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Improving tobacco dependence treatment outcomes for smokers of lower socioeconomic status: A randomized clinical trial

Christine E. Sheffer[a,*], Warren K. Bickel[b], Christopher T. Franck[c], Luana Panissidi[a], Jami C. Pittman[a], Helen Stayna[a], Shenell Evans[a]

[a] City University of New York School of Medicine, City College of New York, 160 Convent Ave, New York, NY 10031, United States
[b] Advanced Recovery Research Center, Virginia Tech Carilion Research Institute, 2 Riverside Circle, Roanoke, VA 24016, United States
[c] Department of Statistics, Virginia Tech, Blacksburg, VA 24061, United States

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ABSTRACT

Introduction: Evidence-based treatments for tobacco dependence are significantly less effective for smokers of lower socioeconomic status which contributes to socioeconomic disparities in smoking prevalence rates and health. We aimed to reduce the socioeconomic gradient in treatment outcomes by systematically adapting evidence-based, cognitive-behavioral treatment for tobacco dependence for diverse lower socioeconomic smokers.

Methods: Participants were randomized to adapted or standard treatment, received six 1-h group treatment sessions, and were followed for six months. We examined the effectiveness of the adapted treatment to improve treatment outcomes for lower socioeconomic groups.

Results: Participants (n = 227) were ethnically, racially, and socioeconomically diverse. The adapted treatment significantly reduced the days to relapse for the two lowest socioeconomic groups: SES1: M = 76.6 (SD 72.9) vs. 38.3 (SD 60.1) days to relapse (RR = 0.63 95% CI, 0.45, 0.88, p = 0.0013); SES2: M = 88.2 (SD 67.3) vs. 40.1 (SD 62.6 days to relapse (RR = 0.57 95% CI, 0.18, 0.70, p = 0.0024). Interactions between socioeconomic status and condition were significant for initial abstinence (OR = 1.26, 95% CI 1.09, 1.46, p = 0.002), approached significance for 3-month abstinence (OR = 0.90, 95% CI 0.80, 1.01, p < 0.071), and were not significant for 6-month abstinence (OR = 0.99 95% CI 0.88, 1.10, p = 0.795). No significant differences in long-term abstinence were observed.

Conclusion: Systematic adaption of evidence-based treatment for tobacco dependence can significantly improve initial and short-term treatment outcomes for diverse lower socioeconomic smokers and reduce inequities in days to relapse. Novel methods of providing targeted extended support are needed to improve long-term outcomes.

1. Introduction

The prevalence of cigarette smoking among lower socioeconomic status (SES) groups in the US remains extraordinarily high (Jamal et al., 2016) and contributes significantly to smoking-related socioeconomic health inequities and costs (Kanjilal et al., 2006; Harper and Lynch, 2007; Smith et al., 2009; Trinidad et al., 2011; Bosdriesz et al., 2015, 2016; Singh et al., 2015; Bosdriesz et al., 2016; Singh and Jemal, 2017). At present, nearly 30% of adults with Medicaid, a low-income government-sponsored health insurance program, smoke compared with 15% of the population (Jamal et al., 2016). In 2014, 15% of all Medicaid costs were smoking-related (Xu, Bishop et al. 2015). Few socioeconomic differences are observed in attempts to quit smoking (Kotz and West, 2009; Reid et al., 2010; Christiansen et al., 2012); however, there is a significant socioeconomic gradient in cessation that is associated with a variety of social, clinical, environmental, and treatment-related factors (Hiscock et al., 2012; Sheffer et al., 2012b; Hiscock et al., 2013; Varghese et al., 2014; Hiscock et al., 2015).

Evidence-based treatment (EBT) for tobacco dependence greatly improves the odds of cessation (Fiore et al., 2008); however, lower SES groups do not benefit equally from EBT (Judge et al., 2005; Foulds et al., 2006; Fiore et al., 2008; Robles et al., 2008; Burgess et al., 2009; Sheffer et al., 2009; Hiscock et al., 2012; Sheffer et al., 2012b; Varghese et al., 2014; Nollen et al., 2017). Given the same EBT, lower SES smokers are significantly less likely to achieve short-term (ST) (Businelle et al., 2011; Hiscock et al., 2013) and long-term (LT)

* Corresponding author at: Department of Health Behavior, Carlton House, Room 402, Roswell Park Cancer Institute, Buffalo, NY 14263, United States.
E-mail address: Christine.sheffer@roswellpark.org (C.E. Sheffer).

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abstinence than higher SES smokers (Kotz and West, 2009; Sheffer et al., 2012b; Varghese et al., 2014; Hiscock et al., 2015).

LT abstinence, defined as abstinence ≥6 months after the quit date (Hughes et al., 2003), is an important milestone; but alone masks the processes required to achieve this milestone (Shiffman et al., 2006). Initial abstinence, defined as 24 h of continuous abstinence (Hughes et al., 2003; Shiffman et al., 2006) must be followed by avoiding the progression from lapse to relapse during ST abstinence, broadly defined as periods of abstinence > 24 h and < 6 months (Hughes et al., 2003). The UK smoking treatment services uses 4-week abstinence as a ST milestone (Judge et al., 2005; Hiscock et al., 2013). The number of days to relapse, called latency to relapse, provides incremental abstinence information from initial to LT abstinence (Hughes et al., 2003; Shiffman et al., 2006).

SES is an index of social and economic position (Galobardes et al., 2006a,b). In the US, lower SES groups are ethnically and racially diverse; however, Black Americans are substantially over-represented (U.S. Census Burea, 2010; Macartney et al., 2013) and racial differences in cessation are sometimes found after making statistical adjustments for SES (Trinidad et al., 2011; Kulak et al., 2016). Cognitive-behavioral EBT for tobacco dependence adapted for Black Americans significantly improves ST abstinence rates for Black smokers (Webb Hooper et al., 2017); however, improvements in LT abstinence rates were not observed in this study and the socioeconomic gradient in outcomes was not reported. Given the magnitude of smoking-related socioeconomic disparities and the impact of these disparities on public health, simply establishing socioeconomic equity in EBT outcomes would represent progress and provide significant public health benefits.

In this study, we compared the effects of cognitive-behavioral EBT adapted for diverse lower SES smokers with standard cognitive-behavioral EBT using multiple abstinence milestones among socioeconomically, racially, and ethnically diverse smokers. We hypothesized that the adapted treatment would increase the latency to relapse and show significantly greater initial, ST, and LT abstinence rates among the lowest SES smokers with little effect on the highest SES smokers. Thus, the interaction between condition and SES on abstinence milestones were of primary interest. Increased efficacy among lower SES smokers was expected to result in improved overall efficacy.

2. Methods

2.1. Participants

Participants (n = 227) were recruited in New York City by word of mouth, fliers in the community, and newspaper advertisements. Participants were eligible if they were ≥18 years of age, smoked daily, were ready to quit in 30 days, were able to engage in group treatment, had no regular use of other tobacco products, had reliable telephonic communication, had no contra-indications for nicotine patch use, were not currently using cessation medications, screened negative for drugs of abuse, drank < 20 alcoholic drinks per week, and attended at least one group treatment session. A socioeconomically, racially, and ethnically diverse sample was sought to enable socioeconomic comparisons and support external validity.

2.2. Materials

2.2.1. Standard treatment (StdT)

The StdT was a well-established, multi-component, manual-driven cognitive-behavioral EBT for tobacco dependence with 6 weekly 1-h group sessions used in numerous programs and studies (Schmitz et al., 1993; Smith et al., 2003; Payne et al., 2006; Sheffer et al., 2009, 2012a,b, 2013; Varghese et al., 2014). StdT components included understanding and applying the cue-urge-smoking cycle, developing individualized strategies for managing cues and urges, self-monitoring, guided scheduled rate reduction, goal setting, stress management, problem-solving, conflict management, tobacco refusal training, relapse prevention, enhancing social support, and education about medication and the health effects of tobacco. The StdT participant workbook included treatment session content and psychoeducational materials.

2.2.2. Adapted treatment (AdT)

The AdT was developed from the StdT with the goals of addressing treatment outcome disparities and the needs, experiences, and perspectives of diverse lower SES smokers in 6 weekly 1-h group sessions. We used an established framework for adapting EBTs that included four broad steps:

1) Information Gathering: Identify modifiable factors that have theoretical and/or empirical support for reducing treatment outcome disparities.
2) Preliminary Adaptation Design: Incorporate data from Step 1 into a clinical and cultural adaptation;.
3) Preliminary Adaptation Tests: Pilot test the preliminary adaptation from Step 2, obtain community and treatment provider feedback; and
4) Adaptation Refinement: Incorporate feedback from Step 3 into the final treatment manual (Barrera and Castro, 2006; Lau, 2006). See Evans et al. (2015) for details.

2.2.2.1. Information gathering. The team reviewed conceptual models of health disparities. Theoretical and empirical evidence indicated that health disparities emerge from complex reciprocal social, psychological, environmental, and biological determinants across the lifespan (Bandura, 2001; Adler and Newman, 2002; Baranowski et al., 2002; Gallo and Matthews, 2003; Ghaed and Gallo, 2007; Moolchan et al., 2007; Adler and Rehkopf, 2008; Adler and Stewart, 2010; Kawachi et al., 2010). The Adler and Stewart (2010) framework of health disparities was selected as the most comprehensive and applicable model (Adler and Stewart, 2010). Factors empirically associated with socioeconomic disparities in cessation were mapped onto the Adler framework (Stronks et al., 1997; Gallo and Matthews, 2003; Ferguson et al., 2005; Honjo et al., 2006; Siahpush et al., 2006a,b; Fernander et al., 2007; Manfredi et al., 2007; Siahpush et al., 2007a,b; Kendzor et al., 2009; Siahpush et al., 2009; Businelle et al., 2011; Hiscock et al., 2012; Sheffer et al., 2012a,b; Businelle et al., 2013; Kaplan et al., 2013; Bickel et al., 2014; Varghese et al., 2014). The factors determined to be modifiable included: Stress, negative affect, smoking in response to negative affect, delay discounting, locus of control, impulsiveness, smoking policies in the home, and treatment utilization.

2.2.2.2. Preliminary adaptation design. We adapted the treatment by including and/or emphasizing interventions to address the modifiable factors identified in the Step 1. We modified the clinical adaptation by systematically incorporating community values and perceptions. Values associated with many lower SES groups, such as greater sensitivity to social context, other-oriented emotional focus, and increased value on pro-social behaviors (Cote et al., 2011; Kraus et al., 2011) overlapped wholly with perspectives endorsed in the PEN-3 Model (Airhihenbuwa, 1990; Airhihenbuwa, 1992), a model for incorporating Black perspectives into health interventions. We cross-referenced each intervention component in each session with the elements of the PEN-3 Model (e.g., perceptions, enablers, nurturers). Community partners reviewed the resulting matrix and provided structured feedback. Community partners also recommended a participant "Toolkit" (e.g., workbook) and this was developed accordingly.

2.2.2.3. Preliminary adaption tests. We pilot-tested the AdT with diverse smokers in two treatment groups (n = 12, n = 13) followed by two focus groups led by community consultants using a democratic deliberative approach.