Original Investigation

Is Delaying a Quit Attempt Associated With Less Success?

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Received June 10, 2011; accepted August 11, 2011

Abstract

Introduction: Delaying a quit date until later may be a cause of, or marker for, low motivation to quit. We tested this possibility in a secondary analysis of a recent clinical trial that allowed smokers flexibility in setting a quit date.

Methods: The trial compared quitting abruptly versus gradually with nicotine lozenge among smokers who were actively trying to quit. Smokers in the abrupt conditions set a quit date sometime between 1 and 3 weeks after study onset; smokers in the gradual condition set a quit date sometime between 3 and 5 weeks after study entry. Within each condition, we examined whether later quit dates were associated with less success.

Results: Independent of study condition, those who set a later quit date were less likely to make a quit attempt, more likely to lapse early on, and showed a nonsignificant trend to be less likely to be abstinent at 6-month follow-up. Those who quit after their planned quit date were more likely to lapse and showed a nonsignificant trend toward less abstinence than those who quit before or on their quit date.

Conclusions: Delaying a quit attempt prospectively predicts less success among smokers actively trying to quit. Whether this represents a causal effect is unclear. Further replication tests of our findings and, possibly, randomized trials of quitting sooner versus later are indicated. If delaying reduces cessation success, then treatments for smoking cessation should encourage quitting very soon upon treatment entry.

Introduction

Five retrospective surveys have found that about half of attempts to quit smoking were “unplanned,” that is, occurred on the same day smokers decided to quit, and half were planned (Cooper et al., 2010; Ferguson, Shiffman, Gitchell, Sembower, & West, 2009; Larabie, 2005; Sendzik, McDonald, Brown, & Ferrence, 2011; West & Sohal, 2006). In three of these surveys, planned quit attempts were associated with less successful abstinence

(Ferguson et al., 2009; Larabie, 2005; West & Sohal, 2006) plus a fourth survey found this at one follow-up but not the other (Sendzik et al., 2011). One possible hypothesis from these results is that, among those who plan to quit, delaying a quit attempt might reduce cessation success. Two of the above surveys reported outcomes for those with different durations between deciding to quit and the quit attempt (Cooper et al., 2010; Ferguson et al., 2009). Neither found longer durations were associated with less success. However, in a prior clinical trial, we reported that the later the planned quit date, the greater the likelihood of lapsing early on (Hughes, Solomon, Livingston, Callas, & Peters, 2010). The one prospective study of this association, done several years ago, found that delaying quitting increased, not decreased, success in quitting. This small study randomly assigned smokers either to quit immediately or 2 weeks later (Flaxman, 1978). In the study, 2 of the 16 participants (13%) in the immediate condition were abstinent at 6 months compared with 9 of the 16 (57%) in the delayed condition.

Although these results are mixed, there are plausible reasons to hypothesize that delay is associated with less success. For example, delaying a quit attempt may allow motivation to quit to decline and this undermines cessation success. Or perhaps, delayed quit attempts are a marker of initial low motivation to quit. Also, delayed quit attempts may be mostly by those who have failed to quit on many past attempts, decide to put more time into planning (and thereby delaying) their attempt.

As mentioned above, we recently completed a randomized trial in which we found that delaying the quit attempt was associated with early relapse (Hughes et al., 2010). We now present further secondary analyses using other measures of time to quit attempt and other measures of abstinence to examine consistency across measures. One rationale for reporting our results is that they examine the prospective association of delay and quit success. The above referenced surveys used retrospective reports of quit attempts up to 14 years earlier. Participant’s recall of quit attempts many years ago is often inaccurate (Berg et al., 2010; Gilpin & Pierce, 1994).

Determination of whether delaying a quit attempt is associated with less success is important because some behavioral

doi: 10.1093/ntr/ntr207

Advance Access published on September 8, 2011

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treatments, for example, self-monitoring, obtaining social support, or gradual reduction, require delaying a quit attempt (Abrams et al., 2003; Hughes & Carpenter, 2005; McEwen, Hajek, McRobbie, & West, 2006; Perkins, Conklin, & Levine, 2007). Some pharmacological treatments, for example, pretreatment or immunotherapy, also require smokers to delay quitting (Maurer & Bachmann, 2007; Shiffman & Ferguson, 2008).

Description of Clinical Trial

In this trial, we randomly assigned smokers who wished to quit gradually to (a) gradual cessation counseling + nicotine replacement therapy (NRT) to reduce prior to quitting; $n = 297$), (b) abrupt cessation counseling ($n = 299$), or (c) a brief advice control condition ($n = 150$; Hughes et al., 2010). Participants averaged 46 years of age, smoked 23 cigarettes/day, and had a Fagerström Test for Nicotine Dependence score of 5.9. Half (46%) were men, and 76% were non-Hispanic Whites. Counseling occurred via phone, and medications were provided via mail. At the first call, participants in each condition were asked to set a quit date. In the gradual condition, the first 3 weeks were to reduce cigarettes per day with the aid of precessation NRT, and the quit date was recommended to be between 3 and 5 weeks after study initiation. In the abrupt and brief advice conditions, no NRT was provided prior to the quit date, and the planned quit date was recommended to be between 1 and 3 weeks from study onset. Upon quitting, participants in all three conditions received NRT. Overall, there were no statistically significant differences among gradual, abrupt, and brief conditions in 7-day carbon monoxide-confirmed point-prevalent abstinence at 6-month follow-up (24%, 31%, and 31%). In the published description of these results (Hughes et al., 2010), we reported only on the association of time to planned quit day and early relapse and only in the gradual cessation condition. We now examine this association (a) in all three conditions, (b) with other measures of time to quit attempt, and (c) with other measures of abstinence outcomes from that study.

The current analysis examined three independent variables: (a) time to planned quit date among the 720 participants (97%

of those enrolled) who set a quit date, (b) time to actual quit date (i.e., first day of abstinence) among the 508 participants (68%) who made a quit attempt, and (c) whether participants quit after versus on the planned quit date among the 508 participants who made a quit attempt. The analysis examined four dependent variables: (a) never making a quit attempt, (b) not quitting (i.e., ≥ 1 day of abstinence) by or on the planned quit date, (c) probability of early lapse (i.e., any smoking) within the first 12 weeks in a survival analysis, and (d) not achieving 7-day point-prevalent abstinence at 6 months. We examined the resultant outcomes first across all participants, independent of condition, and then within each of the experimental conditions. Logistic regression was used to obtain odds ratios for dichotomous outcomes. Proportional hazards regression provided hazard ratios for the analysis of probability of an early lapse, with time to lapse as the survival variable. All analyses for the combined sample adjusted for experimental condition by including design variables for the conditions as covariates in the models. Odds ratios and hazard ratios quantified the increased probability of the worse outcome for each 1-week delay.

Results

Timing of Planned and Actual Quit Attempts

Almost all (>90%) the planned quit attempts were within the designated windows (Table 1). The majority of actual attempts occurred on the planned quit date (61%). Few (8%) occurred before the planned quit date, but a substantial minority (31%) occurred after the planned quit date.

Time to Planned Quit Date

For every week longer till the planned quit date, the odds of never making a quit attempt during the study increased by 40% ($\chi^2_{(1)} = 11.2, p < .001$), independent of experimental condition assignment (Table 2). For example, independent of experimental condition, among those who planned to quit during the first allowed week, 25% (95% CI = 18%–34%) never made a quit attempt, whereas among those who planned to quit during the

Table 1. Incidence (%) of Quit Attempt by Experimental Week

								Timing of actual quit attempt relative to planned QD ^a		
	Week 1	Week 2	Week 3	Week 4	Week 5	After Week 5	Never	Quit before planned QD	Quit on planned QD	Quit after planned QD
Planned QD										
Combined	8	20	37	17	13	1	3			
Gradual	1	0	25	37	33	3	2			
Abrupt	11	32	46	5	1	0	4			
Brief	15	35	42	5	0	0	3			
Actual QD										
Combined	2	16	15	19	8	9	32	8	61	31
Gradual	2	1	4	22	14	14	43	15	57	28
Abrupt	2	25	24	16	4	5	24	5	67	28
Brief	2	26	18	17	5	7	26	5	53	41

Note. Bold indicates quitting during instructed week. QD = quit date.

^a% of 508 who made a quit attempt.

Table 2. Odds Ratios for Association of 1-Week Delay on Abstinence Outcomes

Study	Never made a quit attempt	Not quit on quit date	Probability of early lapse ^a	Not abstinent at 6 months
Time to planned quit date	Combined 1.4***	Combined 1.5***	Combined 1.2**	Combined 1.2
	Gradual 1.3	Gradual 1.4*	Gradual 1.2*	Gradual 1.0
	Abrupt 1.8**	Abrupt 1.8***	Abrupt 1.2*	Abrupt 1.3
	Brief 1.2	Brief 1.3	Brief 1.0	Brief 1.6
Time to actual first day of abstinence	Not applicable	Not applicable	Combined 1.1**	Combined 1.1
			Gradual 1.1	Gradual 1.1
			Abrupt 1.1	Abrupt 1.0
			Brief 1.2*	Brief 1.1
Quit after versus on quit date	Not applicable	Not applicable	Combined 1.6***	Combined 1.5
			Gradual 1.4	Gradual 6.5
			Abrupt 1.6*	Abrupt 1.5
			Brief 1.9**	Brief 0.6

Note. ^aHazard ratios rather than odds ratios.

* $p < .05$. ** $p < .01$. *** $p < .001$.

last allowed week, 34% (29%–40%) never made a quit attempt. A similar effect occurred within each experimental conditions and was statistically significant within the abrupt condition ($\chi^2_{(1)} = 8.9$, $p = .003$) with a strong trend in the gradual condition ($\chi^2_{(1)} = 3.8$, $p = .05$). A similar effect size occurred in the brief advice condition but was not statistically significant, perhaps due to the smaller sample size for this condition. Also, independent of condition, for every week longer to the planned date, the probability of lapsing early increased by 20% ($\chi^2_{(1)} = 8.9$, $p = .003$). This effect was significant within the gradual ($\chi^2_{(1)} = 4.8$, $p = .03$) and abrupt ($\chi^2_{(1)} = 5.2$, $p = .02$) conditions. A similar nonsignificant trend occurred when we examined time to the planned quit date versus the dichotomous point prevalence abstinence at 6-month outcome and other outcomes. For example, among those who planned to quit during the first allowed week, the incidence of 6-month abstinence was 14% (8%–21%), whereas among those who planned to quit during the last allowed week, it was 10% (7%–14%).

Time to Actual Quit Date

Independent of experimental condition, every additional week until the actual quit date increased the probability of an early lapse by 10% ($\chi^2_{(1)} = 7.7$, $p = .006$), and similar significant and nonsignificant trends occurred in the three groups. However, longer times to the actual quit date did not decrease the probability of 6-month abstinence.

Quitting After Versus On Planned Quit Date

Since few participants quit prior to their quit date, we did not test the effect of quitting prior to the planned quit date. Those who quit after their planned quit date were more likely to lapse early on than those who quit on their quit date ($\chi^2_{(1)} = 16.5$, $p < .001$), and this was also statistically significant within the abrupt ($\chi^2_{(1)} = 5.7$, $p = .02$) and brief advice ($\chi^2_{(1)} = 8.0$, $p = .005$) groups. A similar nonsignificant trend occurred with 6-month abstinence.

Moderators

It is plausible that the above differences were due to baseline differences in motivation among those choosing shorter versus longer

delays till quitting; however, baseline motivation to quit on a 0–10 ladder (Hughes, Keely, Fagerstrom, & Callas, 2005) at study onset was only weakly correlated with time to planned and actual quit attempts ($r = -.13$ and $r = -.10$). Adding baseline motivation as a covariate did not substantially change any of the above results.

Discussion

Among smokers who were actively trying to quit, initially declaring a later planned quit day prospectively predicted less initial quitting, more early lapsing, and showed a nonsignificant trend for less long-term abstinence. A similar but less robust effect occurred when we examined longer times to the actual quit attempt. The association appeared to be more consistent within the abrupt cessation condition. Overall, these results suggest that, among smokers actively trying to quit, delaying a quit attempt appears to be a marker for, or cause of, less success in quitting. For most of the outcomes, the effect of delay was of moderate magnitude, for example, each week delay in the planned quit attempt was associated with a decrease in the odds of achieving 6-month abstinence by 20%.

Our results were not explained by less motivation among those who delayed; however, we measured motivation only at baseline and used a single question. Also, we did not obtain repeated measures of motivation to determine whether motivation declined among those who delayed quitting. Several prior treatment studies have allowed smokers' flexibility in when to quit (Hughes & Carpenter, 2006), but we could not locate one that examined time to quit attempt as a predictor of outcome.

Not making a quit attempt until after the planned quit date was also associated with less success. This result is consistent with studies that found that smokers who did not quit on their planned quit date are less likely to achieve abstinence (Borrelli, Papandonatos, Spring, Hitsman, & Niaura, 2004; Kenford et al., 1994; Westman, Behm, Simel, & Rose, 1997).

One asset of our analysis was the use of several independent and dependent outcomes. Results were relatively consistent across outcomes, suggesting convergent validity. The major

liability of our analyses is that participants were not randomized to delayed versus immediate cessation, but rather, participants self-selected one or the other. This is problematic because those who plan quit attempts and those who do not differ on several characteristics (Cooper et al., 2010; Ferguson et al., 2009; Sendzik et al., 2011; West & Sohal, 2006). Thus, whether delayed quitting was an actual cause of worse outcomes or whether it was a marker for some other variable associated with less success, for example, severity of dependence, is unclear. Also, the trial did not collect important information, such as more comprehensive measures of motivation or whether motivation declined over time in those who delayed. The participants were smokers seeking a fairly intensive treatment and may not be representative of all smokers trying to quit (Hughes & Callas, 2010). The analyses were of three conditions that differed in allowable quit dates, reduction, and use of NRT prior to the quit date, and this may have introduced heterogeneity, masking relationships. Finally, findings from post-hoc secondary analyses are often not replicated (Schulz & Grimes, 2005). Given these liabilities, further replications of our findings that delaying a quit attempt in smokers trying to quit is associated with worse outcomes are needed before a definitive conclusion can be made.

Replicating our results and results suggesting that the effect of delay is causal (e.g., showing motivation declines over time) could have significant implications for smoking cessation treatments. Some behavioral treatments for smoking cessation encourage smokers to self-monitor their smoking, obtain social support, etc, before attempting to quit (Abrams et al., 2003; McEwen et al., 2006; Perkins et al., 2007), and some pharmacological protocols encourage pretreatment (Maurer & Bachmann, 2007; Shiffman & Ferguson, 2008). If these treatments cause smokers to delay a quit attempt and if delaying undermines motivation, then these treatments might be less successful than those that encourage smokers to quit as soon as possible.

Funding

Conduct of the trial was supported by an extramural grant from the National Institute on Drug Abuse (DA-017825).

Declaration of Interests

Dr. JRH is currently employed by the University of Vermont and Fletcher Allen Health Care. Since January 1, 2008, he has received research grants from the National Institute on Health and Pfizer; the latter develops and sells smoking cessation medications. During this time, he has accepted honoraria or consulting fees from several non-profit and for-profit organizations and companies that develop, sell, or promote smoking cessation products or services or educate/advocate about smoking cessation: Abbot Pharmaceuticals; Aradigm; American Academy of Addiction Psychiatry; American Psychiatric Association; American Psychiatric Institute for Research and Education; Cambridge Hospital; Dartmouth College; Dartmouth-Hitchcock; Dean Foundation; DLA Piper; EPI-Q; European Respiratory Society; Evotec; Free and Clear; Glaxo-Smith Kline; Golin Harris; Healthwise; Integrated Communication; Invivodata; Maine Health; McGill University Medical School; McNeil Pharmaceuticals; Novartis Pharmaceuticals; Oglivy Health PR; Ottawa Heart Institute; Pfizer Pharmaceuticals; Pinney Associates; Propagate Pharmaceuticals; Reckner Associates; Scientia; University of Arkansas for

Medical Sciences; University of California-San Francisco; University of Wisconsin; US National Institutes on Health; and Wolters Publishing. Dr. PWC has no disclosures.

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