

Field Study

Questionnaire Survey and Environmental Measurements that Led to Smooth Implementation of Smoking Control Measures in Workplaces

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Abstract: Questionnaire Survey and Environmental Measurements that Led to Smooth Implementation of Smoking Control Measures in Workplaces: Yuko SHIMIZU, et al. Komaki-kita Health Section, Nagoya Guidance & Propulsion Systems Works, Mitsubishi Nagoya Hospital, Mitsubishi Heavy Industries, Ltd.—In order to promote smoking countermeasures in a manufacturing plant, we conducted a questionnaire survey about smoking control measures in workplaces. Twenty nine point five percent of the subjects responded that they were exposed to passive smoking where they worked and that the most common source of passive smoking in the workplace and rest areas was environmental tobacco smoke (ETS) leaking from smoking areas. For smoking control measures, 27.8% of employees preferred a total ban on smoking in the building while 55.2% preferred measures to prevent ETS leakage from smoking areas. Regardless of whether they were smokers or not, 99.2% of respondents believed that passive smoking countermeasures in the workplace were necessary and 88.9% of smokers responded that banning smoking in the building was unavoidable. Based on these results, a total ban on smoking in the building was implemented in those workplaces where it was feasible to do so, smoking areas in the remaining workplaces were upgraded to prevent ETS infiltration, and the effects were evaluated by real-time monitoring of the concentration of suspended particle matter. The questionnaire survey results showed that 79.9% of

smokers were interested in smoking cessation, that awareness of the adverse health effects of smoking on the smoker and surrounding non-smokers and the nuisance it caused was significantly lower among smokers compared to non-smokers ($p < 0.01$), and that 65.5% of non-smokers believed that smoking was beneficial to the mental health of smokers, despite the fact that they had no experience of smoking themselves. Reporting these results to the Safety and Health Committee was found to be useful both in ensuring thorough segregation of smoking areas and in supporting smoking cessation programs in places where no previous action had been taken because smoking was viewed as a matter of personal choice. We also believe that provision of accurate information tailored to actual smoking conditions in the workplace is useful in effectively implementing anti-smoking campaigns on the adverse effects of smoking and smoking cessation programs. The implementation of a questionnaire survey and environmental measurements that lead to countermeasures was shown to be effective in establishing designated smoking areas and educational programs for smoking cessation.

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The objectives of smoking control measures in workplaces are firstly to prevent passive smoking from the viewpoints of working environmental control and creation of comfortable working environments, and secondly to reduce the smoking prevalence as part of

health management. Smoking control measures in workplaces in Japan have been promoted mainly from the aspect of prevention of passive smoking by implementing designated smoking areas in workplaces as described in the former Guidelines on Smoking Control in Workplaces¹⁾ released by the former Ministry of Labour in 1996. However, concrete methodology for implementing effective designated smoking areas was not described in the guidelines so that the leakage of environmental tobacco smoke (ETS) is often observed from smoking areas. The methodology for implementing effective designated smoking areas was introduced by the revised Guidelines on Smoking Control in Workplaces (2003)²⁾ but it is not well known among the general public. A total ban on smoking in the building is the best countermeasure in terms of both controlling passive smoking and encouraging smokers to quit. In Japan, however, the prevalence of smoking among males in 2003 was still high at 46.8% (National Survey on Nutrition, Japan) and the majority of people still think smoking is only a personal habit, so most managers think it would be difficult to introduce a total ban on smoking in workplaces. In addition, there are few workplaces that have already introduced smoking cessation programs as an activity of health management. This report describes the possible and practical methodology of introducing comprehensive smoking control in workplaces.

Subjects

The workplace in which the smoking control measures were implemented was a manufacturing plant with 2,000 employees (88% male, 12% female). Smoking control measures had been promoted mainly from the aspect of reducing passive smoking in accordance with the 1996 guidelines, installing exhaust fans and/or air-purifiers in designated smoking areas. There were 56 smoking areas at the beginning of this study. Half of them were smoking rooms and the remainder were only designated smoking corners without physical separation. There were several major problems with the designated smoking areas. Firstly, leakage of ETS from the smoking areas due to the usage of the wrong device "air-purifier"; secondly, the poor air quality in smoking rooms due to the low ventilation rates; and thirdly, the policy of designated smoking areas was not implemented in several resting rooms. As for the smoking cessation activities, the usual information on the adverse health effects of smoking were provided through the factory news and personal recommendations of cessation to smokers that were suffering from smoking related diseases by occupational health personnel.

Methods

1) Questionnaire survey

First, we conducted a self-administered questionnaire

about smoking in workplaces in January 2003. All workers were asked the following questions: 1) the present countermeasures against passive smoking in their workplaces and the average hours of passive smoking while at work; 2) the countermeasures against passive smoking they would like to see implemented in their workplaces; and, 3) their smoking habits. In addition, smokers were asked about: 4) their understanding of measures to control passive smoking in their workplaces and whether they would accept a total ban on smoking inside of the building where they worked; and, 5) their attempts to quit smoking. In order to examine the difference of the awareness of smoking, the following questions were analyzed by smoking status (non-smokers, ex-smokers and current smokers): 6) effects of active smoking on the health of smokers; 7) effects of passive smoking on the health of non-smokers; 8) degree of nuisance of passive smoking in workplaces; and 9) effects of smoking on smokers' mental health.

2) Assessment of leakage of ETS

Fifty-six smoking areas were inspected to find out whether there was leakage of ETS or not. The concentrations of suspended particulate matter (SPM) inside and outside of the smoking areas were measured in several typical cases. Digital dust monitors with a data logger (LD-3K, Scientific Technology, Ltd. Tokyo, Japan) were used for real-time monitoring of SPM concentrations as previously reported^{3,4)}.

Results

1) *Questionnaire: Of the total, 93.5% of questionnaires were returned. The major results of the questionnaire are shown in Table 1.*

a. Passive smoking at work

The results showed that 35.0% of respondents were exposed to passive smoking in the workplaces. In most cases, 70.0% of the cause of passive smoking was due to the leakage of ETS from smoking areas and the remaining cause was violation of the rules. Only 3.1% of workers were working in places where no countermeasure against passive smoking was implemented, and 4.5% of workers were exposed to passive smoking for more than one hour a day.

As for the desirable policy against passive smoking, 27.8% of workers preferred a total ban on smoking in the building while 55.2% preferred effective designated smoking rooms with adequate ventilation that can eliminate passive smoking. Of smokers, 99.2% accepted the implementation of designated smoking areas in workplaces, and 88.9% responded that they would follow the policy of total ban on smoking inside of the building.

b. Smoking prevalence and attempts to quit smoking

The percentage of current smokers was 36.1%; 2.8% were occasional smokers, 42.3% were non-smokers and

Table 1. Results of questionnaire about smoking in workplaces

1. Smoking status	(%)
Current smoker	36.1
Occasional smoker	2.8
Ex-smoker	19.0
Non-smoker	42.1
2. Current countermeasures reducing passive smoking	
Smoke-free	36.0
Designated smoking areas without leakage	29.0
Designated smoking areas with some leakage	24.5
Smoke-free but some violations of rules	5.5
Designated smoking areas with some violations	1.9
Smoking is allowed anywhere	3.1
3. Average hours of passive smoking during working hours	
Extremely short time	70.5
Less than one hour	25.0
Less than four hours	1.8
More than four hours	2.7
4. Desirable countermeasure for reducing passive smoking	
Total ban on smoking	27.8
Designated smoking rooms without leakage	55.2
Designated smoking rooms without leakage, not strict rule	8.0
Designated smoking areas	7.1
No-smoking hours	1.1
No need for smoking restriction	0.8
5. Acceptance of total ban on smoking (answered only by smokers)	
Positively accept	38.1
No choice (negatively accept)	50.8
Cannot be accepted	11.1
6. Attempt to quit smoking (answered only by smokers)	
Interested in quitting less than one month	13.3
Interested in quitting less than six months	19.7
Interested in quitting someday	46.9
No interest to quit smoking	20.1

19.0% were ex-smokers. We examined the relationship between smoking habits and awareness of smoking for three groups: non-smokers, ex-smokers and current smokers. We used the Cochran-Maetel-Haenszel test, setting 5% as the level of significance. The results are shown in Table 2. In response to the question concerning the adverse health effects of smoking on the smokers' health, 66.6% of non-smokers answered that it was "extremely harmful" versus 23.9% of current smokers. In response to the question concerning the adverse health effects of passive smoking among non-smokers, 73.0% of non-smokers answered that it was "extremely harmful" versus 35.4% of current smokers. Only 43.9% of current smokers responded that "passive smoking is a major nuisance at work" compared to 72.1% of non-smokers. The percentage that responded that "smoking is quite beneficial to reduce smokers' stress" or "of some benefit" was 65.5% even for non-smokers and 92.8% for current smokers. Significant differences ($p < 0.01$) between non-

smokers and current smokers were observed in the above responses.

2) Assessment of leakage of ETS

SPM concentrations inside and outside of the typical smoking areas were measured. An example of one the measurements is shown as follows. The number of cigarettes smoked per hour in this smoking room ranged from 25 to 30. As shown in Figure 1a, a large amount of ETS leakage was found and the average SPM concentration within the smoking room exceeded the administrative level of SPM ($=0.15 \text{ mg/m}^3$) described in the 1996¹⁾ and 2003²⁾ guidelines (Fig. 1b).

Implementation of smoking control based on the questionnaire and environmental measurements:

1. Eliminating passive smoking at work: total ban on smoking

The questionnaire revealed that the major cause of

Table 2. Relationship between smoking habits and awareness of smoking

Questions	Smoking status	Current smoker number (%)	Ex-smoker number (%)	Non-smoker number (%)	p
1) Effects of active smoking on the health of smokers	Extremely harmful	154 (23.9)	184 (60.3)	472 (66.6)	**
	Harmful	389 (60.3)	111 (36.4)	229 (32.3)	
	Some positive aspects exist	102 (15.8)	10 (3.3)	8 (1.1)	
2) Effects of passive smoking on the health of non-smokers	Extremely harmful	227 (35.4)	196 (62.0)	533 (73.0)	**
	Harmful	407 (63.5)	120 (38.0)	196 (26.9)	
	Some positive aspects exist	7 (1.1)	0 (0.0)	1 (0.1)	
3) Nuisance of passive smoking in workplaces	Major nuisance	281 (43.9)	213 (66.8)	522 (72.1)	**
	Mild discomfort	344 (53.8)	99 (31.0)	194 (26.8)	
	Causes no nuisance	15 (2.3)	7 (2.2)	8 (1.1)	
4) Effects of smoking on smokers' mental health	Not beneficial	45 (7.2)	83 (32.3)	140 (34.5)	**
	Some beneficial	445 (71.7)	166 (64.6)	242 (59.6)	
	Quite beneficial	131 (21.1)	8 (3.1)	24 (5.9)	

**p<0.01 between non-smokers and current smokers

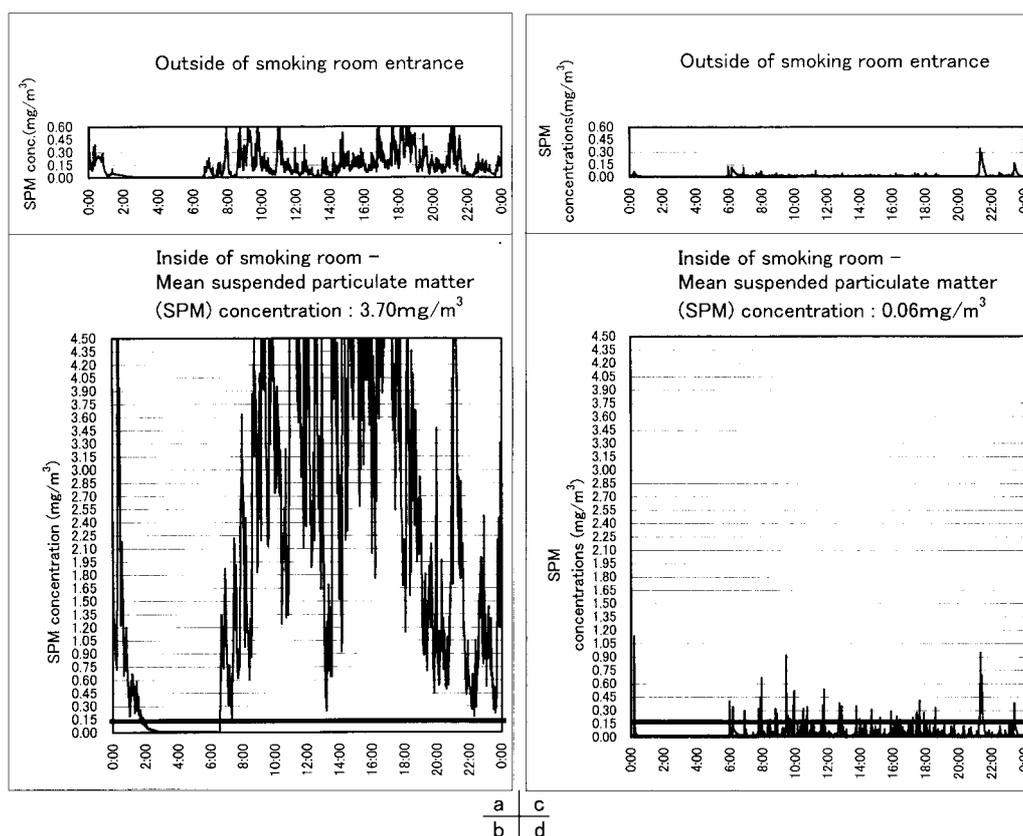


Fig. 1. Suspended particulate matter (SPM) concentration measured before and after the countermeasures.

passive smoking at work was the leakage of ETS from the smoking areas and more than 90% of smokers would accept a total ban on smoking. These results were reported to the occupational safety and health committee

which took and this initiated the drastic decision to move six indoor smoking areas to outdoor smoking areas.

b. Eliminating passive smoking at work: improvement of smoking areas

Those smoking rooms which continued in use were improved by enhancing the exhaust ventilation rates following the methodology described in the revised guidelines of 2003²⁾ and reported by Yamato *et al.*^{3,4)} As a result, ETS leakage was almost eliminated (Fig. 1c) and the average SPM concentration in the smoking room was improved (Fig. 1d).

3) Smoking cessation activities based on questionnaire survey

In responses to the questionnaire, 79.9% of smokers were interested in quitting. This was also reported to the occupational safety and health committee which decided to start a smoking cessation program in the factory clinic using nicotine replacement therapy. The responses to the questionnaire revealed that current smokers significantly underestimated the adverse health effects of active/passive smoking and the degree of annoyance caused by passive smoking. We highlighted these differences between smokers and non-smokers by using posters, factory news, personal comments from the occupational physician and nurses in order to encourage smokers to quit smoking.

Discussion

It is necessary to create mutual understanding between smokers and non-smokers when smoking control in workplaces is promoted. For that purpose, the objective results of the leakage of ETS from smoking areas and the questionnaire results that revealed smokers' underestimation of passive smoking were useful for promoting stricter countermeasures against passive smoking. Additionally, publicity of the questionnaire

results of non-smokers' misunderstanding about smoking (smoking is beneficial for smokers' stress reduction) and smokers' underestimation of health effects of active/passive smoking were useful for creating a negative atmosphere against smoking in the workplaces.

In this manner, we smoothly launched a comprehensive smoking control as a part of occupational health activities. It is expected that interactions of countermeasures against passive smoking, education of both non-smokers and smokers, and smoking cessation programs for smokers will show synergistic effects on changing smokers' behaviors.

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