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Are secondhand smoke-related diseases of children associated with parental smoking cessation? Determinants of parental smoking cessation in a population-based cohort study

Takahiro Tabuchi [a,b,*], Takeo Fujiwara [b]

[a] Center for Cancer Control and Statistics, Osaka Medical Center for Cancer and Cardiovascular Diseases, 3-3, Nakamichi 1-chome, Higashinari-ku, Osaka-shi, Osaka 537-8511, Japan
[b] Department of Social Medicine, National Research Institute for Child Health and Development,2-10-1 Okura, Setagaya-ku, Tokyo 157-8535, Japan

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ABSTRACT

Objective. Little is known about whether secondhand smoke (SHS)-related diseases of young children, such as asthma, induce parental smoking cessation during the early child-rearing period. Our objective was therefore to show the association in addition to other potential determinants of parental cessation.

Methods. We analyzed data from the Longitudinal Survey of Newborns in the 21st Century in Japan, from 0.5 years ($N = 47{,}015$) to 4.5 years ($N = 39{,}817$), having selected participants whose parents smoked at baseline (maternal smoking $N = 8{,}037$; paternal smoking $N = 28{,}486$). Multivariable log-binomial regression models were used to calculate the prevalence ratios for parental smoking cessation according to the onset of SHS-related diseases of their children, using inverse probability weight to account for non-response at follow-up.

Results. A total of 16.7% of smoking mothers and 14.5% of smoking fathers had stopped smoking at follow-up. The onset of SHS-related children's diseases was not statistically significantly associated with either maternal or paternal smoking cessation after multivariable adjustments. Strong determinants were, for example, number of cigarettes smoked per day and partner's smoking status during follow-up.

Conclusion. SHS-related children's diseases were not associated with parental smoking cessation. It may therefore be necessary to provide additional support for parental smoking cessation within their child's medical care setting.

Introduction

Smoking is an addictive behavior, and factors that contribute to smoking cessation have been investigated (Vangeli et al., 2011). Becoming a parent is one opportunity to quit smoking (Pollak et al., 2010). Children's exposure to secondhand smoke (SHS) due to parental smoking significantly increases SHS-related diseases such as asthma, middle ear diseases, respiratory illness including infection, and all-cause hospitalizations (Pattemore, 2013; Royal College of Physicians, 2010; U.S. Department of Health and Human Services[USDHHS], 2006). Therefore, it is thought that the medical care for children's SHS-related diseases setting offers a unique opportunity for health care professionals to advise parents to quit smoking (Stein et al., 2000). More specifically, parents may quit smoking if their child develops SHS-related diseases such as asthma (Stein et al., 2000). However, to the best of our knowledge, few studies have investigated whether, or to what extent, the onset of SHS-related disease in a child was associated with smoking cessation by the parents (Rattan et al., 2013).

According to national statistics in Japan, adult smoking prevalence decreased from 48% to 32% among men and from 14% to 10% among women between 2001 and 2010 (Ministry of Health, Labour and Welfare[MHLW], 2014). The number of 6-month-old children living with a smoking mother also decreased from 17% to 7%, while those living with a smoking father decreased from 63% to 42% between 2001and 2010 (MHLW, 2013). Although parental smoking prevalence has thus declined, many children continue to be exposed to SHS at home. Therefore, it is important to monitor parental smoking status and know the determinants of parental smoking cessation, including the SHS-related disease status of their children, to inform tobacco control measures that protect children's health in early life. However, studies that examine parental smoking cessation after childbirth are scarce (Hauge et al., 2013; Rattan et al., 2013).

The Longitudinal Survey of Newborns in the 21st Century is a nationally representative longitudinal study, which reports parental smoking status when the child is 0.5 years old (baseline), and again at 4.5. Further, this study includes details of the SHS-related disease status of

Abbreviations: SHS, secondhand smoke; PR, prevalence ratio; CI, confidence interval.

* Corresponding author at: Center for Cancer Control and Statistics, Osaka Medical Center for Cancer and Cardiovascular Diseases, 3-3, Nakamichi 1-chome, Higashinari-ku, Osaka-shi, Osaka 537-8511, Japan. Fax: +81 6 6972 7561.
E-mail addresses: tabuti-ta@mc.pref.osaka.jp, tabuchitak@gmail.com (T. Tabuchi), fujiwara-tk@ncchd.go.jp (T. Fujiwara).

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the children. Thus, the data provided us with an opportunity to achieve our objective, which was to investigate whether the onset of SHS-related diseases in their child would induce parental smoking cessation in addition to other potential determinants, using a nationally representative sample.

Methods

Study subjects

The data used for this study were taken from the Longitudinal Survey of Newborns in the 21st century, which was conducted by the Japanese MHLW from the fiscal year 2001 to 2005 (MHLW, 2013). The study included all infants born in Japan during the periods January 10–17, 2001, and July 10–17, 2001 using national birth records ($n = 53{,}575$). Questionnaires were mailed to the households when the infants were 0.5 years of age (at July for children born in January and at January for children born in July). The total number of respondents was 47,015 households (response rate, 87.8%). Follow-up surveys were conducted at the ages of 1.5, 2.5, 3.5, and 4.5 years. Respondent numbers (households) for each survey were 43,925, 42,812, 41,559, and 39,817, respectively. Details of the study are available elsewhere (Fujiwara et al., 2013; Kaneita et al., 2006; MHLW, 2013; Yamakawa et al., 2013).

The analysis focused on parents who smoked at the time of the first surveys ($n = 8172$ for mother and $n = 29{,}220$ for father). Of those, subjects without information on parental age ($n = 0$ for mother and $n = 148$ for father) or child's birthweight ($n = 1$ for mother and $n = 7$ for father) were excluded from the analyses. Subjects of multiple births ($n = 134$ for mother and $n = 581$ for father) were also excluded because of the low reliability of the data. The number of remaining subjects was 8,037 mothers and 28,486 fathers at baseline (Fig. 1), to be analyzed separately. Data were used with permission from the Japanese MHLW. The analyses of national survey data were considered to be exempt from the need for ethical review according to the Epidemiological Research Guidelines.

Variables

Parents were asked whether they smoked (current smoker or not) when their child was 0.5 years old (baseline; 1st survey) and 4.5 years old (5th survey). As smoker (baseline) who did not smoke at the time of the 5th survey was defined as a case of smoking cessation.

The following characteristics were considered to be potential confounding factors on the basis of their potential association with parental smoking behavior and were categorized as (i) characteristics of smoking parent, (ii) characteristics of partner, (iii) characteristics of household, and (iv) characteristics of child. The characteristics of smoking parent included the following: the number

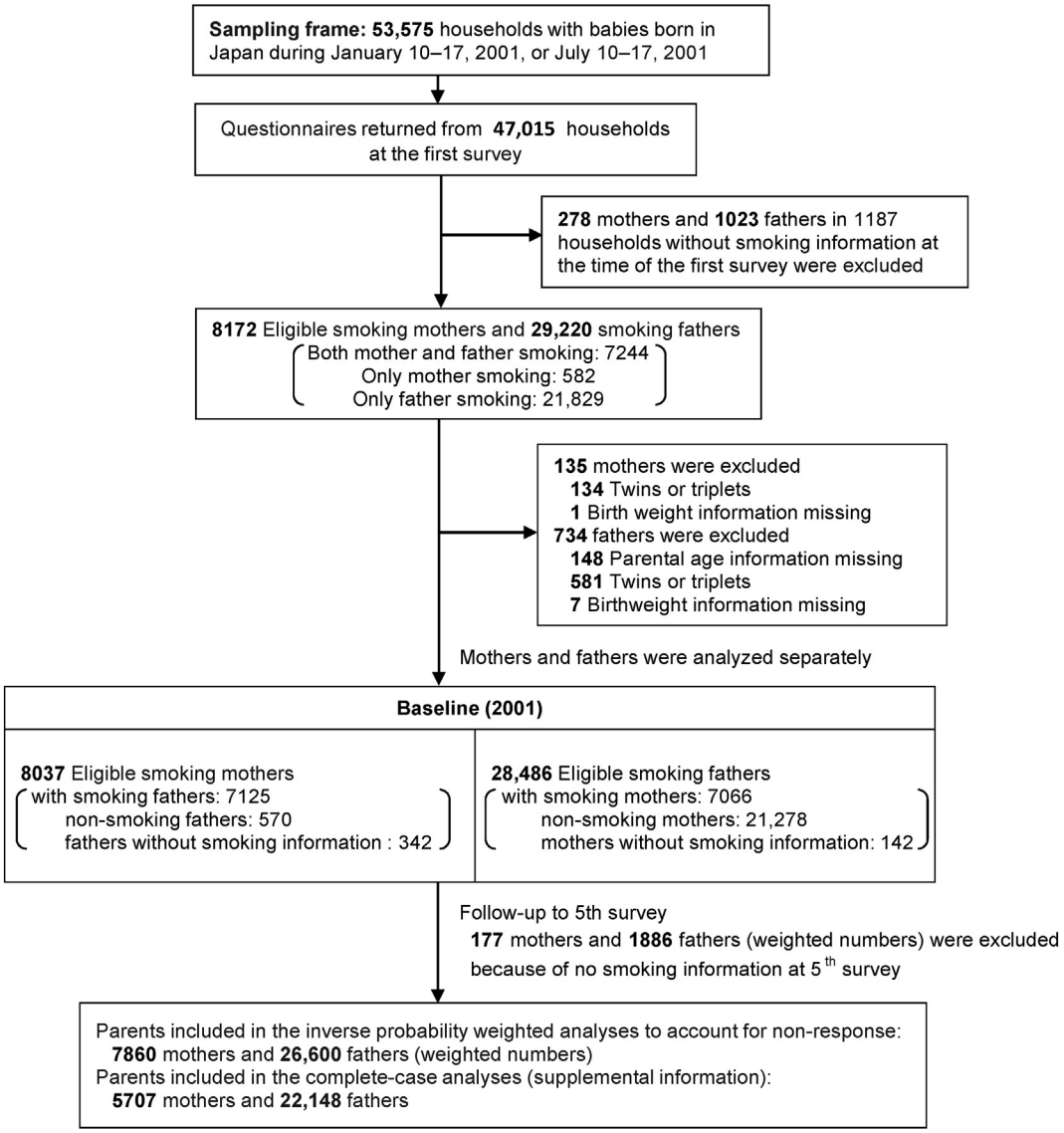

Fig. 1. Flow diagram for study subjects; Japan, 2001–2005.