Mothers' Efforts to Protect Their Infants from Environmental Tobacco Smoke

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Infant exposure to environmental tobacco smoke (ETS) is reported to be associated with abnormal neonatal airway structure, lower respiratory illness, chronic bronchitis, asthma, recurrent otitis media, and sudden infant death syndrome.¹⁻⁵ In light of the evidence, parents are well advised to limit their children's exposure to cigarette smoking. Currently, there is a dearth of research that can direct policy makers regarding the control of ETS.⁶ The aim of this study was to document families' efforts to make their homes tobacco smoke-free and to minimize their infants' exposure. The sample consisted of women who had stopped smoking for their pregnancy, primarily because they were concerned about the health of their unborn baby. We explored whether this concern was carried over to the first year of the infant's life, i.e., whether the child was protected from ETS.

METHODS

The data for this study were collected for a randomized controlled trial (RCT) to test the efficacy of a smoking relapse prevention intervention designed for women who

had stopped smoking during pregnancy. The intervention was delivered at the time of birth and during the first three months postpartum, and included nurse-delivered telephone support, relapse prevention training, and information about the adverse effects of smoking and ETS. The primary purpose of the intervention was to assist participants in maintaining their smoking cessation. The participants were interviewed at 6 months and 12 months following delivery, in their homes, and were asked about their smoking status, efforts to protect their babies from ETS, and demographics. Self-reports of smoking status were verified with assessments of carbon monoxide in expired air. Details about the intervention, its efficacy, and subject recruitment are reported elsewhere.⁷⁻¹⁰

The participants were recruited from a pool of 8,837 women screened for study eligibility over a seven-month period in 1996 in the five Greater Vancouver teaching hospitals. (There were about 16,000 births in these hospitals in the entire year.) Inclusion criteria for the RCT required that participants smoked cigarettes before their pregnancy, stopped during pregnancy, gave birth to healthy infants and could be contacted by telephone. Among the women screened, we estimated that 16.4% smoked immediately prior to pregnancy. In the catchment area, 16-19% of women aged 12+ years smoke.¹¹

Of 416 eligible women, 251 (60%) consented to participate. Those who declined tended to be overly confident that they were former smokers at very low risk of smoking relapse. Some may have had no intention of remaining abstinent and thus saw no benefit in participating in a relapse prevention program. The non-participants did not appear to differ from the partici-

pants in other ways. There was minimal loss to follow-up; interviews were completed with 241 (96%) and 238 (95%) participants at 6 and 12 months, respectively.

RESULTS

The women ranged in age from 15 to 40 years and were socio-economically and culturally diverse. Three quarters (74%) were primiparous and most (84%) were married or in common-law relationships. They had stopped smoking, on average, for 33 weeks ($SD = 7$) before delivery. At 6 months postpartum, 36% of the women remained abstinent, while 26% were smoking occasionally or intermittently and 38% had relapsed to daily smoking. Relapse continued in the latter part of the child's first year with only 20% of the women remaining abstinent at 12 months; 35% smoked occasionally and 46% smoked daily. (Only 1.4% of the self-reports of abstinence were contradicted by CO readings of ≥ 10 ppm; these women were classified as smokers.)

At 6 months postpartum, 76% of the women reported that they did not allow people to smoke in their houses. Six months later, only one of these women reported that she could not maintain the non-smoking ban. The respondents also were asked if they had undertaken four actions to make their homes smoke-free and to describe any other actions taken (see Table I). Some women (less than 10%) described additional actions taken that were alleged to reduce exposure to ETS including: ensuring that tenants were non-smokers, using air filtration systems, leaving their windows open, placing candles near chimneys to draw smoke, and making an outdoor smoking area comfortable and clean. In-depth interviews with a

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subset of women who had relapsed revealed other actions taken to putatively reduce ETS (e.g., smoking under a kitchen exhaust fan or near an open window; in a designated area in the house, away from children; or at designated times such as when children were sleeping).

At 6 months postpartum, 78.5% of the women reported no difficulties in making their homes smoke-free. By 12 months, this percentage increased to 86.9%. Among those who described problems, the most common problem was associated with enforcing the no-smoking ban. The women reported experiencing conflict with smokers and discomfort in confronting other smokers. This was particularly problematic when visiting the homes of friends or relatives who smoked.

The women who relapsed to smoking were slightly more likely to allow people to smoke in their houses at 6 months than those who remained abstinent (26.5% vs. 20.9%). By 12 months, the gap had widened (26.2% vs. 14.9%). This was not associated with exposure to the minimal health education intervention that one-half of the women received at the time of delivery. It may have been associated with the smoking behaviour of the partner/spouse; 79.7% of the women whose partners did not smoke maintained smoke-free homes compared to 71.0% of those whose partners smoked.

DISCUSSION

The generalizability of these findings is somewhat limited because of the 60% participation rate and the RCT eligibility criteria. The women in this study had stopped smoking during pregnancy and were motivated to remain abstinent, hence their participation. Nonetheless, this "motivated" group exposed their children to ETS at a rate comparable to that noted in a recent BC survey.¹¹ The BC survey

TABLE I Actions Taken to Limit Exposure to ETS		
ETS Reduction Methods	6 Months Postpartum (n = 241)	12 Months Postpartum (n = 238)
Absolutely no smoking allowed in house	75.5%	76.1%
Removed ashtrays	76.8%	89.0%
Displayed no-smoking signs	8.7%	7.6%
Tried to ask people to smoke outdoors	88.8%	85.2%

found that in households with children under the age of 12, there is daily or near daily exposure to ETS in 18% of households, and some exposure in 28% of households. Exposure to ETS has been reported to have a negative relationship with age; that is, as non-smokers age, they are less likely to be exposed to ETS in their homes. Unlike adults, children and infants are unable to exercise their rights to breathe clean air.

While regional legislative activity has been effective in reducing ETS in many public places,¹² private homes cannot be easily regulated. Public health education remains the most effective means to protect children from ETS in their homes. While there is growing appreciation for the importance of smoke-free homes,¹³ there remain significant misperceptions about effective ways to enact this protection. A number of women in this study indicated that they experienced difficulties in enforcing smoking bans in their homes and others enacted strategies that are likely to be ineffective. Some of the strategies may have protected children from direct ETS but did not prevent children from observing their parents smoking. In addition to educating families about the importance of maintaining smoke-free homes, families require information about effective strategies for implementation.

REFERENCES

1. Elliot J, Vullermin P, Robinson P. Maternal cigarette smoking is associated with increased inner airway wall thickness in children who die from sudden infant death syndrome. *Am J Respir Crit Care Med* 1998;158(3):802-6.
2. Margolis PA, Keyes LL, Greenberg RA, et al. Urinary cotinine and parent history (questionnaire) as indicators of passive smoking and predictors of lower respiratory illness in infants. *Pediatric Pulmonology* 1997;23(6):417-23.
3. Gergen PJ, Fowler JA, Maurer KR, et al. The burden of environmental tobacco smoke exposure on the respiratory health of children 2 months through 5 years of age in the United States: Third National Health and Nutrition Examination Survey, 1988 to 1994. *Pediatrics* 1998;101(2):E8.
4. Strachan DP, Cook DG. Health effects of passive smoking. 4. Parental smoking, middle ear disease and adenotonsillectomy in children. *Thorax* 1998;53(1):50-56.
5. Anderson HR, Cook DG. Passive smoking and sudden infant death syndrome: Review of the epidemiological evidence. *Thorax* 1997;52(11):1003-9.
6. Ashley MJ, Ferrence R. Reducing children's exposure to environmental tobacco smoke in homes: Issues and strategies. *Tobacco Control* 1998;7(1):61-65.
7. Ratner PA, Johnson JL, Bottorff JL. Smoking during pregnancy: How well are we doing in encouraging women to quit? *BC Medical Journal* 1997;39(9):492-95.
8. Ratner PA, Johnson JL, Bottorff JL, et al. Twelve-month follow-up of a smoking relapse prevention intervention for postpartum women. *Addictive Behaviors* 2000;25(1):81-92.
9. Ratner PA, Johnson JL, Bottorff JL. Smoking relapse and early weaning among postpartum women: Is there an association? *Birth* 1999;26(2):76-82.
10. Johnson JL, Ratner PA, Bottorff JL, et al. Preventing smoking relapse in postpartum women. *Nursing Res* 2000;49(1):44-52.
11. Heart and Stroke Foundation of BC and Yukon. Tobacco Use in BC 1997. Vancouver, BC, 1997.
12. Abernathy T, O'Grady B, Dukeshire S. Changes in ETS following anti-smoking legislation. *Can J Public Health* 1998;89(1):33-34.
13. Ashley MJ, Cohen J, Ferrence R, et al. Smoking in the home: Changing attitudes and current practices. *Am J Public Health* 1998;88(5):797-800.

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