was more complex than previously thought, with users often transitioning between intending to quit and not intending to quit, and among typical use, abstinence, and reduction, on multiple occasions. The current study attempted to replicate those results.

Methods: A convenience sample of 40 tobacco smokers who intended to quit within the next 3 months called in nightly for 28 days to an interactive voice response system to report cigs/day and daily intentions to smoke or not for the next day. We provided no treatment.

Results: Within the month of the study, 32% of smokers had multiple episodes of intentions to not smoke, and 64% transitioned among smoking as usual, abstinence, and reduction status on multiple occasions. When participants reported that they intended not to smoke the next day, 56% of the time they did not make a quit attempt the next day. Just under half (44%) of quit attempts occurred on days with no intentions to quit the night before. Most quit attempts (69%) lasted less than a day. Reduction in cigs/day was as common as abstinence.

Conclusions: Our prospective results replicated retrospective findings that most attempts to stop smoking result in a complex pattern of changes in smoking. These results suggest treatments should accommodate (a) multiple quit attempts over a short period, (b) reduction episodes, (c) unplanned quit attempts, and (d) immediate relapse.

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1. Introduction

Prior studies suggest that when tobacco smokers try to quit on their own, many smokers change their intentions about quitting daily (Hughes et al., 2005), and often rapidly vacillate among short periods of use, reduction and abstinence (Peters and Hughes, 2009). The current study extends these findings by adding information on the incidence of (a) quit attempts lasting less than a day, (b) aborted quit attempts, and (c) reduction specifically associated with a quit attempt. Our major interest was whether, among daily tobacco smokers who intend to quit in the near future, (a) most will transition between intentions to quit and no such intentions, and among smoking as usual, reduction or abstinence status, on multiple occasions, (b) many daily intentions to quit will not result in abstinence, (c) many quit attempts will be unplanned, (d) many

quit attempts will not last a full day, and (e) reduction will be as common as abstinence.

2. Methods

2.1. Recruitment

Notices on Craigslist (www.craigslist.org), newspaper ads, and Internet banner ads invited "daily cigarette smokers who plan to quit". To enrich the sample to observe smoking changes, smokers had to state they probably or definitely intended to quit in the next 3 months. Also, in order to observe significant reductions in cigs/day, smokers had to smoke ≥10 cigs/day.

Among the 309 smokers screened, 269 were ineligible (mostly due to low motivation to quit). Among the 40 participants, the mean age was 40 (SD = 10); most were women (65%) and high school graduates (98%). Most participants were non-Hispanic Whites (70%) with fewer African Americans (25%), Asians (2%), and Hispanics (2%). Most were neither married (78%), nor employed full-time (62%). They smoked an average of 16.2 cigs/day (5.0), and had a mean Fagerstrom Test for Nicotine Dependence score of 4.4 (2.4; Piper et al., 2006). The sample appeared comparable to the average US daily smoker on age, race, cigs/day and dependence, but were more likely to be women, unmarried and unemployed (Hughes and Callas, 2010a; Piper et al., 2006).

2.2. Interactive voice response (IVR)

Participants were instructed to call to an interactive voice response (IVR) system near bedtime. The IVR asked number of cigarettes smoked that day and "Do you think

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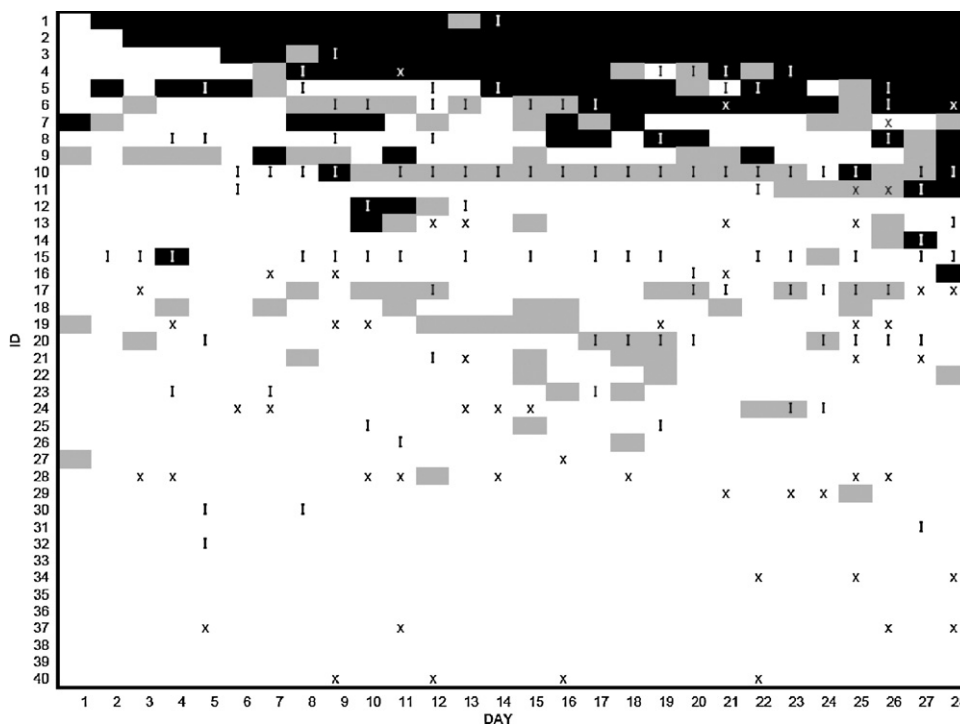E-mail address: john.hughes@uvm.edu (J.R. Hughes).

Fig. 1. Outcomes for individual participants (rows) across the 28 days of the study. Black pixels indicate abstinence; gray pixels indicate reduction ≥50%, white pixels indicate smoking near their usual cigs/day, and "x" represents missing data. An "I" indicates that, the night before, the participant stated they intended not to smoke on the next day.

you will smoke cigarettes tomorrow? (Yes/No)". We used this wording because we believed it would be less reactive than asking about quit attempts every night.

If the IVR detected a day of abstinence, it asked if this was due to a quit attempt. Few (8%) days of abstinence were not due to a quit attempt. To detect quit attempts that may not have lasted a full day, once each week the IVR asked whether participants made a quit attempt that lasted less than a day in the past week. Participants were reimbursed $2/daily for IVR completion plus a $10 bonus if they completed all IVR calls in a week. We provided no treatment. The study was approved by the University of Vermont Committee on the Use of Human Subjects and was registered at www.clinicaltrials.gov (NCT00995644).

2.3. Data analysis

In analyses, we assumed missed data represented smoking except in the 5% of calls when the missing period was ≤2 days, when we imputed outcomes based on the day prior and the day after the missing days. Also, to prevent counting rapid transitions of abstinence/lapse/abstinence during a quit attempt as two different quit attempts, we required 7 days of consecutive smoking between quit attempts (Hughes et al., 2003).

3. Results

3.1. Individual data

A pixel graph (Fig. 1) illustrates transitions for individual participants. This graph examines smoking status only and thus, does not include retrospective reports of quit attempts of less than a day. Three participants (8%; the first three rows of Fig. 1) made a quit attempt that resulted in multiple consecutive days of abstinence. In contrast, 10 participants (25%; the bottom 10 rows) never reported either a day of abstinence or reduction. Most smokers (26, 64%) transitioned among smoking as usual, reduction, and abstinence on multiple occasions. For example, Participant 5 smoked near his/her usual cigs/day for 1 day, abstained for 1 day, smoked for 1 day, abstained for 3 days, reduced >50% for 1 day, smoked for 6 days, abstained for 6 days, reduced for 1 day, smoked for 1 day, abstained for 2 days, smoked for 1 day, reduced for 1 day, and abstained for 3 days.

3.2. Daily intentions to quit

During the month, 55% of participants stated they intended not to smoke the next day on one or more days. Among the 104 days in which smokers stated they intended not to smoke the next day, on 56% of these days, participants later stated they did not make a quit attempt on that day.

3.3. Quit attempts

Fifteen participants (38%) reported 17 quit attempts that were associated with a day of abstinence and 22 participants (55%) reported 37 attempts not associated with a day of abstinence. Combining these two, 30 participants (75%) reported 54 attempts. Overall, there were 140 days of abstinence. Among the attempts associated with abstinence, 8 (44%) were not preceded by an intention not to smoke the next day; i.e., were unplanned. Abstinence was more likely when participants said they would not smoke the night before than when they said they would smoke (multilevel logistic regression, $t = 6.1$, $p < .001$). Very few participants achieved long periods of abstinence: 69% of attempts lasted less than a day, 9% lasted only one day, 7% lasted 2–6 days, and 15% lasted 7+ days.

3.4. Reduction

If reduction is defined as a ≥50% decrease in cigs/day (omitting abstinent days) (Hughes and Carpenter, 2005), 27 smokers (68%) had a total of 116 days of smoking reduction. The number of days of reduction is similar to the number of days of abstinence (Goodness-of-fit test $\chi^2 = 2.25$ $p = .13$). Few reduction episodes were associated with an intention to quit on the prior day (9%; i.e., due to a failed quit attempt), immediately preceded abstinence (11%; i.e., due to gradual cessation), or immediately followed abstinence (23%; i.e., due to a relapse process). Thus, most reduction (58%) was not associated with quit attempts.