

A Pilot Study of Home-Based Smoking Cessation Programs for Rural, Appalachian, Pregnant Smokers

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Keywords

rural
pregnant smokers
smoking cessation

ABSTRACT

Objective: To evaluate a web-based contingency management program (CM) and a phone-delivered cessation counseling program (Smoking Cessation for Healthy Births [SCHB]) with pregnant smokers in rural Appalachia who were ≤ 12 weeks gestation at enrollment.

Design: Two group randomized design.

Setting: Home-based cessation programs in rural Appalachia Ohio and Kentucky.

Participants: A community sample of pregnant smokers ($N = 17$).

Methods: Participants completed demographic and smoking-related questionnaires and were assigned to CM ($n = 7$) or SCHB ($n = 10$) conditions. Smoking status was assessed monthly using breath carbon monoxide and urinary cotinine.

Results: For CM, two of seven (28.57%) of the participants achieved abstinence, and three of 10 (30%) of those enrolled in SCHB were abstinent by late in pregnancy. Participants in CM attained abstinence more rapidly than those in SCHB. However, those in SCHB experienced less relapse to smoking, and a greater percentage of these participants reduced their smoking by at least 50%.

Conclusion: Based on this initial evaluation, the web-based CM and SCHB programs appeared to be feasible for use with rural pregnant smokers with acceptable program adherence for both approaches. Future researchers could explore combining these programs to capitalize on the strengths of each, for example, rapid smoking cessation based on CM incentives and better sustained cessation or reductions in smoking facilitated by the counseling support of SCHB.

JOGNN, 44, 236-245; 2015. DOI: 10.1111/1552-6909.12547

Accepted November 2014

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The authors report no conflict of interest or relevant financial relationships.



Smoking cigarettes while pregnant is considered the top preventable cause of poor birth outcomes in the United States and can cause serious health and behavioral issues for a developing fetus and/or infant (Britton, James, Collier, Sprague, & Brinthaup, 2013; Cnattingius, 2004; Obel et al., 2009). For example, maternal smoking contributes to placental abruption, stillbirth, low birth weight, preterm birth, and sudden infant death syndrome (SIDS) (Cnattingius, 2004; Dietz et al., 2010). Later, these offspring are at increased risk for attention-deficit/hyperactivity disorder (e.g., Obel et al., 2009), impaired reading (Cho, Frijters, Zhang, Miller, & Gruen, 2012), becoming smokers themselves (Buka, Shenassa, & Niaura, 2003), and obesity (Haghighi et al., 2013). However, many if not all of the negative outcomes associated with smoking during pregnancy can be eliminated if the woman is able to quit smoking by the end of her

first trimester of pregnancy (McCowan et al., 2009).

Various treatment approaches have been employed to assist pregnant women with smoking cessation. Treatment methods include brief counseling, motivational interviewing, psychosocial education on pregnancy and smoking-related topics, and contingency management (Lumley et al., 2009; Valanis et al., 2001). Of these, incentive-based treatments such as contingency management have been identified as the most effective in achieving smoking cessation (Chamberlain et al., 2013; Lumley et al., 2009). For example, Tuten, Fitzsimons, Chisom, Nuzzo, and Jones (2012) found that 31% of participants randomized to a contingent voucher-based treatment group were abstinent from smoking at the end of the 12-week treatment versus no abstinence by those randomized to usual care. Despite the effect of

incentive-based treatments, counseling interventions are more widely implemented. The effects of counseling interventions on smoking cessation for pregnant women range from insignificant to modest (Chamberlain et al., 2013). For example, in a randomized controlled trial of multisession, telephone-based counseling compared to a one-time telephone counseling session, the intervention group reported a 10% abstinence rate at the end of pregnancy compared to 7.5% in the control group (Rigotti et al., 2006).

Appalachia is a large region of the eastern United States, including all of West Virginia and parts of 12 other states; rates of smoking in Appalachia are consistently higher than national averages (Behavioral Risk Factor Surveillance System [BRFSS], 2011). Appalachia also has high rates of maternal smoking. For example, of more than 4,100 women surveyed in Appalachia, 24.7% reported smoking during pregnancy at a time when the national average was 12.6% (Bailey & Jones Cole, 2000). Several factors may contribute to these elevated rates of smoking, including a lower average socioeconomic status, lower levels of education, and in many areas of Appalachia a reliance on tobacco production as a means of economic support (Meyer, Toborg, Denham, & Mande, 2008).

Pregnant smokers who live in rural Appalachia or who live in other rural locations with similar regional characteristics often face substantial barriers to intensive smoking cessation programs. These women frequently face extended travel distances to clinic facilities where treatments might be offered, which creates logistic barriers to any ongoing treatment programs (Cupertino et al., 2007). Also, as a result of living in an economically depressed region, these women may experience resource barriers, such as the lack of community health care providers, that can affect access to and knowledge of smoking cessation programs (Cupertino et al., 2007). Furthermore, the social acceptance of smoking in Appalachia, partially due to the presence of the tobacco industry, may influence smokers' cessation attempts (Correll, Dalton, & Bailey, 2013). For these reasons, identifying treatment options that are suitable for pregnant smokers in rural Appalachia represents an important and unique opportunity to affect public health in a population that has been largely underserved.

In this pilot study, we evaluated two home-based smoking cessation programs. One of these programs was an intensive web-based contin-

Cigarette smoking during pregnancy often has harmful effects on developing fetuses. Intensive smoking cessation treatments for pregnant smokers living in rural regions are needed.

gency management (CM) program that could be completed from home (Dallery & Glenn, 2005; Reynolds, Dallery, Shroff, Patak, & Leraas, 2008). This program provided tangible reinforcers of increasing value over time for frequently verified (twice per day) abstinence from smoking. Higgins et al. (2010) reported that a similar CM approach can be effective among urban pregnant smokers completing the CM program in a clinic setting. However, these clinic-based programs require the pregnant smoker to make clinic visits for abstinence verification, which is not feasible for rural pregnant smokers. Also, because the current CM program is home based and does not require clinic visits to verify smoking status, we were able to arrange a more intensive version of the CM program in terms of frequency of abstinence verifications and reinforcement than has been reported previously for pregnant smokers (Higgins et al., 2014). There is substantial evidence that frequent verifications and reinforcement during CM programs promote more rapid behavior change than similar programs that verify and reinforce less frequently (Petry, 2000).

We developed the other home-based treatment program for delivery by nurses over the phone using a standardized manual, *Smoking Cessation for Healthy Births (SCHB)* (Appalachia Health Research Center, 2014). Development of the SCHB program was heavily based on the best practices for pregnant smokers of the American College of Obstetricians and Gynecologists (Jordan, Dake, & Price, 2006). Bullock et al. (2009) evaluated a nurse-delivered telephone counseling program that involved nurses calling participants weekly during pregnancy and being available 24 hours per day to return calls when paged. Cessation rates were between 17% and 22% for this program based on participants receiving just the phone calls versus calls plus self-help supplemental materials delivered by mail. Although these are encouraging results, a possible limitation of this type of program is that the weekly phone calls and 24-hour pager availability are time-consuming and expensive and may affect the feasibility of implementing this program beyond the research context.

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