



Research paper

Smoking among adults with serious psychological distress: Analysis of anonymized data from a national cross-sectional survey in Japan



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ABSTRACT

Background: Smoking behavior among people with serious psychological distress (SPD) has not been fully investigated in Asia, although smoking has become a public health concern worldwide. Many Western population-based studies indicate that people with psychological distress are more likely to smoke.

Methods: This study used a national representative data set from the 2010 Comprehensive Survey of Living Conditions of Japan. SPD was defined as scores ≥ 13 or greater on the Kessler Psychological Distress Scale (K6). Multivariate logistic regression analyses were conducted to analyze the association between SPD and current smoking in Japanese adults.

Results: In both men ($n = 27,937$) and women ($n = 30,786$), SPD was significantly associated with current smoking (adjusted odds ratios [95% confidence intervals]: 1.169 [1.030–1.328] for men and 1.677 [1.457–1.931] for women). Among men, SPD was significantly associated with current smoking only in people aged ≥ 50 years (1.519 [1.232–1.874]) and married (1.456 [1.228–1.728]). SPD was significantly associated with current smoking in women of all ages. SPD had a greater impact on current smoking for women aged 20–49 years than for those aged ≥ 50 years (1.832 [1.552–2.162] and 1.445 [1.099–1.900], respectively).

Limitations: The cross-sectional design precludes assumptions about the direction of causality. In addition, smoking status was self-reported.

Conclusions: SPD was significantly associated with current smoking in Japan and the association was much stronger for younger women. Clinical strategies are needed to reduce the prevalence of smoking among people with SPD to reduce excess mortality in this population.

1. Introduction

Excess mortality among people with serious psychological distress (SPD), such as depression and anxiety, is a global public health issue (Pratt, 2009; Russ et al., 2012) and is a result of both physical illness and suicide. The association between psychological distress and mortality may be partly mediated by behavioral and lifestyle factors, including smoking (Hamer et al., 2008).

Smoking is a leading global risk factor for early death and disability owing to smoking-attributable diseases such as cardiovascular disease, cancers, and chronic respiratory diseases (GBD 2015 Tobacco Collaborators., 2017). There has been little research in Japan on smoking behavior among people with SPD, although many population-based studies conducted in Western countries have indicated that people with psychological distress are more likely to smoke than those without psychological distress (Weinberger et al., 2017). It is unclear

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whether findings from Western countries are applicable to Asian countries, as the latter have relatively higher smoking rates, and the smoking rate for females is much lower than for males (Eriksen et al., 2015). To the best of our knowledge, only one study has examined the association between psychological distress and smoking in a nationally representative sample in Japan. Furihata et al. conducted a nationally representative population-based study in Japan and reported a non-significant association between current smoking and presence of mild depressive symptoms (not SPD) as assessed by the Center for Epidemiologic Studies Depression Scale (CES-D) in a sample of 2334 individuals (Furihata et al., 2018). However, this sample size was relatively small for analyzing subgroups stratified by sex and age. In addition, it remains unclear whether SPD was associated with current smoking because the previous study adopted a cut-off point for mild depression. There have been at least two regional population-based studies in Japan examining associations between several health behaviors and SPD, although their findings are inconsistent regarding the age at which this association is apparent. Kuriyama et al. reported that current smoking was significantly associated with psychological distress, defined as a Kessler Psychological Distress Scale (K6) score ≥ 13 , among men and women aged 40–64 years. However, they found no significant association for those aged 65 years or more (Kuriyama et al., 2009). In the other study, Hori et al. reported that current smoking was significantly associated with psychological distress, defined as a General Health Questionnaire 12 score ≥ 4 , only in women aged 65 years or more (Hori et al., 2016). A few Asian studies have reported significant associations between current smoking and depression in women (Kim et al., 2016; Noh et al., 2014; Yun et al., 2012). Some studies have found a significant association between current smoking and depression in men (Chang and Chiang, 2009; Noh et al., 2014; Yun et al., 2012), whereas others have found a non-significant association (Kim et al., 2016). Therefore, a large nationally representative population-based study examining the association between SPD and current smoking in Japan is needed. An examination of demographic differences in the association between SPD and smoking is also required (Weinberger et al., 2017). We hypothesized that SPD is associated with smoking behavior in the Japanese population.

The study objectives were 1) to investigate the association between SPD and current smoking in the general population in Japan and 2) to explore demographic differences in the associations between SPD and current smoking.

2. Methods

2.1. Data source

An anonymized data set from the 2010 Comprehensive Survey of Living Conditions (CSLC), which was a national cross-sectional survey conducted by the Ministry of Health, Labour and Welfare (MHLW) of Japan (MHLW, 2018), was analyzed. In the 2010 survey, the Household and Health questionnaire covered 289,363 households in Japan randomly sampled from 5510 districts included in the 2005 National Census; the response rate was 79.1% (228,864 responses). An anonymized subset of the data, which was resampled by the MHLW maintaining representativeness, comprised 93,730 responses (MHLW, 2017a). Our statistical data differ from those reported by the MHLW because our analysis of the anonymized data set was conducted independently.

2.2. Participants

We included adults aged 20 years or more, and excluded participants based on the following criteria: 1) unknown age; and 2) in hospital or in social welfare facilities on the survey date (or this information was unknown). Our analyses focused on adults aged 20 years or more, because the validity of the K6, which was used to assess

psychological distress in the 2010 CSLC, is unknown in people aged less than 20 years.

2.3. Variables

2.3.1. Smoking

In the 2010 Household and Health questionnaire, participants were asked to indicate their smoking status and the mean number of cigarettes smoked per day. For smoking status, participants were asked to select from the following four categories: 1) I do not smoke; 2) I smoke every day; 3) I smoke occasionally; and 4) I used to smoke before, but I have not smoked for more than a month. In this study, participants who responded 1) and 4) were defined as current non-smokers and those who responded 2) and 3) were defined as current smokers. For mean number of cigarettes per day, daily or occasional smokers were asked to select from the following four categories: 1) 10 or fewer; 2) 11–20; 3) 21–30; and 4) 31 or more. To measure the level of smoking per day, current non-smokers were assigned a score of 0 and smokers selecting the responses 1) to 4) were assigned scores of 1–4, respectively.

2.3.2. Psychological distress

The K6 scale was used to measure psychological distress in the CSLC. The K6 was developed as a brief screening scale for nonspecific psychological distress in adults and outperforms other scales (Kessler et al., 2002; Kessler et al., 2003). The K6 consists of six questions: “During the past 30 days, about how often did you feel ... a) nervous? b) hopeless? c) restless or fidgety? d) so depressed that nothing could cheer you up? e) that everything was an effort? f) worthless?” The Japanese version of the K6 was developed using the standard back-translation method, and it has been validated in people aged 20 years or more (Furukawa et al., 2008). We classified individuals with scores of ≥ 13 as having SPD (Kessler et al., 2003). We considered this equivalent to the 12-month criteria for diagnosis of any disorder from the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV, other than a substance use disorder, and to a Global Assessment of Functioning (GAF) score of < 60 (Kessler et al., 2003).

2.3.3. Other demographic variables

The categorical variables age, sex, educational status, employment status, marital status, and the presence or absence of current visits to outpatient clinics for physical illness were included as potentially confounding variables (Table 1). These demographic data were self-reported in the 2010 Household and Health questionnaire.

2.4. Ethical considerations

The present study was conducted in accordance with the Statistics Act, and was approved by the MHLW. The anonymized data set used in the current study did not contain any personally identifiable information. Therefore, the study did not need to be reviewed by our institutional review board.

2.5. Statistical analysis

All analyses were conducted using SPSS version 22 (IBM Corporation, Tokyo, Japan). We described the background characteristics of the participants stratified by presence or absence of SPD and calculated the prevalence of current smoking and 95% confidence intervals (CIs). We conducted univariate and multivariate logistic regression analyses to assess the associations between SPD and current smoking. We calculated the crude odds ratio (OR) and 95% CI of SPD for current smoking and the OR with adjustment for all covariates. In addition, we analyzed the supplementary quantitative relationship between psychological distress and current smoking with a multiple regression analysis using the total K6 score and the level of smoking per day. In the supplementary multiple regression analysis, we examined

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