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Active and passive smoking and depression among Japanese workers ☆

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Abstract

Objective. To assess the relation of passive and active smoking to depressive symptoms in 1839 men and 931 women working in a suburb of Tokyo in 2002.

Method. Self-reported smoking history and exposure to passive smoking (no, occasional, or regular) at work and at home. Depressive symptoms according to the Center for Epidemiologic Studies Depression Scale, with a cut-off point of 16.

Results. Compared to never smokers unexposed to passive smoking, never smokers reporting regular and occasional exposure to passive smoking at work had increased depressive symptoms. The adjusted odds ratios (aORs) were 1.92 (95% confidence interval (CI) 1.14, 3.23) for regular exposure and 1.63 (95% CI 1.08, 2.47) for occasional exposure. Current smokers had significantly increased depressive symptoms (aOR ranging from 2.25 to 2.38) but former smokers had only marginal increases of depressive symptoms (aOR ranging from 1.43 to 1.55). Gender did not modify the effects of active/passive smoking on depressive symptoms.

Conclusion. Passive smoking at work and current smoking appear associated with higher levels of depressive symptoms.
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Keywords: Passive smoking; Smoking; Depressive symptoms; Working population; Epidemiology; Occupational health

Introduction

A number of epidemiological studies have demonstrated a link between cigarette smoking and depressive symptoms/disorders (DSD) (Paperwalla et al., 2004). Although the nature of this relationship remains unclear, several hypotheses have been proposed to explain the association. DSD may cause smoking by increasing the likelihood that individuals will self-medicate negative emotions by smoking (Breslau et al., 1991; Escobedo et al., 1998; Fergusson et al., 2003; Patton et al., 1998). Smokers with a history of DSD are more likely to initiate smoking and progress to regular or heavy smoking (Anda et al., 1990; Escobedo et al., 1998; Patton et al., 1998), become nicotine dependent (Breslau et al., 1998), are less successful with smoking cessation (Breslau et al., 1993; Covey et al., 1997; Glassman et al., 1990), and are at greater risk of developing a new episode of depression when abstaining from smoking (Glassman et al., 2001; Tsoh et al., 2000). An alternative hypothesis is that smoking itself leads to DSD (Brook et al., 2004; Brown et al., 1996; Choi et al., 1997; Goodman and Capitman, 2000; Johnson and Breslau, 2006; Kinnunen et al., 2006; Klungsoyr et al., 2006; Korhonen et al., 2007; Lam et al., 2005; Steuber and Danner, 2006; Wu and Anthony, 1999). This concept was supported by the fact that adolescents who smoke are at increased risk of subsequently developing DSD (Brook et al., 2004; Brown et al., 1996; Choi et al., 1997; Goodman and Capitman, 2000; Lam et al., 2005; Steuber and Danner, 2006; Wu and Anthony, 1999). Reciprocal mechanisms have also been proposed to explain the smoking–DSD association (Breslau et al., 1998; Fergusson et al., 2003; Windle and Windle, 2001). By contrast, there is the so-called 'non-causal' hypothesis, which asserts that shared genetic or environmental factors predispose

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Table 1
Characteristics of participants by smoking status in a suburb of Tokyo, Japan, 2002 (n=2770)[a]

Characteristics	Smoking status			p value[b]
	Never	Former	Current	
Number of respondents (%)[c]	1168 (42.2)	315 (11.4)	1287 (46.5)	
Gender:				<.001
Men	529 (28.8)	238 (12.9)	1072 (58.3)	
Women	639 (68.6)	77 (8.3)	215 (23.1)	
Depressive symptoms:				<.001
Total respondents				
CES-D score ≥ 16	421 (39.1)	102 (9.5)	553 (51.4)	
CES-D score < 16	747 (44.1)	213 (12.6)	734 (43.3)	
Mean [SD]	14.8 [8.1]	14.0 [7.9]	15.9 [8.8]	<.001
Women				.033
CES-D score ≥ 16	222 (59.8)	30 (8.1)	119 (32.1)	
CES-D score < 16	417 (74.5)	47 (8.4)	96 (17.1)	
Mean [SD]	14.6 [8.2]	15.0 [9.2]	17.0 [9.6]	.003
Men				.012
CES-D score ≥ 16	199 (28.2)	72 (10.2)	434 (61.6)	
CES-D score < 16	330 (29.1)	166 (14.6)	638 (56.3)	
Mean [SD]	15.0 [7.9]	13.7 [7.4]	15.7 [8.6]	.001
Age groups:				.001
16 to 29	284 (49.9)	42 (7.4)	243 (42.7)	
30 to 39	282 (38.4)	79 (10.8)	373 (50.8)	
40 to 49	145 (34.0)	54 (12.7)	227 (53.3)	
50 to 59	306 (43.5)	81 (11.5)	316 (45.0)	
60 and over	151 (44.7)	59 (17.5)	128 (37.9)	
Mean [SD]	43.9 [14.4]	47.0 [13.8]	43.0 [12.8]	<.001
Marital status:				.001
Married	676 (39.1)	213 (12.3)	840 (48.6)	
Not married	492 (47.3)	102 (9.8)	447 (42.9)	
Highest education:				<.001
Junior high school	192 (40.2)	51 (10.7)	235 (49.2)	
High school	469 (40.7)	98 (8.5)	585 (50.8)	
Vocational/college/ university	507 (44.5)	166 (14.6)	467 (41.0)	
Alcohol consumption (g ethanol/day):				<.001
Non-drinker (0.0)	469 (55.0)	95 (11.1)	289 (33.9)	
0.01 to 4.9	303 (58.3)	46 (8.8)	171 (32.9)	
5.0 to 14.9	212 (37.5)	66 (11.7)	288 (50.9)	
15.0 to 24.9	102 (24.3)	56 (13.4)	261 (62.3)	
25.0 and over	82 (19.9)	52 (12.6)	278 (67.5)	
Mean [SD]	6.2 [10.7]	11.9 [14.7]	13.6 [14.5]	<.001
Caffeine intake (cups of coffee or tea/day):				<.001
Almost none	138 (56.3)	35 (14.3)	72 (29.4)	
1 to 2	556 (43.6)	158 (12.4)	562 (44.0)	
3 or more	474 (38.0)	122 (9.8)	653 (52.3)	
Body Mass Index (kg/height (m)^2) (in quintiles):				.064
<20th	234 (42.9)	53 (9.7)	259 (47.4)	
≥20th–<40th	235 (42.1)	57 (10.2)	266 (47.7)	
≥40th–<60th	235 (42.6)	51 (9.2)	266 (48.2)	
≥60th–<80th	228 (40.8)	75 (13.4)	256 (45.8)	
≥80th	236 (42.5)	79 (14.2)	240 (43.2)	
Mean [SD]	22.6 [3.3]	23.0 [3.3]	22.6 [3.3]	.065
Number of chronic disease:				<.001
None	788 (41.0)	164 (8.5)	970 (50.5)	
1	347 (45.7)	129 (17.0)	284 (37.4)	
2 or more	33 (37.5)	22 (25.0)	33 (37.5)	
Job title:				<.001
Professional	140 (53.4)	48 (18.3)	74 (28.2)	
Managerial/clerical	378 (48.4)	94 (12.0)	309 (39.6)	
Sales/service	57 (27.8)	30 (14.6)	118 (57.6)	
Production/Technical	457 (39.5)	110 (9.5)	591 (51.0)	
Other	136 (37.4)	33 (9.1)	195 (53.6)	
Industry sector:				<.001
Manufacturing	939 (41.6)	232 (10.3)	1,085 (48.1)	
Service	173 (50.3)	71 (20.6)	100 (29.1)	
Transportation	44 (32.1)	7 (5.1)	86 (62.8)	
Construction	12 (36.4)	5 (15.2)	16 (48.5)	

Note. SD, standard deviation; CES-D, Center for Epidemiologic Studies Depression Scale.
[a] Data may not total 100% due to rounding.
[b] p value derived from χ^2 test for categorical variables and analysis of variance for continuous variables (comparison within smoking status).
[c] Percent within smoking status.

individuals to both increased risk of smoking and DSD (Breslau et al., 1991; Dierker et al., 2002; Duncan and Rees, 2005; Fergusson et al., 2003; Kendler et al., 1993; Son et al., 1997), although the evidence has been equivocal (Breslau et al., 1991, 1993; Fergusson et al., 2003; Martini et al., 2002). Such contradictions may partly be explained by the evidence that severe forms of depression are primarily affected by genetic factors while mild to moderate forms of depression are primarily affected by environmental factors (Lyons et al., 1998; McCaffery et al., 2003).

Despite a significant body of literature associating cigarette smoking with DSD, a critical issue remains unresolved, that is the effect of passive smoking on DSD. It is conceivable that if smoking induces DSD, non-smokers who are exposed to a high level of passive smoking may also experience DSD as a result. If this hypothesis is true, previous findings associating smoking and DSD could be underestimated because the referent (control) group in most studies of cigarette smoking included non/never smokers who are potentially exposed to passive smoking.

In Japan, a nationwide survey conducted in 2002 reported that 33.1% of non-smokers were exposed to passive smoking at work almost every day, and 39.7% were exposed occasionally (Statistical Database, Ministry of Health, Labor, and Welfare, Japan, 2002). This estimate indicates that three-quarters of Japanese non-smoking workers are exposed to passive smoking on a daily basis.

The purpose of this report is to examine the association of exposure of never smokers to different levels of passive smoking with depressive symptoms as well as the association of current and former smoking with such symptoms among the full-time working population.

Methods

Study sample and procedures

This cross-sectional study was conducted in a suburb of Tokyo, Japan, from June to December 2002. The study design has been described elsewhere (Nakata et al., 2006). Briefly, we randomly selected 391 enterprises (4351 full-time workers). Representation of the types of small and medium-scale enterprises (SMEs) was weighted according to the number of each type of SME in the area. Members of the study staff contacted each enterprise by telephone to request participation of their workers in completing a self-administered questionnaire