Original Article

Association of Smoking with Other Lifestyle Factors and Mental Health Status of Japanese Factory Workers

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Abstract

A self-administered questionnaire survey was conducted among factory workers in Japan. The questionnaire included items concerning eight health practices recommended by Morimoto and the General Health Questionnaire-28. Data from 1598 male workers were analyzed. There were few differences in comprehensive health status due to smoking status, but smokers under the age of 30 years had worse lifestyle habits than nonsmokers with regard to favorable drinking and eating breakfast, and smokers between the ages 30 and 44 years had worse lifestyle habits with regard to favorable drinking and eating breakfast, and better habits regarding sleeping hours and working hours. Smokers under 30 showed worse mental health status than ex-smokers with regard to social dysfunction, though there was little difference between those aged from 30 to 44 and those 45 and older. The results suggested the importance of considering the difference in lifestyle and mental health status due to smoking status when providing advice for improving health habits.

Key words: Smoking, Health practice, Lifestyle, Mental health status, General health questionnaire-28

Introduction

Lifestyle factors are known to be influential in the onset and prognosis of many diseases including cancer, cardiovascular diseases, cerebrovascular diseases and diabetes mellitus[1]. Breslow et al.[2] demonstrated that in a general population sample, seven health practices (not smoking, limiting the amount of alcohol consumption, sleeping 7 to 8 hours per night, eating breakfast regularly, not snacking, maintaining a desirable weight, and getting regular exercise) were associated with physical health status and mortality. Based on their study, and considering the Japanese cultural background, Morimoto et al.[1] revised the list of seven health practices to a list of eight health practices for Japanese respondents. We previously demonstrated the relationship between these eight health practices and sister chromatid exchange[3,4], natural killer cell activities[5], IgE[6], mental health status[7,8], and working-life satisfaction[9,10].

Smoking is a well-known risk factor for the onset of cancer (especially lung cancer), cardiovascular diseases, and arteriosclerosis[11]. It is well known that smoking negatively influence not only the smokers themselves but also the people around them[12]. Smoking is well known to negatively influence physical health status to a greater degree than any other lifestyle factor, and it also influences mental health status. For this reason, many people encourage smokers to stop smoking, but this is difficult since nicotine, which is included in cigarettes, is highly addictive and causes dependency[13].

We thought that there might be some key factor for improving health status in association of smoking and other lifestyle factors and mental health status. Therefore we focused on smoking status in relation to other lifestyle factors and mental health status in this study. To investigate the relationship of smoking status to other lifestyle habits and mental health status in Japanese factory workers, a questionnaire survey was conducted among workers at an electrical goods manufacturing company in Japan.

Materials and methods

We used a self-administered questionnaire to survey 2310 workers at a Japanese electrical goods manufacturing company in

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Table 1 Eight health practices recommended by Morimoto.

Items	Good practices (1 point)	Poor practice (0 points)
Exercise	Once a week or more	Less than once a week
Drinking	Sometimes or never	Almost every day
Smoking status	Not smoking	Smoking
Sleeping hours per day	7-8 hrs./night	Others
Nutritional balance[a]	Balanced	Not balanced
Eating breakfast	Every day	Sometimes or not
Working hours per day	≤9 hrs./day	≥10 hrs./day
Subjective stress[b]	Moderate	Too much or too little

[a] eating a balanced diet
[b] limiting mental stress

a suburb of Osaka during the annual physical examination at the work place performed between June and July 1993. A total of 2218 (96%) workers responded to the survey. The questionnaire consisted of items related to personal health practices and mental health status.

Items concerning personal health practices were related to eight health practices recommended by Morimoto[1] (not smoking limiting the amount of alcohol consumption, eating breakfast, sleeping 7 to 8 hours per night, working less than 9 hours per day, physical exercise more than once a week, good nutritional balance, and moderate mental stress) as shown in Table 1. Each item had multiple answers (3 to 5), and the answers were dichotomized into the categories of "good" or "not good" health

practices as shown in Table 1. Answers in the "good" category received 1 point, and those in the "not good" category received 0 points. In this study, smoking status was considered a separate variable. Therefore, we scored the other seven of the eight health practices recommended by Morimoto but not smoking status. Scores from the seven items were totaled to provide an index of cumulative personal health practices, and we called this score the Health Practice Index 7 (HPI7; 0 ~ 7 points). The more favorable the personal health practices, the higher the HPI7 score became.

The grade of mental health status was measured by the 28-item version of the General Health Questionnaire (GHQ-28)[14] translated into Japanese by Maruyama[7,8] which effectively measures mental health status. The GHQ-28 provides four subscales (somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression). These subscales consist of seven questions, and the GHQ-28 consists of twenty eight questions overall. Items were scored using Likert-type scoring of 1-2-3-4 for response categories, and these were converted into 2- point scores of 0-0-1-1. The sum of seven scores in each category indicating the score in each category (0 ~ 7 points), and the sum of all 28 questions on the GHQ-28 indicated the score of the total GHQ-28 (0 ~ 28 points). The worse the personal mental health status was, the higher the score on the GHQ-28 became.

Each respondent was categorized into one of three subgroups (smokers, ex-smokers, and nonsmokers) divided by smoking status. Almost all female workers were nonsmokers, so further analyses focused on the 1639 male workers who responded

Table 2 Mean scores on HPI7 and seven lifestyle factors by smoking status and age.

	Exercise	"Favorable" drinking	Sleeping hours	Nutritional balance	Eating breakfast	Working hours	Subjective stress	HPI7
[~29 yrs.]								
Smoker (N=341)	0.53±0.50	0.77±0.42	0.36±0.48	0.11±0.31	0.47±0.50	0.64±0.48	0.58±0.49	3.45±1.29
Ex-smoker (N=25)	0.64±0.49	0.68±0.48	0.48±0.51	0.36±0.49	0.68±0.48	0.48±0.51	0.64±0.49	3.96±1.62
Nonsmoker (N=212)	0.56±0.50	0.87±0.33	0.37±0.48	0.09±0.29	0.61±0.49	0.54±0.50	0.58±0.49	3.63±1.32
F value	0.70	6.01**	0.71	8.12***	6.64**	3.31*	0.19	2.55
[30-44 yrs.]								
Smoker (N=362)	0.38±0.49	0.44±0.50	0.38±0.49	0.15±0.36	0.63±0.48	0.43±0.50	0.56±0.50	2.97±1.38
Ex-smoker (N=55)	0.53±0.50	0.42±0.50	0.29±0.46	0.35±0.48	0.76±0.43	0.29±0.46	0.40±0.49	3.04±1.37
Nonsmoker (N=173)	0.43±0.50	0.62±0.49	0.22±0.42	0.29±0.45	0.76±0.43	0.28±0.45	0.47±0.50	3.07±1.36
F value	2.30	9.11***	7.26***	9.84***	5.64**	6.46**	3.58*	0.32
[45 yrs.~]								
Smoker (N=276)	0.38±0.49	0.36±0.48	0.47±0.50	0.28±0.45	0.83±0.38	0.48±0.50	0.60±0.49	3.39±1.40
Ex-smoker (N=65)	0.52±0.50	0.40±0.49	0.32±0.47	0.29±0.46	0.86±0.35	0.46±0.50	0.58±0.50	3.45±1.55
Nonsmoker (N=130)	0.48±0.50	0.42±0.50	0.37±0.48	0.39±0.49	0.88±0.33	0.45±0.50	0.52±0.50	3.52±1.35
F value	3.33*	0.93	3.43*	2.90	0.82	0.15	1.02	0.37

*p<0.05 **p<0.01 ***p<0.001
F values were computed by one-way analysis of variance, and differences in scores for HPI7 and seven lifestyle factors were analyzed by Scheffe's multiple comparison method.

to each question. The mean age of workers was 36.7 ± 10.8 years of age. The percentage of workers below 30 years of age was 35.3%, while 36.0% were from 30 to 44, and 28.7% were 45 and over. Among those workers, 40.5% were blue-collar, 55.6% were white-collar, and 3.9% of workers were those who answered both of white- and blue-collar. Of the blue-collar workers 58.8% were engaged in daytime work and 41.2% were engaged in shift-work. In this study we focused on the effect of smoking status, therefore we did not divide workers by type of job for analysis. But HPI7 increased and GHQ-28 decreased with age, and the mean ages of smokers, ex-smokers, and nonsmokers differed significantly. Thus, each of the three smoking status groups was further divided into three age groups (below 30, from 30 to 44, and 45 and over). Then we examined the differences of HPI7, lifestyle categories, total GHQ-28, and its four subscales among the smoking habit groups of each age group using one-way analysis of variance and Scheffe's multiple comparison method.

These analyses were conducted using the Statistical Package for Social Science (SPSS) computer program at the Computation Center of Osaka University.

Results

In this study, the prevalence of smoking among male workers was 59.7% overall, whereas it was 59.0% among those under 30, 62.1% among those from 30 to 44, and 58.6% among those 45 and over.

The means and standard deviations of the HPI7 and each lifestyle factor by smoking status and age are shown in Table 2. In HPI7 scores, there was no significant differences among the three smoking status groups of all age groups. There were significant differences in some lifestyle factors. Initially, the scores for "physical exercise" showed significant differences among the three smoking status groups in the 45-and-over group (p<0.05), but they showed no significant differences in the below-30 and 30-to-44 groups. The scores for "favorable drinking" among nonsmokers were significantly higher than that of smokers in below-30 and 30-to-44 age groups (p<0.01), but showed no significant differences among the three smoking-status groups in the 45-and-over age group. The scores for "sleeping hours" of smokers were significantly higher than that of nonsmokers in the 30-to-44 age group (p<0.001), but showed no significant differences among the three smoking status groups for workers under 29 and 45-and-over. The scores for "nutritional balance" among ex-smokers were significantly higher than those of smokers in workers under 30 and from 30 to 44 (p<0.01), but showed no significant differences among the three smoking status groups in those 45 and older. The scores for "eating breakfast" among smokers were significantly lower than those of nonsmokers in below-30 and 30-to-44 age groups (p<0.05), but showed no significant differences among the three smoking-status groups in the 45-and-over age group. The score for "working hours" among smokers was significantly higher than that of nonsmokers in the 30-to-44 group (p<0.01), but showed no significant differences among the three smoking-status groups in other age groups. The scores for "subjective stress" showed significant differences among the three

Table 3 Mean scores of the total GHQ-28 and its four subscales by smoking status and age.

	Somatic symptoms	Anxiety-Insomnia	Social dysfunction	Severe depression	Total GHQ-28
[−29 yrs.]					
Smoker (N=341)	1.20±1.09	0.65±1.14	3.96±1.98	0.14±0.63	5.94±3.39
Ex-smoker (N=25)	0.72±1.21	0.60±1.12	2.84±2.03 **	0.04±0.20	4.20±3.98
Nonsmoker (N=212)	1.10±1.21	0.64±1.13	3.79±2.06	0.12±0.57	5.65±3.61
F value	2.33	0.02	3.71*	0.38	3.07*
[30−44 yrs.]					
Smoker (N=362)	1.14±1.25	0.59±1.13	3.49±2.16	0.07±0.29	5.29±3.68
Ex-smoker (N=55)	0.93±1.02	0.78±1.36	2.76±1.94	0.09±0.55	4.56±3.74
Nonsmoker (N=173)	1.17±1.25	0.66±1.19	3.14±2.28	0.16±0.78	5.13±4.07
F value	0.88	0.71	3.44*	1.83	0.89
[45 yrs.−]					
Smoker (N=276)	0.79±1.09	0.41±0.82	2.57±1.96	0.08±0.36	3.85±2.90
Ex-smoker (N=65)	0.95±1.27	0.51±0.81	2.49±1.89	0.02±0.12	3.97±2.88
Nonsmoker (N=130)	0.81±1.11	0.54±1.00	2.27±2.18	0.05±0.31	3.67±3.39
F value	0.57	1.02	1.01	0.98	0.25

*p<0.05
F values were computed by one-way analysis of variance, and differences in scores for the total GHQ-28 and its four subscales were analyzed by Scheffe's multiple comparison method.

smoking-status groups in the 30-to-44 group (p<0.05), but showed no significant differences in other age groups.

The means and standard deviations of scores for the total GHQ-28 and 4 subscales by smoking status and age are shown in Table 3. The scores of the total GHQ-28 among the three smoking-status groups were significantly different in the under-30 group (p<0.05), but there were no significant differences in the 30-to-44 and 45-and over groups. The scores for "social dysfunction" among ex-smokers were significantly lower than those of smokers in the under-30 group (p<0.05), and there were significant differences among the three smoking status groups in workers from 30 to 44 (p<0.05), but there were no significant differences groups in workers 45 and older. The scores for "somatic symptoms", "anxiety and insomnia", and "severe depression" showed no significant differences among the three smoking-status groups in any age group.

Discussion

In this study, we investigated the relationship of smoking status with lifestyle factors related to eight health practices, excluding smoking habits and mental health status, recommended by Morimoto[1] of Japanese factory workers.

According to a survey of the nutritional status among Japanese by the Ministry of Health and Welfare in 1993, the prevalence of smoking among adult males was 44.8%. The rate was highest in the age group from 30 to 39 (48.7%), and decreased gradually as age increased[15]. In this investigation, contrary to the previous survey, the prevalence of smoking in the age group under 30 was about the same as that in the groups from 30 to 44 and 45 and older, and the prevalence of smoking was higher than that reported in the previous survey in the three age groups.

The relationship between smoking status and other lifestyle practices has been reported in many studies. Kato et al.[16] and Goldbourt et al.[17] reported that smokers showed a higher consumption of alcoholic beverages. Kato et al.[16] and Woodward et al.[18] reported that smokers had lower physical activity than nonsmokers. In this study, there were no significant differences in cumulative health practices (HPI7) by smoking status. However, there were significant differences in some lifestyle factors. Comparing the lifestyle of smokers with nonsmokers, smokers had worse health practices than nonsmokers with regard to favorable drinking and eating breakfast among workers 29 or younger. They also had worse health practices with regard to favorable drinking, nutritional balance, and eating breakfast, although they had better practices with regard to sleeping hours and working hours among workers from 30 to 44. There were few differences between the three smoking status groups in physical exercise, sleeping hours, and subjective stress among workers under 30, few differences in physical exercise among those from 30 to 44, and few differences in favorable drinking habits, nutritional balance, eating breakfast, working hours and subjective stress among those 45 and older. These findings were consistent with the findings of previous studies[16-18] in regard to under-30 and 30-to-44 age groups. Health practices in which smokers were worse than nonsmokers have been emphasized for a long time in health advice for prevention of diseases such as cancer and cardiovascular diseases. This might indicate a difficulty for smokers to improve their lifestyles.

Regarding the relationship between smoking status and mental health status, there have been many studies. Wetter et al.[19] reported that smoking was associated with sleep disturbance. Anda et al.[20] and Perez-Stable et al.[21] reported a correlation between cigarette smoking and depression. By contrast, in this study comparing mental health status between smokers and nonsmokers, there were few differences with regard to the total GHQ-28 and its four subscales in the three smoking-status groups. But smokers were worse than ex-smokers on "social dysfunction" in workers under 30. Mental health status among the three smoking-status groups was different in workers under 30, but was almost the same in the other age groups. These findings were not consistent with the findings of previous studies[19-21]. This might be because the workers were employed in a large company, and this study was based on a self-administered questionnaire conducted in the workplace. However, it might indicate that only individuals with good mental health status can successfully quit smoking among those under 30, while many people were able to successfully quit smoking in the 30-to-44 and 45-and over age groups because of previous health advice or adverse health status, so there was no significant difference in mental health status between smokers, ex-smokers and nonsmokers aged 30 or older.

Our study suggests the importance of considering differences in lifestyle and mental health status in relation to smoking status to improve lifestyle practices among factory workers. Further investigation should be conducted with regard to improving lifestyle, mental health status and physical health status. These are very important issues for occupational health in Japan.

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