FACTORS ASSOCIATED WITH QUIT ATTEMPTS AND QUITTING AMONG EASTERN HUNGARIAN WOMEN WHO SMOKED AT THE TIME OF PREGNANCY

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SUMMARY

Introduction: The purpose of this research was to assess factors associated with quit attempts and successful smoking cessation among a sample of socioeconomically disadvantaged pregnant women living in Eastern Hungary.

Materials and methods: In-person interviews were conducted among 201 women residing in Eastern Hungary who self-identified as occasional or regular smokers at the time they learned they were pregnant.

Results: 54% of the women were smokers at the time they learned they were pregnant. Just over half tried to quit, but only 20% were successful. Factors associated with reduced likelihood of quit attempts included being a regular (vs. occasional) smoker (OR=0.36, 95% CI 0.13–1.00) and being Roma (vs. non-Roma) (OR=0.32, 95% CI 0.14–0.72). Women who completed high school were 7½ times more likely to quit (OR=7.5, 95% CI 1.68–33.2) and those who were employed were 7½ times more likely to quit (OR=7.6, 95% CI 1.88–30.35). Regular smokers were 88% less likely to quit than occasional smokers.

Discussion: Smoking cessation interventions targeting pregnant women are needed in Eastern Hungary. Efforts to integrate smoking cessation into the current excellent pre-natal care and health visitor program will reach most women who are pregnant or who have given birth within the preceding 3 years.

Key words: smoking, pregnancy, Roma, maternal and child health, prenatal

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INTRODUCTION

A recent study by Tombor et al. (2010) found that 51% of pregnant women from Budapest and 12 other regions in Hungary were either occasional (22%) or regular (29%) smokers (1). The purpose of this research study was to assess factors associated with quit attempts and successful smoking cessation among high-risk, socioeconomically disadvantaged pregnant women living in Eastern Hungary.

According to the 2004 U.S. Surgeon General's Report, women who smoke during pregnancy increase the risk of pre-term birth (PTB), low-birth weight (LBW), stillbirth, and sudden infant death syndrome (2). In addition, maternal active smoking may lead to premature rupture of the membranes, placenta previa, and placental abruption. Among women who are nursing, nicotine is found in breast milk. Furthermore, prenatal exposure to cigarette smoke affects health of the newborn infant and his/her subsequent school performance (3, 4).

In 2007, Szabolcs-Szatmár-Bereg County (Eastern Hungary) experienced a high low-birth (11.4%) and pre-term birth rate (10.3%) — the worst in Hungary (5). By 2008, the 12.3% of all live births in this county were PTB/LBW. The World Health Organization estimates that 9.6% of global births were preterm in 2005, with the lowest rates observed in Europe (6.2%) (6). Although global incidence of low-birth weight is estimated to be higher than pre-term births (15.5%), over 95% of LBW babies are born in developing countries (7). In developed regions, approximately 7% of babies are born LBW and in Eastern Europe the proportion of LBW is even lower (6.4%). Szabolcs-Szatmár-Bereg County clearly exceeds regional and global incidence for pre-term and low-birth weight. High smoking rates coupled with low socioeconomic status of this region may partially explain this disparity.

Szabolcs-Szatmár-Bereg County is one of the least developed regions of Hungary. In 2008, the average county-level GDP per capita was half the national average (52.4%) (8). As part of a larger study of correlates of PTB/LBW babies in this region, we found that 29% of women who gave birth to a PTB/LBW baby in 2008 had previously given birth to a PTB/LBW baby. In addition, a high proportion of Roma families reside in this county. Recent studies show that Roma have disproportionately poorer health than non-Roma resulting from low socioeconomic status (SES), severe social exclusion, and unhealthy behavioural patterns, all of which could influence birth outcomes (9, 10, 11). Given the extreme poverty, the high proportion of low-birth weight and pre-term births, and the high rate of smoking in this region, we identify

factors associated with quit attempts and successful smoking cessation in order to design and target future interventions to reduce tobacco use among pregnant women in this region. Ultimately, reducing tobacco use among pregnant women should result in a lower incidence of PTB/LBW babies.

MATERIALS AND METHODS

Sample: This research was approved by human subjects' review boards at Semmelweis University and Davidson College as part of a larger study on building capacity for tobacco research in Hungary. Out of 767 women who gave birth to a pre-term or low-birth weight baby in 2008 and who were living in Szabolcs-Szatmár-Bereg County, 382 were reached and consented to participate in an in-person structured interview (50% response rate). At the time of the interview, the infant was at home and was between 3–15 months of age. Because our study was focused on women who smoked at the time they learned that they were pregnant, only these women (n=206) were deemed eligible. Five cases were dropped due to inconsistent and/or missing data on smoking status pre- and post-pregnancy. The final analytical sample consisted of 201 women who were occasional or regular smokers at the time they learned they were pregnant and subsequently gave birth to low-birth weight and/or pre-term infant(s).

Measurement: The outcomes were: attempted to quit smoking during pregnancy (1=yes, 0=no) and successfully quit smoking (1=0 cigarettes since learning she was pregnant, 0=≥1 cigarettes). Demographic characteristics include mother's age at pregnancy (age ≥18 vs. <18), completed high school (12 grades), married/cohabitating (yes, no), total number of children at home, self-identified as Roma (yes, no), and employed (yes, no). Characteristics of the newborn include gestational age at birth (in weeks) and weight (grams). Economic indicators include household income <100% of the poverty level (yes, no) and complete access to water supply mains, sewage, and operational heating (yes, no). Health habits include alcohol use during pregnancy (yes, no, no answer given), daily intake of vegetables (yes, no) and fruits (yes, no) and current breastfeeding (yes, no). External influences includes whether the mother lives with a partner who smokes (yes, no).

Analysis: Descriptive statistics of all variables in the study were conducted. χ^2 tests were used to compare differences between those who attempted to quit and those who successfully quit with all covariates. Multivariable logistic regression models were also computed, and results are reported as odds ratios and 95% confidence intervals. Stata: Release 9 was used for all statistical analyses.

RESULTS

Characteristics of the Sample: 54% of the women were smokers at the time they learned they were pregnant. About half tried to quit, but only 1 in 5 was successful (Table 1). The majority was 18 and older and married or living with a partner. The women had on average 3 children (range 1–10). Almost three of four women lived with a partner who smoked. Less than 1 in 5 women had completed high school and 21% were employed at the time of pregnancy. Half of the sample self-identified as Roma. The vast majority of the women lived in deep poverty and only 37% of the women lived in dwellings with complete access to water supply mains, sewage, and operational heating. About half consumed vegetables (45%) and fruits (48%) on a daily basis. Only 3 women reported alcohol use during pregnancy although 15 chose not to answer the questions. At the time of the interview, 80% were breastfeeding their infants.

Factors Associated with Attempting to Quit: In bivariate analyses, factors associated with attempting to quit included being non-Roma (74% vs. 33%, $p<0.001$), completing high school (85% vs. 48%, $p<0.001$), being employed (79% vs. 48%, $p<0.001$), having complete access to public health amenities (75% vs. 41%, $p<0.001$), daily intake of vegetables (66% vs. 44%, $p<0.01$), daily intake of fruits (69% vs. 40%, $p<0.001$), and breastfeeding (57% vs. 38%, $p<0.05$). Regular smokers prior to pregnancy were significantly less likely to attempt quitting compared to occasional smokers (47% vs. 78%, $p=0.001$). In the multivariable model, being a regular smoker reduced the odds of attempting to quit by 64% and being Roma reduced the odds of attempting to quit by 68%.

Factors Associated with Quitting: Factors associated with quitting in bivariate analyses included being non-Roma (35% vs. 6%, $p<0.001$), completing high school (67% vs. 11%), being employed (55% vs. 11%, $p<0.001$), household income ≤100% national poverty level (55% vs. 18%, $p<0.01$), having complete access to public health amenities (42% vs. 7%, $p<0.001$), and daily intake of vegetables (27% vs. 15%, $p<0.05$) and fruits (30% vs. 12%, $p<0.001$). Living with a partner who smokes reduced the chances of quitting (16% vs. 36%, $p<0.01$) as did being a regular smoker prior to learning she was pregnant (13% vs. 51%, $p=0.001$). In the multivariable model, being a regular smoker reduced the odds of quitting by 88%. Women who completed high school and those who were employed were 7½ times more likely to quit. Having a smoking partner approached statistical significance (OR=0.32, 95% CI 0.09–1.18, $p=0.09$).

DISCUSSION

Fifty-four percent of women in this sample were smoking at the time they learned they were pregnant. About half tried to quit, but only 20% were successful. A review article on a spontaneous quitting among pregnant women has shown that 'spontaneous' quitters are more likely to be better educated, have higher incomes, be married, and be sporadic smokers (11). Spontaneous quitters, who quit without advice or assistance from others, are also more likely to have environments conducive to quitting (e.g., having a non-smoking partner). Thus, our pilot study expands the literature on quit attempts and quitting among pregnant mothers to Eastern Europe and provides additional evidence of the importance of socioeconomic status, educational attainment of the mother, and supportive environments on quitting.

Interventions to maintain abstinence among pregnant women who spontaneously quit has been marginal (10). However, research has demonstrated that advice and assistance from a health care provider coupled with educational material and supportive environments can reduce smoking and improve abstinence (2, 13, 14). Furthermore, acknowledging the moral and emotional role(s) of the mother may motivate low-income women to stop smoking (15, 16).

Table 1. *Factors associated with quit attempts and successful quitting among low-income pregnant women living in Eastern Hungary (n=201)*

	Characteristics of the sample (n=201) n (%)	**Multivariable correlation with quit attempt (n=184)** OR (95% CI)	**Multivariable correlation with quitting (n=185)** OR (95% CI)
Outcomes			
Tried to quit during pregnancy	108 (54.0)	–	–
Quit when learned she was pregnant	41 (20.4)	–	–
Socio-demographic characteristics of the mother			
Completed high school (12 grades) or more	40 (18.3)	1.21 (0.31–4.80)	7.48 (1.68–33.24)
Married or cohabitating	179 (89.1)	1.85 (0.47–7.21)	10.79 (1.00–115.77)
Average number of children (n=198) 1–10	2.95 (1.83)	0.96 (0.79–1.18)	1.03 (0.73–1.46)
Self-identified as Roma	100 (49.8)	0.32 (0.14–0.72)	0.54 (0.13–2.16)
Employed	42 (21.0)	1.37 (0.45–4.18)	7.56 (1.88–30.35)
Characteristics of the newborn			
Weeks gestation (n=199) 25–41	35.0 (3.14)	0.98 (0.84–1.15)	0.98 (0.76–1.25)
Weight (grams) (n=199) 480–3500	2147.4 (501.7)	1.00 (0.99–1.00)	0.99 (0.99–1.00)
Economic indicators			
Household income ≤100% of the poverty level (n=197)	186 (94.4)	0.90 (0.14–5.63)	0.17 (0.02–1.49)
Complete access to water supply mains, sewage, and operational heating	76 (36.8)	1.30 (0.50–3.34)	0.99 (0.25–3.82)
Health habits			
Regular (vs. occasional) smoker prior to learning she was pregnant	164 (81.6)	0.36 (0.13–1.00)	0.12 (0.04–0.39)
Reported alcohol use during pregnancy	3 (1.5)	*a*	*a*
Daily intake of vegetables	91 (45.3)	2.21 (0.92–5.30)	2.07 (0.53–8.10)
Daily intake of fruits	97 (48.3)	1.33 (0.56–3.16)	1.04 (0.26–4.10)
Currently breastfeeding infant	158 (79.8)	1.72 (0.68–4.31)	1.35 (0.34–5.38)
External influences			
Lives with a partner who smokes (n=191)	149 (72.3)	0.50 (0.19–1.29)	0.32 (0.09–1.18)

a Unable to compute the multivariable relationship between alcohol use and quit outcomes due to low variability in responses to this question.

In Hungary, there is an excellent prenatal and postnatal care infrastructure that could play an important supportive role in motivating pregnant women to quit smoking. In our earlier research, the vast majority (>90%) of pregnant women had >5 prenatal health care visits and all women were seen by a health visitor after delivery. Health visitors meet the women in their homes within 48 hours of leaving the hospital, once a week for the next 6 weeks, once a month up to 12 months, and at least 6 times a year until the end of the third year. The government has a stake in supporting smoking cessation programs for pregnant women given the high cost of health care associated with pre-term and low-birth weight babies. Furthermore, more than twice as many mothers are motivated to quit than are actually successful. Thus, given high health care costs of caring for PTB/LBW babies, the high prevalence of smoking in this population, motivation to quit among mothers, and the existing infrastructure to deliver evidence-based tobacco cessation services, the opportunities to intervene are excellent.

This is the first study to document the correlates between quit attempts and successful quitting among low-income Eastern Hungarian pregnant women who smoke. In addition, the high proportion of Roma women in this study provides further evidence for the socioeconomic challenges experienced among this population and the need for targeted, tailored interventions in this community to reduce tobacco use.

Despite these strengths, several limitations must be acknowledged. First, the findings may not be generalisable to other Eastern European communities. However, the consistency of our findings with those from the United States, United Kingdom, Australia, and Sweden suggests that the correlates of spontaneous quitting are ubiquitous – better education, employment, and supportive environments are important factors for quitting (12). Second,

the sample size is small and thus may be underpowered to detect significant differences and lead to large standard errors in our multivariable models. Third, the sample included only women who had given birth to PTB/LBW babies and requires retrospective reports of smoking behaviour, which may introduce reporting bias and inflates the proportion of smokers in the population. Finally, self-reported tobacco and alcohol use among pregnant women is likely to be under-reported (17).

Despite these limitations, this study was the first to attempt to characterise tobacco use behaviours among a low SES population of pregnant women living in Eastern Hungary. Based on our findings, we strongly support the need for a comprehensive 'quit smoking' intervention among this population with special consideration of the high proportion of Roma women in this community.

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Declaration of Competing Interests

None

Statement on the Ethical Conduct of Research

This research was reviewed by the Human Subjects' Institutional Review Board at Davidson College and the Ethical Review Board at Semmelweis University.

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