

Smoking Cessation Strategies in Pregnancy

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Abstract

Although pregnancy often motivates women to quit smoking, 20% to 25% will continue to smoke. Smoking is associated with adverse obstetric and neonatal outcomes such as placental abruption, stillbirth, preterm birth and sudden infant death syndrome, and it is therefore important to motivate women to quit during pregnancy. In this review, we explore the efficacy and evidence for safety of strategies for smoking cessation in pregnancy, including behavioural and pharmacologic therapies. The PubMed, Medline, EMBASE, and Cochrane databases (1990 to 2014) were accessed to identify relevant studies, using the search terms "smoking cessation," "pregnancy," "medicine, behavioural," "nicotine replacement products," "bupropion," and "varenicline." Studies were selected based on the levels of evidence presented by the Canadian Task Force on Preventative Health Care. Based on our review of the evidence, incentives combined with behavioural therapy appear to show the greatest promise for abstaining from smoking in the pregnant population. Nicotine replacement therapy administered in the form of gum may be better than using transdermal forms to avoid high levels of nicotine in the fetal circulation. One small trial demonstrated that bupropion is an effective aid for smoking cessation and that it does not appear to be associated with an increased risk of major congenital malformations. The currently available studies of varenicline in pregnancy are insufficient to provide evidence for the safety or efficacy of its use.

Résumé

Bien que la grossesse parvienne souvent à motiver les femmes à abandonner le tabagisme, de 20 % à 25 % des femmes enceintes continuent de fumer. Le tabagisme est associé à des issues indésirables obstétricales et néonatales telles que le décollement placentaire, la mortinaissance, l'accouchement préterme et le syndrome de mort subite du nourrisson; il est donc important de motiver les femmes à cesser de fumer pendant la grossesse. Dans cette analyse, nous explorons l'efficacité des stratégies d'abandon du tabagisme (y compris les traitements comportementaux et pharmacologiques) et les données en soutenant l'innocuité

pendant la grossesse. Nous avons mené des recherches dans les bases de données PubMed, Medline, EMBASE et Cochrane en vue d'en tirer les études pertinentes (1990-2014) au moyen des termes de recherche suivants : *smoking cessation, pregnancy, medicine, behavioural, nicotine replacement products, bupropion et varenicline*. Les études ont été sélectionnées en fonction des niveaux de résultats présentés par le Groupe d'étude canadien sur les soins de santé préventifs. Notre analyse des données probantes indique que l'offre concomitante d'incitatifs et d'une thérapie comportementale semble être la plus prometteuse pour ce qui est de l'abandon du tabagisme pendant la grossesse. Le recours à la thérapie de remplacement de la nicotine administrée sous forme de gomme pourrait être plus efficace que le recours aux formes transdermiques pour éviter l'obtention de taux élevés de nicotine dans la circulation fœtale. Un essai de faible envergure a démontré que le bupropion constitue un agent efficace pour l'abandon du tabagisme et qu'il ne semble pas être associé à un risque accru de malformations congénitales majeures. Les données qui sont issues des études actuellement disponibles s'étant penchées sur l'utilisation de varenicline pendant la grossesse ne sont pas suffisantes pour en étayer l'innocuité ou l'efficacité.

J Obstet Gynaecol Can 2015;37(9):791-797

INTRODUCTION

Approximately 90% of women are aware that smoking is associated with pregnancy complications. Despite this, 17% of Canadian women continue to smoke during pregnancy.^{1,2} Women with higher levels of intrinsic motivation to improve both their own health and that of their baby are more likely to quit smoking in pregnancy.³ Approximately 30% of smokers will quit during their pregnancy, and 85% will continue to abstain throughout pregnancy.⁴ However, almost 70% of women who quit during pregnancy will resume smoking within the first six months postpartum.^{3,4} Canadian women who are more likely to smoke during pregnancy include those who are younger than 25 years (33% vs. 13% for those > 30 years), are unmarried (34% vs. 14%), have a low income (30% vs. 16% for upper-middle class), have had limited education (38% non-high school graduate vs. 10% college graduate) and are Canadian-born (22% vs. 2% for immigrants).²

Key Words: Smoking cessation, pregnancy, medicine, behavioural, nicotine replacement products, bupropion, varenicline

Competing Interests: None declared.

Received on August 20, 2014

Accepted on December 16, 2014

In this review we discuss the safety and efficacy of current behavioural and pharmacologic smoking cessation strategies in pregnancy.

METHODS

We searched PubMed, Medline, EMBASE, and the Cochrane databases for relevant studies published between 1990 and 2014. The search terms comprised “smoking cessation,” “pregnancy,” “medicine, behavioural,” “nicotine replacement products,” “bupropion,” and “varenicline.” Studies were selected based on the levels of evidence presented by the Canadian Task Force on Preventative Health Care.^{5,6}

RESULTS

Forty-nine articles were reviewed, including meta-analyses, systematic reviews, randomized controlled trials, prospective cohort studies, case-control studies, SOGC and CAN-ADAPTT guidelines, and review articles.

Adverse Obstetric and Neonatal Outcomes

Smoking is strongly associated with adverse obstetric and neonatal outcomes. Compared with non-smokers, smokers have twice the risk of ectopic pregnancy,⁷ miscarriage,^{7,8} placental abruption,⁹ stillbirth,¹⁰ and childhood obesity in their offspring,¹¹ and three times the risk of placenta previa,¹² preterm birth,^{7,13} and having a child with attention deficit hyperactivity disorder. A follow-up study of children exposed to smoking in utero, conducted at the age of 14, demonstrated more defiant, aggressive behaviour, social problems, withdrawal, and anxious or depressed symptoms.¹⁴⁻¹⁷ Compared to non-smokers, the infants of smokers have four times the risk of sudden infant death syndrome; the risk increases to eight times if the mother smokes more than 20 cigarettes per day.^{10,18,19} Other adverse outcomes include low birth weight (reduced by a mean of 250 g if the mother smokes 5 to 20 cigarettes daily and by a mean of 350 g if > 20 cigarettes a day).²⁰ In addition, the risk of congenital anomalies in the offspring of smokers is increased by 5% to 90%, depending on the anomaly.²¹ There is also a putative association between maternal smoking and childhood hematologic and brain malignancies.²²⁻²⁵ Finally, offspring of mothers who smoke are at an increased risk of becoming smokers themselves.²⁶ For these reasons, it is imperative that pregnant women who smoke receive encouragement and support to try to stop smoking, or at least reduce their cigarette consumption in pregnancy.

Behavioural Therapy

Behavioural therapy includes counselling, social support, incentives, and hypnosis.

Counselling and social support

A meta-analysis of eight randomized controlled trials (n = 3290) studying the value of counselling for smoking cessation in pregnancy, validated biochemically at six or 12 months, showed no significant effect (OR 1.08; 95% CI 0.84 to 1.40). This lack of effect was also noted when the studies of individual therapy were analyzed separately (OR 1.12; 95% CI 0.81 to 1.56) and when studies using only telephone counselling were analyzed (OR 1.03; 95% CI 0.68 to 1.55).²⁷ The wide confidence intervals may be explained by the heterogeneity of the type of counselling received and the difference in study designs.

Incentives

The use of incentives to encourage smoking cessation is based on the theory of operant conditioning.²⁸ Higgins et al. performed a meta-analysis of three trials (n = 166) in which participants were randomized to receive vouchers for retail goods that were either contingent on smoking cessation or not contingent on smoking cessation.²⁹ The vouchers were initially valued at \$6.25, but would increase by \$1.25 for each consecutive urine specimen negative for cotinine (the principal metabolite of nicotine), to a maximum of \$45. Those in the contingent group showed greater abstaining from smoking in late pregnancy (34.1% vs. 7.4%, $P < 0.001$), higher mean birth weight (3295 g vs. 3093 g, $P = 0.03$) and fewer babies with a birth weight < 2500 g (5.9% vs. 18.5%, $P = 0.02$). However, the effect on smoking abstinence was lost when the vouchers were discontinued postpartum.²⁹ This method may not be generalizable to all pregnant populations because of the need for funding for the vouchers. Donatelle et al. found similar rates of smoking abstinence in late pregnancy and increased rates of abstinence two months postpartum when both the patient and a “social supporter” received vouchers for continuing not to smoke.³⁰ However, the population in this study was small (n = 220) and proposed an approach to smoking cessation that was more expensive than that of Higgins et al.²⁹ since it required funding for each patient and an additional person.

Hypnosis

Valbo and Eide randomized 158 women to two 45-minute hypnosis sessions or to no intervention.³¹ There was no difference in smoking cessation rates between the groups (10%). The outcomes were assessed by self-reporting, compared with biochemical markers in other studies, potentially affecting the accuracy of cessation rates and the reported number of cigarettes smoked.

In general, psychosocial interventions such as counselling, incentive-based therapy, and hypnosis do not appear to be associated with any adverse effects on the fetus.³²

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