Addictive Behaviors 45 (2015) 150–155

Contents lists available at ScienceDirect

Addictive Behaviors

Are you in or out? Recruitment of adolescent smokers into a behavioral smoking cessation intervention

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HIGHLIGHTS

- We examine a behavioral smoking cessation intervention for adolescents.
- We investigate participant baseline predictors of intervention participation.
- Participation is predicted by nicotine dependence and quit motivation.
- Heavier smoking behavior is indirectly positively associated with participation.
- Participants in need of professional cessation support were reached.

ARTICLE INFO

Available online 30 January 2015

Keywords:
Youth tobacco use
Treatment and intervention
Cessation
Behavioral
Recruitment

ABSTRACT

Introduction: Even though many adolescent smokers want to quit, it is difficult to recruit them into smoking cessation interventions. Little is known about which adolescent smokers are currently reached by these measures. In this study we compare participants of a group-based, cognitive behavioral smoking cessation intervention with adolescent smokers who decided against participating.
Methods: Within a non-randomized controlled trial, data of 1053 smokers (aged 11–19) from 42 German secondary schools were analyzed. Of these smokers, 272 were recruited into 47 courses of the intervention. An in-class information session, individually addressing potential participants, and incentives were used as means of recruitment. Personal predictors of participation were analyzed using regression analyses and multivariate path analyses to test for mediation.
Results: In the path analysis model, nicotine dependence, quit motivation, and a previous quit attempt were directly positively related to participation. Heavier smoking behavior was indirectly positively associated with participation through nicotine dependence and negatively through quit motivation, yielding an overall positive indirect effect. The positive effect of a previous quit attempt on participation was partially mediated through nicotine dependence and quit motivation. The proportion of smoking friends were indirectly positively related to participation, mediated through nicotine dependence.
Conclusions: Since adolescents with heavier smoking behavior and stronger nicotine dependence are less likely to undertake a successful unassisted quit attempt, the reach of these young smokers with professional cessation interventions is desirable. Further measures to improve the recruitment of those currently not motivated to quit have to be examined in future studies.

1. Introduction

In Germany, 12.0% of adolescents between 12 and 17 years old are current smokers (Federal Centre for Health Education (BZgA), 2013). Although the smoking rates among German teenagers have dropped over the last decade from 27.5% in 2001, this decline may be due to successful prevention of smoking rather than due to success in getting young people to quit once they have started (Orth & Töppich, 2010). Given that 80% of adult smokers have started smoking during adolescence, smoking cessation is important as early in the smoking career as possible (U.S. Department of Health & Services, 1994).

Even though a large part of adolescent smokers is motivated to quit and cessation attempts are frequent, only few of these cessation

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http://dx.doi.org/10.1016/j.addbeh.2015.01.030
0306-4603/

attempts are successful (Bancej, O'Loughlin, Platt, Paradis, & Gervais, 2007). An additional factor hindering successful smoking cessation in adolescence is the fact that young smokers may want to become smoke free, but professional cessation support is neither well known nor well liked among this population (Leatherdale & McDonald, 2007). Therefore, one of the key challenges in behavioral smoking cessation with adolescents is the recruitment of the target group.

We know little about which personal predictors distinguish adolescent smokers who participate in smoking cessation interventions from those deciding against participating. Previous studies have either compared adult participants with non-participants after successful screening for smoking cessation interventions (Dahm et al., 2009) or compared adolescent intervention participants with smokers from general population samples (Horn et al., 2008). Additional potential predictors of adolescent smoking cessation can be identified from a prospective observational study of adolescent smokers with no professional treatment contact (Kleinjan et al., 2009). Taken together the findings of these studies suggest that nicotine dependence may be a strong predictor of intervention participation. Furthermore, adolescents' intentions to quit in the near future are important predictors of quit attempts (Kleinjan et al., 2009) and treatment effectiveness (Thrul, Stemmler, Bühler, & Goecke, 2014), and adolescent smokers participating in a smoking cessation intervention reported more previous quit attempts compared to adolescent smokers from the general population (Horn et al., 2008). The literature is mixed regarding how smokers in the social context of an individual influence the likelihood for intervention participation. Results from a study with young adult smokers suggest that living in a household with another smoker may present a barrier to participation (Audrain-McGovern et al., 2009). However, studies with adolescent smokers found that intervention participants were more strongly embedded in smoking peer groups and families (Horn et al., 2008). In sum, previous findings suggest that a variety of factors related to smoking behavior/nicotine dependence, cognitions and quit motivation, and the social context may be relevant for participant recruitment.

Given the importance of adolescent smoking cessation, there still is a considerable lack of knowledge on how to recruit young smokers and a need for more research has been expressed in the literature (Backinger et al., 2008). In this study, we analyze predictors of voluntary participation in a behavioral smoking cessation intervention for adolescents. Based on the reviewed literature we firstly hypothesize that stronger smoking and stronger nicotine dependence will be positively associated with participation. Secondly, we expect that a stronger quit motivation and a previous quit attempt will increase the likelihood to participate. In addition, we will explore how perceived smoking among parents, siblings, and friends of adolescents is associated with participation. Lastly, we will examine whether nicotine dependence and quit motivation are mediators between individual and social predictors and adolescents' decisions to participate.

2. Methods

2.1. Procedure

In 2010, 41 professionals (e.g., social workers) from 13 German states received a 2 day training session in a behavioral smoking cessation manual for adolescent smokers and served as instructors in this study. These professionals recruited basic and intermediate secondary schools (Haupt- & Realschulen) to implement a smoking cessation intervention for interested young smokers in grades 7 to 10 (students' age range approximately 12–17 years). Recruitment was targeted at this age range and these schools because studies have consistently shown that smoking prevalences are high in older teenagers and in basic and intermediate schools in Germany (Federal Centre for Health Education (BZgA), 2012; Federal Centre for Health Education (BZgA), 2013; Lampert & Thamm, 2007; Orth & Töppich, 2010). Based on recommendations from the previous literature (Sussman & Sun, 2009), mandatory in-class information sessions, individual referral by teachers and school social workers, and incentives for regular participation (3 media vouchers, 10 € each) were used to improve recruitment. All students of classes assigned to receive the mandatory information session were asked to complete a baseline questionnaire before the session. Students participating in the intervention also completed another questionnaire at the beginning of the first course session; this questionnaire was identical to the baseline questionnaire regarding all measures used in the present study. At 42 schools, 273 young smokers were recruited into 47 intervention courses and served as the intervention group (IG). The control group (CG) consisted of 783 currently smoking students who participated in the information session but decided against participating in the intervention. The intervention was based on cognitive–behavioral methods and motivational enhancement and was especially developed for adolescent smokers (Bühler et al., 2012; Thrul et al., 2014; Wegmann, Bühler, Strunk, Lang, & Nowak, 2012). It consisted of 6 sessions (5 group sessions lasting 90 min, 1 individual session lasting 15 min) within 3 weeks and an aftercare interval of 4 weeks including follow up calls and text messages. All study procedures were approved by the ethics commission of the German Psychological Society. Parental consent of participation in the study was requested beforehand by letters sent to the schools and distributed by teachers.

2.2. Participants

A total of 273 currently smoking intervention participants and 783 currently smoking students in the control group provided data for this study. As several different recruitment methods were used, a substantial part of intervention participants ($n = 109$, 40%) did not participate in the information session and did not complete the baseline questionnaire. Therefore, the information these participants provided in the identical questionnaire completed before the first intervention session was used as baseline data. A comparison within participants that provided data at both of these assessment points showed that quit motivation was biased from baseline to first session (i.e., intervention participants reported being more motivated at the beginning of the first session than at baseline). Values for these variables were imputed using the single imputation command UVIS (Royston & White, 2011) for Stata 12.0 (StataCorp., 2009), which imputes missing data for a single variable as a function of the covariates specified (i.e., quit motivation at first course session was used as predictor for quit motivation at baseline). One observation was excluded because the gender variable was missing and 2 observations were excluded because of more than 50% missing values in total. Remaining missing values ($n = 400$ data points; 1.31% of all data) were imputed using multivariate imputation by chained equations (MICE) via the command ICE (Royston & White, 2011; Van Buuren, Boshuizen, & Knook, 1999) for Stata. This resulted in an analytical sample of $n = 1053$ smoking students (IG = 272; CG = 781).

2.3. Measures

2.3.1. Demographics

Participants were asked to indicate their age and gender.

2.3.2. Smoking behavior

Smoking behavior was assessed with 2 questions. Smoking frequency (On how many of the last 30 days have you smoked cigarettes?) and quantity (How many cigarettes do you usually smoke on a smoking day?). A quantity–frequency index of cigarettes per day (CPD) was calculated ((quantity * frequency) / 30) (Kraus, Piontek, Pabst, & de Matos, 2013).

2.3.3. Perceived smoking of others

Perceived smoking of mother and father was assessed with two items (Does your mother/father smoke?) and responses were recorded