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Dependence and motivation to stop smoking as predictors of success of a quit attempt among smokers seeking help to quit

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HIGHLIGHTS

- The 'Fagerstrom', and its component scores, predicted abstinence in the short and long-term.
- Motivation towards quitting smoking did not predict abstinence.
- At 12 mths the 'Fagerstrom' and non-Heaviness of Smoking Index items were equally strong predictors.

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ABSTRACT

Introduction: It is not known how well motivation to stop smoking predicts abstinence in a clinical sample relative to the most widely used measure of cigarette dependence.
Methods: A secondary analysis was conducted from a trial with 864 smokers making quit attempt. Fagerström Test of Cigarette Dependence (FTCD), Heaviness of Smoking Index (HSI), and motivation to stop smoking (composite of determination to quit and importance of quitting) were measured at baseline. Continuous smoking abstinence, validated by expired-air carbon monoxide, was assessed at 4 weeks, 6 months and 12 months post-quit date. FTCD, HSI, non-HSI items in FTCD, and motivation were assessed as predictors of abstinence.
Results: In multiple-logistic regressions, controlling for age, gender and medication use, lower scores for FTCD, HSI and non-HSI all significantly predicted abstinence at all follow-ups, while motivation did not predict abstinence at any time. Likelihood ratio tests showed that the FTCD contributed most to the model at 4 weeks and 6 months; at 12 months FTCD and non-HSI equally contributed most to the model. At 4 weeks and 6 months, predictions were improved by combining HSI and non-HSI components, compared with using these components alone.
Conclusions: Cigarette dependence, measured by the FTCD, or by its HSI or non-HSI components, predicts both short-term and medium-term outcomes of attempts to stop smoking in treatment-seeking smokers involved in a clinical trial, whereas strength of motivation to stop predicts neither. Both the HSI and non-HSI components may be considered as briefer alternatives to the full FTCD.

1. Introduction

Data from population samples show that motivation to stop smoking predicts incidence of quit attempts but does not generally predict the success of those attempts; whereas cigarette dependence does not consistently predict quit attempts but does predict relapse to smoking following those attempts (Vangeli, Stapleton, Smit, Borland, & West, 2011). This issue is central to our understanding of factors that promote or inhibit different parts of the quitting process and has implications for targeting interventions that promote and aid quit attempts (West, 2009).

Clinical samples (i.e., smokers who proactively seek stop-smoking treatment in a stop smoking clinic) are also important to study because, compared with population studies, they generally provide an opportunity for measuring motivation and dependence immediately prior to the quit attempt, include greater rigour of measurement of outcome, and permit better control of the conditions under which quitting occurs. A range of factors might contribute to differences between studies, including the measures used, the samples, and the duration of abstinence. As regards dependence, studies from clinical samples, with smokers who are motivated to quit, have tended to show more mixed results compared with population studies, with dependence predicting quit

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success in some studies (Breslau & Johnson, 2000; Courvoisier & Etter, 2010; Ferguson et al., 2003; Japuntich, Leventhal, Piper, et al., 2011; Kozlowski, Porter, Orleans, Pope, & Heatherton, 1994) and other studies failing to observe this effect (Etter, 2005; Frikart, Etienne, Cornuz, & Zellweger, 2003; Piper, Piasecki, Federman, et al., 2004; Piper, McCarthy, & Baker, 2006). Dependence could be a more consistent predictor of abstinence in population studies, compared with clinical studies, because population samples tend to have a wider range of dependence.

For motivation, clinical studies have recruited a mixed sample of smokers wanting to quit and those not interested in quitting and have shown that motivation predicts success (Cox, Wick, Nazir, et al., 2011; Sciamanna, Hoch, Duke, Fogle, & Ford, 2000); however, in these studies, the results are confounded by combining, in the analysis, smokers who have and have not made a quit attempt. We could identify only two clinical studies in which the entire sample were treatment-seeking smokers, attempting to quit smoking, and motivation (assessed as determination to quit) predicted the success of quit attempts up to 12 months of abstinence in one study (Bauld, Ferguson, McEwen, & Hiscock, 2012) but not in the other study (Ferguson, Bauld, Chesterman, & Judge, 2005). However, these studies recruited smokers from routine smoking cessation clinics in the English National Health Service and it is not clear whether all the participants actually tried to quit (i.e., made it to their quit date), and that could influence the findings.

The present study aimed to add to the evidence base on associations between motivation to quit, cigarette dependence and success of quit attempts by employing a large clinical sample, making a definite quit attempt, and with data on both short- and medium-term follow-up with half the sample receiving no medication in support of the attempt. It provided a robust test of the relative predictive power of these measures through applying a strict criterion for abstinence, involving no self-reported smoking from the quit date onwards, with biochemical verification at 1, 2, 3 and 4 weeks and at 6 months and 12 months after the target quit date. Use of a strict abstinence criterion (e.g., lapse-free abstinence from the quit date) is important as weaker outcome measures (e.g., point prevalence — typically defined as not smoking on the day of follow-up or for a specified number of days before a follow-up) are contaminated by some 'successes' being only transient arising after failure of the initial quit attempt (West, Hajek, Stead, & Stapleton, 2005).

The most commonly used self-report measure of cigarette dependence is the Fagerström Test for Cigarette Dependence (FTCD, previously known as the Fagerström Test for Nicotine Dependence) (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991; Fagerstrom, 2012) which has been found to predict success at stopping smoking in some studies (Breslau & Johnson, 2000; Courvoisier & Etter, 2010; Ferguson et al., 2003; Japuntich et al., 2011; Kozlowski et al., 1994), although other studies have found no relationship with quitting success (Etter, 2005; Frikart et al., 2003; Piper et al., 2004). Measures based on self-rated dependence or Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria typically fail to predict quitting outcomes (Piper et al., 2006; DiFranza, Ursprung, Lauzon, et al., 2010; Piper, McCarthy, Bolt, et al., 2008). A scale composed of two items from the FTCD, time to first cigarette of the day and number of cigarettes usually smoked per day (i.e., Heaviness of Smoking Index (HSI)), (Heatherton, Kozlowski, Frecker, Rickert, & Robinson, 1989) has been shown to predict failure of quit attempts at least as well as the full scale, whether in population studies (Courvoisier & Etter, 2010; Fidler, Shahab, & West, 2011) or in clinical studies with treatment seeking smokers who are motivated to quit (Kozlowski et al., 1994; Baker, Piper, McCarthy, et al., 2007; Burling & Burling, 2003; Fagerstrom, Russ, Yu, Yunis, & Foulds, 2012). Overall, as these studies found no evidence of superiority of the FTCD over the HSI for predicting abstinence, they have encouraged use of the HSI as a more economical substitute for the FTCD. However, these studies used a point-prevalence measure of abstinence which, as argued above, has limitations. It would be useful to collect more data from clinical samples to determine whether the non-HSI parts of the FTCD predict outcome over and above the HSI.

As regards use of multiple follow-up points, it might be expected that cigarette dependence would be more successful in predicting short-term than medium or long-term relapse to smoking. This is because relapse after the initial period of cigarette withdrawal symptoms might be more of a random event, arising from a range of environmental and social triggers. This is also consistent with the proposal that the FTCD is predominantly a measure of physical dependence (DiFranza et al., 2013; Moolchan, Radzius, Epstein, et al., 2002).

Thus, this study addressed the following questions: (i) How well do motivation to stop smoking and cigarette dependence measured just prior to a quit attempt in a clinical sample of treatment-seeking smokers predict short-term (i.e., at 4 weeks) and medium-term (i.e., at 6 or 12 months) abstinence? (ii) How do the HSI and non-HSI parts of the FTCD compare as predictors of short- and medium-term abstinence?

2. Methods

2.1. Design and interventions

This study involved secondary data analysis from a double-blind placebo-controlled trial of glucose tablets for smoking cessation (West et al., 2010) Information on demographic characteristics and smoking patterns was gathered by means of a postal questionnaire completed at one to four weeks before the quit date. All participants attended the clinic 1 week prior to their target quit date, on their quit date, then weekly up to 4 weeks after their quit date, totalling six sessions over 5 weeks. At each session, they received 60 min of group-based behavioural support (Stead & Lancaster, 2012). Participants were randomised to receive either glucose tablets or sorbitol tablets (placebo), supplied up to 6 weeks after the quit date. In addition, within the both groups, participants were randomised to receive either stop smoking medication (nicotine replacement therapy (NRT) and/or bupropion) or no medication, which were prescribed up to 8 weeks post-quit. Participants were followed up 1, 2, 3, 4, 26, and 52 weeks post-quit date.

2.2. Participants

Smokers wanting help with stopping smoking were recruited through general practitioner referral, word of mouth, and advertising. They were excluded if under 18, diabetic, currently smoking < ten cigarettes a day, unable to read and write English, or if they reported a current psychiatric condition. Written informed consent was obtained. Nine-hundred-twenty-eight participants were recruited over a 19 month period between November 2006 and May 2008. The eligibility criteria were clearly outlined in the invitation letter and it was not necessary to exclude anyone who expressed interest in taking part. As the study was investigating the prediction of success of quit attempts, only the 891 (96%) who made a quit attempt were included. Twenty-seven participants with missing FTCD scores were excluded from the analysis. The characteristics of those included were very similar to the excluded 27. Eight-hundred-sixty-four (93.1%) participants were included in the analysis.

2.3. Measures

Prior to the quit attempt, demographics, motivation to quit and cigarette dependence were assessed. Demographics, including age, gender and occupation were assessed by the postal questionnaire.