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Comparing abrupt and gradual smoking cessation: A randomized trial

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ABSTRACT

Aims: To compare abrupt and gradual smoking cessation.
Design and setting: Randomized trial and observational study, Internet, 2007–2010.
Participants: Smokers with no strong preference for abrupt or gradual quitting were randomly assigned to quitting immediately ($n = 472$), or to gradually reducing their cigarette consumption over 2 weeks and then quit ($n = 502$). Smokers who strongly preferred to quit abruptly were instructed to do so immediately ($n = 2456$), those who strongly preferred gradual were instructed to reduce their cigarette consumption over 2 weeks, then quit ($n = 1801$). Follow-up was conducted 4 weeks after target quit dates.
Findings: Those who preferred abrupt quitting were the most motivated to quit and the most confident in their ability to quit. At follow-up, quit rates were 16% in those who preferred abrupt cessation, 7% in those who preferred gradual cessation and 9% in those who had no preference ($p < 0.001$). In the latter group, quit rates were equal for those randomized to abrupt or gradual (9%, $p = 0.97$). In those who expressed a strong preference for either method, there were interactions between quitting method, motivation to quit and confidence in ability to quit: those who had low levels of motivation or low levels of confidence were more likely to quit at follow-up if they preferred and used abrupt rather than gradual.
Conclusions: In those who had no strong preference for either method, abrupt and gradual produced similar results. Those who preferred and used the abrupt method were more likely to quit than those who preferred and used the gradual method, in particular when they had low motivation and confidence.

1. Introduction

Several observational studies found that smoking abstinence rates were higher in smokers who quit abruptly than in those who quit gradually (Cheong et al., 2007; Fiore et al., 1990; Glasgow et al., 1985; Peters et al., 2007; West et al., 2001). However, in observational studies, associations may be explained by confounding variables such as motivation to quit, self-efficacy, dependence level, or the amount of support received, as those who used the gradual method may have been less likely to receive professional support, since gradual cessation is not recommended by most treatment guidelines (Fiore, 2008; West et al., 2000). It is also possible that the lower quit rate in those who quit gradually is explained by adverse self-selection, if smokers chose the gradual method only after having failed with the abrupt method. From the literature, it is however not clear whether using abrupt versus gradual quitting is associated with motivational variables. Some studies found that gradual quitters were less motivated to quit than abrupt quitters (Peters et al., 2007) or felt more peer pressure to quit (Bolliger, 2000), but other studies found that motivation to quit, self-efficacy and tobacco dependence were not associated with use of abrupt versus gradual methods (Cheong et al., 2007; Hughes, 2007).

1.1. Efficacy

Randomized controlled trials (RCTs) provide better evidence for causality. In smokers motivated to quit, two meta-analyses of RCTs found that abrupt quitting and gradual reduction had the same efficacy (Law and Tang, 1995; Lindson et al., 2010), but another (unpublished) meta-analysis concluded that the gradual method ("cigarette fading") was ineffective (Fiore, 2008). Another meta-analysis found that starting a nicotine patch treatment a few weeks before quitting almost doubled the odds of quitting, compared with quitting abruptly and starting the patch on the quit date (Shiffman and Ferguson, 2008). However, three recent studies found that pre-treatment with the nicotine gum and lozenge did not increase the efficacy of nicotine therapy (Bullen et al., 2010; Etter et al., 2009; Hughes et al., 2010), and a meta-analysis found that nicotine-aided reduction was as effective as abrupt cessation (Lindson and Aveyard, 2010; Lindson et al., 2010). Finally, in smokers not motivated to quit, two meta-analyses and a literature review found that smoking reduction treatments increased the odds of future cessation (Hughes and Carpenter, 2006; Moore et al., 2009; Stead and Lancaster, 2007).

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1.2. Preference for abrupt or gradual

It is not clear which method smokers prefer. Some studies found that most smokers used the abrupt method in their most recent quit attempt (Cheong et al., 2007; Hughes, 2007; Hyland et al., 2004; Shahab et al., 2009), but others found that half or more of the smokers who planned to quit were interested in gradual rather than abrupt cessation (Hughes et al., 2007; Peters et al., 2007; Shiffman et al., 2007), and that at any time point, most smokers were attempting smoking reduction (Beard et al., 2011). Smokers' preferences may also fluctuate over time (Peters and Hughes, 2009) or geographically. Finally, there is little published research about what categories of smokers benefit the most from abrupt versus gradual cessation. One may hypothesize that the gradual method is best for heavy smokers, for those who are not confident in their ability to quit, for those who have previously failed with the abrupt method, or for ambivalent smokers who do not plan to quit soon (Hughes et al., 2010; Lindson and Aveyard, 2010).

Thus, there is a need for observational and experimental studies comparing the relative efficacy of the gradual and abrupt methods, and testing whether the differences reported in observational studies are explained by confounding effects. Studies are also needed to assess smokers' preferences for either method and to document which categories of smokers benefit the most from each method. All these are practical questions relevant to smokers, therapists and public health practitioners. In particular, offering the gradual method may attract smokers who failed with the abrupt method and are not interested in repeating a method that failed in the past. Thus, more smokers might take up treatment if gradual cessation was offered.

1.3. Aims

The aims of this study were to assess whether smokers preferred the abrupt or the gradual method, to compare smoking cessation rates for abrupt versus gradual, and to study moderators of these effects.

2. Methods

2.1. Participants

We conducted an Internet survey, in French and English, between 2007 and 2010 (during 40 months) on the smoking cessation website http://stop-tabac.ch/. This website is visited by smokers who want to quit smoking and by recent quitters, and receives about 90,000 visitors per month (Etter, 2006, 2009; Wang and Etter, 2004). Eligibility criteria included current daily smoking, age > 18, indication of an e-mail address, commitment to answer 3 follow-up surveys and commitment to attempt to quit using the method assigned by us (abrupt or gradual). Participants were invited by e-mail to answer follow-up surveys 2, 4 and 6 weeks after baseline.

2.2. Measurements

The baseline survey covered smoking status: daily-, occasional-, former, never-smoker (only current daily smokers were included), cigarettes per day now and 4 weeks ago, minutes to the first cigarette of the day, craving for cigarettes (5 response options), intention to quit smoking (in the next 2 weeks, not in the next 2 weeks, no intention), preference for abrupt or gradual cessation: "If you intend to quit smoking in the next 2 weeks, do you: (a) strongly prefer to quit abruptly; (b) strongly prefer to first reduce your cigarette consumption, then quit smoking in 2 weeks from now; or (c) have no strong preference for either *a* or *b*", motivation to quit and confidence in ability to quit (0–100 scales), method used for the last quit attempt (abrupt or gradual), relapse date (for smokers who had ever tried to quit), age, sex, country and a 2-item screen of depression (Whooley et al., 1997). The follow-up surveys covered any smoking (even 1 puff) in the past 24 h and 4 weeks, quit date (for those who stopped) and relapse date for those who relapsed (i.e., date when they started again to smoke, after a quit attempt).

2.3. Randomized trial

Daily smokers who had no strong preference for either abrupt or gradual ($n = 974$) were randomly assigned by the computer (list of random numbers) to receiving either the instruction (on the web page and by e-mail) to quit abruptly and immediately (group 1, $n = 472$), or the instruction to gradually reduce their cigarette consumption by half over the next 2 weeks and then quit (group 2, $n = 502$). Those assigned to gradual received by e-mail an individually tailored calendar indicating their target cigarette consumption for each day of the next 2 weeks. For each participant, the computer calculated a linear reduction in cig./day, ending with a 50% reduction on the day before the target quit date. We hypothesized that abrupt would be more effective than gradual, with a risk ratio of 1.4. Based on an expected quit rate of 20% in the abrupt group, we needed 950 people in the randomized trial to detect this effect (power 80%, significance level 0.05).

2.4. Observational study

In the context of a web-based study, it was not deemed feasible to ask smokers to use a method different from the method they strongly preferred. Therefore, participants who expressed a strong preference for either abrupt or gradual were ineligible for the randomized trial. Those who strongly preferred abrupt were instructed to stop smoking immediately (group 3, $n = 2456$), and those who strongly preferred gradual (group 4, $n = 1801$) were instructed to gradually reduce their cigarette consumption by half during the next 2 weeks and then quit, and they received the computer-tailored reduction calendar described above.

2.5. Compliance with instructions

At the 2-week survey, we used quit dates (in recent quitters) and relapse dates (in smokers who made a quit attempt after entry in the study) to assess compliance with our instructions about quitting method.

2.6. Statistical analyses

We used χ^2 tests to compare proportions and Kruskal–Wallis χ^2 tests to compare medians in 3 groups. In participants who expressed a strong preference for either method, we used multivariate logistic regression models to identify independent predictors of smoking cessation. We assessed whether associations were moderated by dependence level, craving for tobacco, motivation to quit, confidence in ability to quit, method used in the previous quit attempt, depression, age and sex. Data were analyzed "intention to treat" (including all participants and counting dropouts as smokers).

We compared groups at each follow-up survey (that is, 2, 4 and 6 weeks after baseline), and also with matched durations after the target quit date, that is, for a duration of 2 weeks post target quit date, we used the 2-week survey for groups 1 and 3 and the 4-week survey for groups 2 and 4. For a duration of 4 weeks post target quit date, we used the 4-week survey for groups 1 and 3 and the 6-week survey for groups 2 and 4.

3. Results

3.1. Participation

The screening questionnaire was answered by 19,025 people, but 13,794 were ineligible (2236 declined data storage, 2874 were former/non-daily/never smokers, 382 were <18 years, 3808 did not provide an e-mail address and 4494 did not commit to quit as requested or to answer to follow-up surveys). Most of the 5231 eligible participants were women (57%), and the median age was 34 years (Table 1). Participants lived in France (58%), Switzerland (14%), Algeria/Morocco/Tunisia (8%), Canada (6%), Belgium (5%), the USA (2%), or other countries (7%). The response rates were 47% ($n = 2465$) at the 2-week survey, 32% ($n = 1681$) at the 4-week survey and 24% ($n = 1250$) at the 6-week survey.

3.2. Preference for abrupt versus gradual cessation

Among participants who had already tried to quit, 74% used the abrupt method for their last quit attempt and 26% used the gradual method. When asked whether, for their next quit attempt, they preferred abrupt or gradual, almost half (47%) strongly preferred to quit abruptly, one third (34%) strongly preferred to first reduce then quit 2 weeks later, and 19% had no strong preference for either method. Compared with those who preferred gradual or had no preference, those who preferred abrupt were more likely to be men, more motivated to quit and more confident in their ability to quit (Table 1). Daily cigarette consumption, minutes to