ORIGINAL PAPER

Trends in smoking rates among urban civil servants in Japan according to occupational categories

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ABSTRACT

Occupation could affect the distribution of smoking status of workers, and the success of smoking cessation among workers depends partly on worksite conditions. Blue collar workers have been identified as a high-risk group for smoking. The aim of the present study was to examine trends in smoking rates among urban civil servants in Japan according to occupational categories. Subjects were urban civil servants aged 30–59 years. They annually reported smoking status in a questionnaire in a worksite health check-up each year from 2004 to 2011. Urban civil servants reported substantially lower current smoking rates than national smoking rates in Japan (20.2%, 23.8%, and 27.0% for males in their 30s, 40s, and 50s and 2.4%, 6.3%, and 9.5% for females, respectively, in 2011). In analysis by occupational categories, current smoking rates declined among all groups except female white collar workers in their 50s. The current and persistent smoking rates (number of current smokers/[number of ex-smokers and current smokers]) among blue collar workers were higher than those among white collar workers at almost all time points in all age and gender groups. This study found relatively lower current smoking rates among urban civil servants than the national average and higher current and persistent smoking rates in blue collar workers than in white collar workers among them. These results would help to make suitable worksite smoking cessation policies for each occupational category.

Key Words: smoking rate, smoking cessation, occupational category, worksite

INTRODUCTION

Smoking is well-established as a risk factor of various diseases, such as cardiovascular diseases, respiratory diseases, and cancers. In Japan, 27.8% of male death and 6.7% of female death were attributable to smoking.[1] The smoking rates among Japanese males have been decreasing gradually since 1965, and that in 2011 was less than half of that in 1965 (82.3% in 1965 and 33.7% in 2011).[2] In contrast, Japanese females have kept low smoking rates of around 10% for the last 50 years (15.7% in 1965 and 10.6% in 2011).[2,3]

Occupation could affect the distribution of smoking status among workers. Blue collar workers have been identified as a high-risk group for smoking and were reported to smoke more heavily, and initiate smoking at a younger age compared with white collar workers.[4] This might be

because blue collar workers are likely to have higher job strain and be exposed to more hazards on the job than white collar workers.[5,6] Moreover, the role of cultural norms in worksites for blue collar workers can partly contribute to the high smoking rates among blue collar workers.[4]

On the other hand, the success of smoking cessation for workers partly depends on worksite conditions. Worksite smoking rates affect the likelihood of successful smoking cessation.[7] Also, the presence of smoking cessation programs at worksites and the presence of worksite rules limiting smoking have beneficial effects of reducing current smokers.[4] However, smoking cessation benefits of worksites are least available to worker groups with the highest smoking rates, such as blue collar workers, because their worksites are scattered and their workers frequently change employers.[4] Therefore, this disparity between occupational categories should be taken into account when considering efforts to decrease smoking rates.

To date, current smoking rates in Japan have been surveyed in various specific groups, such as members of the Japanese Cancer Association[8] and medical students,[9] but there were few studies among urban civil servants. The present study aimed to examine trends in smoking rates among urban civil servants in Japan according to occupational categories. The differences in smoking rates between white and blue collar workers could be useful information to make worksite smoking cessation policies that are suited to each occupational category.

METHODS

Study population

Subjects were civil servants aged 30–59 years of a local government in Aichi Prefecture in central Japan. The local government serves the fourth-largest population in Japan (2.3 million people in 2010).[10] The subjects were eligible for annual health check-up. Civil servants who did not take the health check-up each year or did not completely answer the relevant questions for the purpose of this study were excluded. Final study groups of each year included 13,101, 12,818, 12,385, 11,966, 10,408, 9,941, 9,733, and 9,229 subjects for 2004 to 2011, respectively. The local government provided us with anonymized data for the current analysis. This study was approved by the ethics committee of Nagoya University School of Medicine (approval No. 2012-0290).

Data collection and analysis

A self-administered and onymous questionnaire survey was conducted each year. The civil servants reported their smoking status in the questionnaire. Information on age, gender, and occupational code was given by the local government. According to the International Standard Classification of Occupation-08 by the International Labor Organization (available at http://www.ilo.org/public/english/bureau/stat/isco/), all civil servants were categorized into the following six major occupational groups; managers, professionals, technicians and associate professionals, clerical support workers, plant and machine operators, and elementary occupations. Subsequently, these occupational groups were divided into two occupational categories; white collar (managers, professionals, and clerical support workers) and blue collar (technicians and associate professionals, plant and machine operators, and elementary occupations).

Smoking status was categorized as "never smoker," "ex-smoker," and "current smoker." A current smoking rate was calculated as the number of current smokers divided by that of all subjects, and a persistent smoking rate was calculated as the number of current smokers divided by that of those who had started smoking (ex-smokers and current smokers). A persistent smoking rate is appropriate for assessing the success of smoking cessation efforts.[4] This study compared

the current smoking rates with age-adjusted national smoking rates in Japan based on the age distribution among urban civil servants of the local government[2)] and observed annual changes in both of the smoking rates according to age, gender, and occupational categories.

RESULTS

Study subjects

   The distributions of subjects from 2004 to 2011 were shown in Table 1. The sample sizes had become smaller year by year. Especially, the number of blue collar workers in their 30s in 2011 was less than half of that in 2004 for both males and females.

Current smoking rates

   Fig. 1 shows that the current smoking rates among urban civil servants were substantially lower than age-adjusted national smoking rates in Japan every year in both males and females. Also, the overall current smoking rates among urban civil servants declined during the study period (35.2% to 23.3% for males and 9.9% to 5.2% for females).

   Fig. 2 shows the trends of current smoking rates according to age (30s, 40s, and 50s) and occupational categories (white collar worker and blue collar worker) by gender. The current smoking rates among all groups except female blue collar workers in their 50s trended to decline within eight years. In both male and female white collar workers, the 50s group reported the

Table 1   Distributions of study subjects according to age, gender, and occupational categories by year.

Year	2004	2005	2006	2007	2008	2009	2010	2011
Male	8,149	8,042	7,757	7,461	6,661	6,315	6,141	5,774
White collar worker								
30 to < 40 years	1,355	1,381	1,381	1,389	1,221	1,269	1,343	1,311
40 to < 50 years	1,692	1,589	1,522	1,471	1,312	1,253	1,221	1,126
50 to < 60 years	2,839	2,821	2,704	2,495	2,159	1,962	1,798	1,686
Blue collar worker								
30 to < 40 years	767	722	660	601	495	424	349	267
40 to < 50 years	797	825	798	842	854	818	820	748
50 to < 60 years	699	704	692	663	620	589	610	636
Female	4,952	4,806	4,628	4,505	3,747	3,626	3,592	3,455
White collar worker								
30 to < 40 years	1,334	1,305	1,249	1,203	899	904	926	898
40 to < 50 years	1,025	1,010	1,029	1,045	909	891	900	890
50 to < 60 years	1,071	1,042	1,003	995	798	722	723	666
Blue collar worker								
30 to < 40 years	421	377	325	288	231	204	170	153
40 to < 50 years	457	478	497	506	491	490	492	471
50 to < 60 years	644	594	525	468	419	415	381	377

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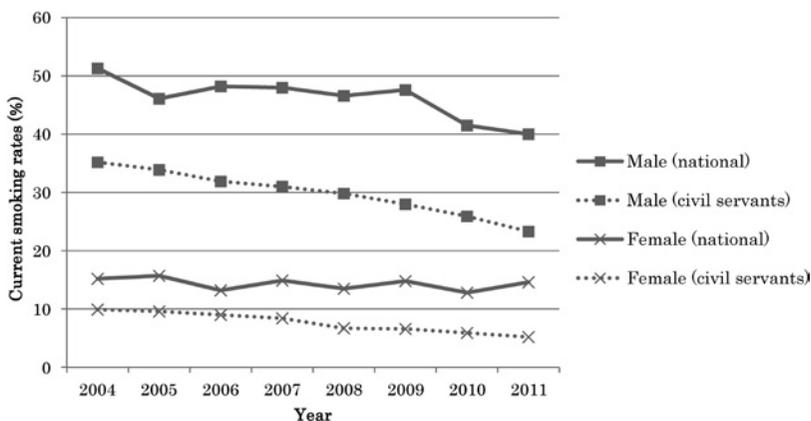
Fig. 1 Current smoking rates among urban civil servants and age-adjusted national smoking rates in Japan (Health and Welfare Statistics Association. *J Health Welfare Stat*, 2012).

Male
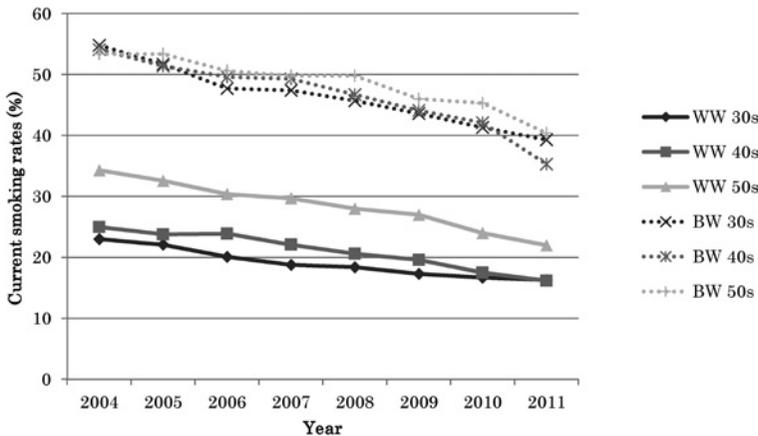
Female
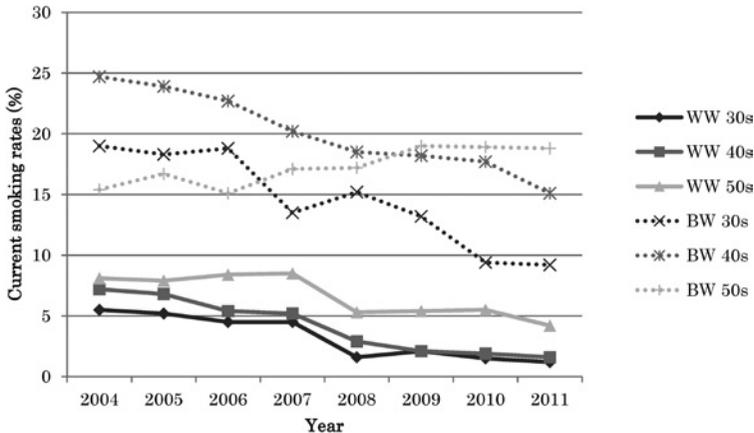
Fig. 2 Trends in current smoking rates according to age and occupational categories by gender. WW, white collar worker; BW, blue collar worker.

highest current smoking rates, and the differences in the rates between the 30s and 40s groups had become smaller gradually. On the other hand, among blue collar workers, all three age groups in males were quite similar in the trend of current smoking rates, while the smoking rate among females in the 50s was the highest among the three age groups in 2011, though it was the lowest in 2004. The current smoking rates among blue collar workers were substantially higher than those among white collar workers at all time points in every age and gender group.

Persistent smoking rates

Fig. 3 shows the trends of persistent smoking rates. Females in their 30s reported remarkable decline of persistent smoking rates regardless of occupational categories. The persistent smoking rates in their 30s were the highest for males and the lowest for females among the three age groups in 2011, in both white and blue collar workers. Similar to current smoking rates, the persistent smoking rates among blue collar workers were higher than those among white collar workers at almost all time points in every age and gender group.
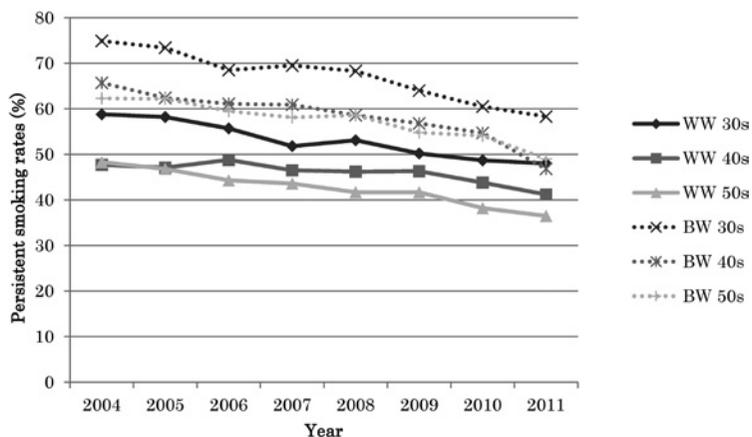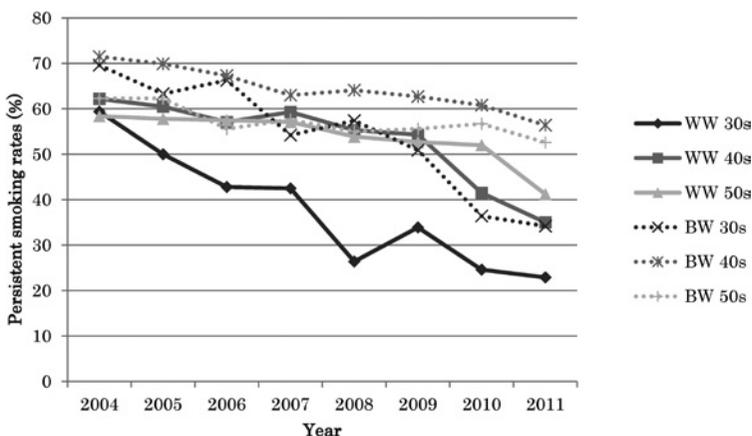
Fig. 3 Trends in persistent smoking rates according to age and occupational categories by gender.
WW, white collar worker; BW, blue collar worker.

DISCUSSION

In our study, the current smoking rates among urban civil servants were substantially lower than national smoking rates in Japan throughout the study period[2)] and still tended to decline. This might be a result of various efforts of the local government to reduce the current smoking rate among civil servants. Examples were smoking cessation seminars for young smoking workers and old workers with heavily accumulation of smoking, promotion by doctors and nurses to quit smoking for smokers who had abnormal findings in the annual health checkup, and smoking cessation programs for smokers wishing to quit smoking. Moreover, good access to information on the health dangers of smoking and smoking cessation support may have been effective to reduce current smokers.

This study showed a remarkable decline in the persistent smoking rates among females in their 30s regardless of occupational categories, while only a slight decline in those among males in their 30s. In previous studies, there was a clear tendency to quit smoking in older age groups, but the existing evidence regarding a gender difference in the effect of smoking cessation interventions has so far been unclear.[11)] One of the possible reasons for the gender difference in our study is a recent trend towards late marriage in Japanese. In a previous study, an association between current smoking and single status was negative for males and positive for females, and the association was stronger for females than for males.[12)] Therefore, females in their 30s might be more likely to quit smoking due to marriage than males in their 30s. Furthermore, a temporary nationwide increase in the smoking rates among Japanese young females around 2000 survey might have caused social movement towards reducing young female smokers.[2)]

For reduction of the high smoking rates among blue collar workers, worksite smoking policies that address environmental factors as well as individual factors are most likely to have a positive impact on smoking.[13)] Among such environmental factors are worksite rules limiting smoking. A total smoking ban in worksites is effective not only for smoking cessation at worksites, but also for that in off-duty situations, suggesting that environmental changes would affect individual psychological intentions to quit smoking.[7)] Also, a total smoking ban could be useful for limiting exposure to the environmental hazards of second-hand smoke at worksites.[14)] In addition to a total smoking ban, environmental factors include job stress, hazardous working conditions, pace of work, and the meaning of smoking among workers.[4)] Understanding the role of these factors in smoking cessation is substantially important for making worksite smoking cessation policies applicable to worksite conditions for blue collar workers. Moreover, groups with high persistent smoking rates should be considered target groups for making worksite smoking cessation policies more effective.

This study has several limitations. First, smoking status reported in some cases might be incorrect because the questionnaire was onymous. Second, some occupations were difficult to classify into the two occupational categories. This limitation might lead to an underestimation of differences in smoking trends between white and blue collar workers. Finally, the study subjects might not represent general white or blue collar workers in Japan because urban civil servants had less anxiety about their employment and more income than other workers in Japan.[4)] Therefore, it might be difficult to generalize our results to the greater Japanese population.

In summary, this study found relatively low current smoking rates among Japanese urban civil servants, and differences in the trends in current and persistent smoking rates between white and blue collar workers among them. Although it remains unclear what caused these differences, our findings would help to make worksite smoking cessation policies suitable for each occupational category. Further studies focusing on the difference between occupational categories are desirable for protecting workers from the health dangers of smoking.

ACKNOWLEDGMENTS

CONFLICT OF INTEREST

There is no conflict of interest to disclose for each author.

REFERENCES

1) Katanoda K, Marugame T, Saika K, Satoh H, Tajima K, Suzuki T, Tamakoshi A, Tsugane S, Sobue T. Population attributable fraction of mortality associated with tobacco smoking in Japan: a pooled analysis of three large-scale cohort studies. *J Epidemiol*, 2008; 18: 251–264.
2) Health and Welfare Statistics Association. (5) smoking. *J Health Welfare Stat*, 2012; 59: 97–99 (in Japanese).
3) Tsugane S. Alcohol, smoking, and obesity epidemiology in Japan. *J Gastroenterol Hepatol*, 2012; 27: 121–126.
4) Ham DC, Przybeck T, Strickland JR, Luke DA, Bierut LJ, Evanoff BA. Occupation and workplace policies predict smoking behaviors: analysis of national data from the current population survey. *J Occup Environ Med*, 2011; 53: 1337–1345.
5) Hirokawa K, Tsutsumi A, Kayaba K. Occupation and plasma fibrinogen in Japanese male and female workers: the Jichi Medical School Cohort study. *Soc Sci Med*, 2009; 68: 1091–1097.
6) Chin DL, Hong O, Gillen M, Bates MN, Okechukwu CA. Cigarette smoking in building trades workers: the impact of work environment. *Am J Ind Med*, 2012; 55: 429–439.
7) Nishiura C, Narai R, Ohguri T, Funahashi A, Yarita K, Hashimoto H. The effect of smoking prevalence at worksites on individual cessation behavior. *J Occup Health*, 2009; 51: 48–56.
8) Saika K, Sobue T, Katanoda K, Tajima K, Nakamura M, Hamajima N, Oshima A, Kato H, Tago C. Smoking behavior and attitudes toward smoking cessation among members of the Japanese Cancer Association in 2004 and 2006. *Cancer Sci*, 2008; 99: 824–827.
9) Takeuchi Y, Morita E, Naito M, Hamajima N. Smoking rates and attitudes to smoking among medical students: a 2009 survey at the Nagoya University School of Medicine. *Nagoya J Med Sci*, 2010; 72: 151–159.
10) Ministry of Internal Affairs and Communications. Statistical Handbook of Japan 2012. pp.11–25, 2012, Statistics Bureau, Japan.
11) Puente D, Cabezas C, Rodriguez-Blanco T, Fernández-Alonso C, Cebrian T, Torrecilla M, Clemente L, Martín C. The role of gender in a smoking cessation intervention: a cluster randomized clinical trial. *BMC Public Health*, 2011; 11: 369.
12) Hu L, Sekine M, Gaina A, Nasermoaddeli A, Kagamimori S. Association of smoking behavior and socio-demographic factors, work, lifestyle and mental health of Japanese civil servants. *J Occup Health*, 2007; 49: 443–452.
13) Cunradi CB, Lipton R, Banerjee A. Occupational correlates of smoking among urban transit operators: a prospective study. *Subst Abuse Treat Prev Policy*, 2007; 2: 36.
14) Alexander LA, Crawford T, Mendiondo MS. Occupational status, work-site cessation programs and policies and menthol smoking on quitting behaviors of US smokers. *Addiction*, 2010; 105: 95–104.