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Relation of smoking and drinking to sleep disturbance among Japanese pregnant women

Yoshitaka Kaneita, M.D., Ph.D. [a], Takashi Ohida, M.D., Ph.D. [a,*], Shinji Takemura, Ph.D. [b], Tomofumi Sone, M.D., Ph.D. [b], Kenshu Suzuki, M.D., Ph.D. [a], Takeo Miyake, M.D., Ph.D. [a], Eise Yokoyama, M.D., Ph.D. [a], Takashi Umeda, Ph.D. [c]

[a] *Department of Public Health, School of Medicine, Nihon University 30-1 Oyaguchi-kamimachi, Itabashi-ku, Tokyo 173-8610, Japan*
[b] *Department of Public Health Policy, National Institute of Public Health, Wako, Saitama, Japan*
[c] *Department of Public Health, School of Medicine, Hirosaki University, Hirosaki, Aomori, Japan*

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Abstract

Background. Pregnant women suffer from sleep disturbance, which may be aggravated by smoking and/or drinking. We investigate here the joint effect of smoking and drinking with respect to sleep disturbance during pregnancy.

Methods. Survey of about 16,000 pregnant women in Japan, conducted in 2002 using a self-administered questionnaire.

Results. Both smoking and drinking increased the odds of sleep disturbances, such as subjective insufficient sleep, difficulty in initiating or maintaining sleep, early-morning awakening, short sleep duration, excessive daytime sleepiness and restless legs syndrome. The joint odds ratios for smoking and drinking corresponded more or less to the products of the odds ratio for smoking or drinking.

Conclusion. Smoking and drinking are independently associated with increased sleep disturbance during pregnancy, in addition to their other well-known side-effects.

Keywords: Sleep disturbance; Smoking; Drinking; Pregnant women; Japan; Epidemiology

Introduction

Sleep disturbance is a common complaint among the general population and is associated with an increased risk of various physical or psychiatric disorders and accidents (Chang et al., 1997; Kim et al., 2000; Ford and Kamerow, 1989; Kales et al., 1984; Motohashi and Takano, 1995; Weissman et al., 1997). Many epidemiological studies have examined the relationship between sleep disturbance and social factors, such as socioeconomic group and lifestyle (Welsten et al., 1983; Ford and Kamerow, 1989; Bliwise et al., 1994; Karacan et al., 1983). Among the lifestyle factors, an association has been observed between sleep disturbance and substance use (Ohida et al., 2001; Phillips et al., 2000; Janson et al., 1995; Phillips and Danner, 1995; Ribet and Derriennic, 1999; Johnson et al., 1998). Some of these studies have reported that 15–28% of subjects drank alcoholic beverages to induce sleep. However, it is reported that use of alcohol to improve sleep might actually lead to sleep deprivation (Roehrs and Roth, 2001). With regard to smoking, it is reported that the pharmacological effects of nicotine exacerbate sleep problems (Phillips and Danner, 1995). Therefore, it is inferred that tobacco and alcohol are detrimental to healthy sleep.

Physicians have reported that pregnant women in general often suffer from sleep disturbance (Suzuki et al., 2003a; Karacan et al., 1968), and previous studies have reported a decrease in both stage-4 sleep and rapid-eye-movement sleep among pregnant women (Bruner et al., 1994; Hertz et al., 1992). Pien et al., who reviewed many studies on sleep disorders among pregnant women, reported that sleep deprivation might increase the risk of mental disorders, ranging from postpartum depression to overt psychosis. They also warned about the possibility of accidents caused by sleep disorders. Meanwhile, they pointed out that despite the high prevalence of sleep disturbance among pregnant women, the majority of women did not report the problem to their physicians. They

* Corresponding author. Fax: +81 3 3972 5878.
E-mail address: tohida@niph.go.jp (T. Ohida).

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emphasized that, as little is known about the effects of sleep, further studies were required to clarify the effects of sleep disorders among pregnant women on their own bodies and their fetuses. They also stressed the importance of education about sleep hygiene for pregnant women in the light of possible effects of sleep-inducing drugs on fetuses. As mentioned before, the effects of tobacco and alcohol on sleep have been reported, and pregnant women are not immune to their effects (Pien and Schwab, 2004; Ohida et al., 2004). Although some studies have examined the effects of smoking and drinking on the health of the fetus and the mother's body (Dement et al., 1993; Suzuki et al., 2003b; The Ministry of Health and Welfare, 2000), to our knowledge, no epidemiological study has reported an association between sleep disturbance and smoking/drinking during pregnancy. Therefore, the aim of the present study was to clarify this association by analyzing the results of a survey (Suzuki et al., 2003a,b) of about 16,000 pregnant women in Japan conducted in 2002. The study is significant in that it will hopefully contribute to improving the quality of sleep of pregnant women, thereby ensuring better maternal health.

Methods

Subjects and procedure

Our study was part of a nationwide survey on smoking, drinking and sleep among Japanese pregnant women. A random sample of 500 clinical institutions with maternity patients was selected. The study subjects were women with a confirmed pregnancy who had attended for a second or subsequent consultation at one of these institutions during the period 1–14 February 2002.

Each subject was asked to complete a self-administered questionnaire during the time that they were waiting at the institution. They were then asked to seal the completed questionnaire in an envelope, which was then collected. In each of the institutions, all of the pregnant women who met the inclusion criteria were selected as subjects, and there was no sampling of this group. The questionnaires included a statement that the staff of the institution had not seen the completed questionnaires, and the questionnaires were collected in sealed envelopes. This was done in order to protect the privacy of the subjects and to obtain responses that were as candid as possible. The estimated collection rate was 95.7%. Details of the procedure have been described elsewhere (Suzuki et al., 2003a,b).

Measures

The major items included in the questionnaire were: (1) drinking behavior; (2) smoking behavior; (3) sleep status; and (4) personal data. Questions on seven items relating to sleep status during the previous month were included in the questionnaire: (1) subjective insufficient sleep (SIS); (2) difficulty in initiating sleep (DIS); (3) difficulty maintaining sleep (DMS); (4) early-morning awakening (EMA); (5) short sleep duration (SSD, <7 h); (6) excessive daytime sleepiness (EDS); and (7) restless legs syndrome (RLS). The definitions of sleep disorders in the present study were as follows: SSD was defined as getting <7 h sleep per night. SIS was ascribed to those who answered "insufficient" or "very insufficient" to the corresponding question. The remaining five items (DIS, DMS, EMA, EDS and RLS) were ascribed to those who answered "sometimes", "often" or "always" to the corresponding questions.

The questionnaire also included questions on smoking and drinking status before pregnancy and at the time of the survey, when pregnancy had been confirmed.

The demographic variables were age (fewer than 20, 20–29, 30–39 or 40 or older), schooling completed (junior college or lower/college or higher) and employment status (employed/ unemployed). There were also questions on pregnancy status, including the number of pregnancies (1st, 2nd or subsequent) and pregnancy trimester (1st, 2nd or 3rd). These five items of personal data are shown in Table 1. Details of the sleep questions have been described elsewhere (Suzuki et al., 2003b).

Analysis

Table 2 shows the subjects divided into five groups according to their smoking status before pregnancy and at the time of the survey, when pregnancy had been confirmed. Subjects who did not smoke before or after pregnancy had been confirmed were defined as non-smokers. Those who quit smoking after pregnancy had been confirmed and were defined as ex-smokers, and those who initiated smoking after pregnancy had been confirmed and were defined as new smokers. Among those who had smoked continuously, women who smoked fewer than 20 cigarettes per day either before or after pregnancy had been confirmed and were defined as smokers, and those who smoked 20 cigarettes or more per day both before and after pregnancy had been confirmed and were defined as heavy smokers. The prevalence of each of the seven sleep items was calculated. Table 3 shows the subjects divided into four groups (non-drinkers, ex-drinkers, new drinkers and drinkers) similar to the format of Table 2, and the calculated prevalence of each sleep disorder. We did not create a heavy-drinker group because the number of subjects whose daily intake of pure alcohol exceeded 40 g was extremely small (only four women). An intake of 40 g of pure alcohol is equivalent to 1000 ml of Japanese beer (The Ministry of Health and Welfare, 2000). Table 4 shows the prevalence of sleep disturbance among the subjects divided into four groups (nonsmokers and nondrinkers; nonsmokers and drinkers; smokers and nondrinkers; smokers and drinkers), according to smoking and drinking status on the survey day during the period 1–14 February 2002, after pregnancy had been confirmed. As shown in Tables 2–4, the odds ratios (OR) and 95% confidence intervals (95% CI) were calculated.

For statistical analysis, SPSS for Windows Version 11.0 was used. Multiple logistic regression analysis was used to determine the adjusted odds ratios of smoking and drinking status to each of the seven sleep disorders: SIS, DIS, DMS, EMA, SSD, EDS and RLS (yes/no). The dependent variable was defined as in the case of each of the sleep items. The independent variables were smoking status (nonsmokers; ex-smokers;

Table 1
Demographic status of a sample of pregnant women living in Japan

Items	*N*	%
Age		
19≥	234	1.4
20–29	8461	51.2
30–39	7572	45.8
40≤	255	1.5
Schooling completed		
Junior college or lower	13,908	84.5
University or higher	2548	15.4
Employment		
Employed	4317	26.3
Unemployed	12,073	73.7
Pregnancy trimester		
1st	1810	11.3
2nd	4958	31.0
3rd	9213	57.6
Number of pregnancies		
1st	8234	49.9
2nd or subsequent	8250	50.1

Note. In each section, the missing data of the subjects are not displayed.