Relationships between smoking habits and other behavior factors among males: From the Results of the 1990 National Cardiovascular Survey in Japan

Yosikazu Nakamura, Kiyomi Sakata, and Hiroshi Yanagawa

Relationships between smoking habits and other behavior factors such as habitual exercise, physical activities, and alcohol drinking habits were observed among Japanese males. Data used were obtained in The 1990 National Cardiovascular Survey in Japan, which consisted of 3826 males aged 30+ years selected from the Japanese population randomly. The proportion of current smokers was 53.5% in overall, and it decreased according to aging; these results were similar to Japanese former data. Those exercising habitually were more likely to be former smokers, whereas no relationship was observed between smoking habits and physical activities. Smoking and alcohol drinking habits were closely related; habitual drinkers were 3.34 times as likely to be current smokers as non-drinkers. Dose-response relationship was observed as well. Thus, the relationship between smoking and alcohol drinking habits was shown quantitatively.

Smoking, alcohol drinking, exercise, physical activities, confounding factors

Many researchers believe that smokers are more likely to drink alcohol beverages than non-smokers. Indeed, a previous review shows that many researches suggest the relationship, and recent studies also show the relations. In addition, smoking and alcohol drinking are independent risk factors of many diseases. Therefore, these factors were treated as confounding factors in many epidemiologic researches.

Several former studies have shown the relationship between smoking habits and alcohol consumption. Many of them, however, did not show quantitative evaluation of the relation, such as a relative risk of being smokers between non-drinkers and drinkers. Accordingly, the magnitude of effects between the two factors as confounding factors is still unclear.

Physical activity and exercise habits are also related to the smoking habits. However, there are few studies that show the quantitative relations, either.

In this study we analyzed random sampling data throughout Japan in 1990 and showed the relationships between smoking habits and other health-related behavior factors among men. The specific questions for this analysis are the following: 1) whether smoking habits are related to these other factors among Japanese males, and 2) how large the magnitude of these factors related to smoking habits is.

Methods

In Japan, nationwide surveys named The National Cardiovascular Survey have been held every 10 years. The fourth survey was in 1990 and this is the most recent one. We analyzed the data from the survey in 1990.

Approximately 12,000 individuals, age 30 years and over as of November 1, 1990, were drawn for the survey from among 20,000 members of approximately 6,000 households in 300 survey districts. These survey districts had been selected at random from districts designated for the 1990 National Livelihood Survey of households and household members in all parts of Japan.

The survey period was from November 1 to 30, 1990. During this period, the survey of circulatory disorders was conducted along with a study of physical condition, a nutrition survey covering three consecutive days in November 1990, and a diet study covering one day during this survey period. A questionnaire on circulatory disorders, which included questions about habitual exercise, daily physical activity, smoking habits, and alcohol consumption, was distributed in advance to each survey subjects. The subjects were asked to bring the questionnaire to the survey point. Because the proportion of current smokers among females was as small as 9.4%, we...
observed only males.

We analyzed only males who submitted the questionnaire. In the questionnaire, the information about habitual exercise was obtained using three categories; having a habit of exercise, not having, and being unable to have because of illness. Daily physical activities were divided into four categories that are usually used in Japan. They depend on both occupations and leisure time physical activities. The category I is the least active category, and the category IV is the most. Category I usually includes sedentary workers and housewives without infants and toddlers. Category II includes industry workers. Category III includes farmers and fishermen. Category IV includes farmers in the busy farming season and professional sportsmen. In this study we compared category I vs. categories II, III, and IV. Alcohol drinking habits were observed using three categories; non-drinker, former drinker, and habitual drinker. The habitual drinkers were those who drank alcohol beverages more than three times a week, and who drank more than 28g ethanol (one “go” of Japanese sake, or one large bottle of beer) once. The former drinkers were those who had been habitual drinkers for more than one year and who did not have the habit at the survey. The habitual drinkers were divided into two levels according to the daily average amount of ethanol intake; mild drinkers who drank <40g per day and heavy drinkers who drank more than or equal to 40g per day.

Smoking habits were analyzed using three categories; non-smoker, former smoker, and current smoker. In the survey, the non-smokers included those who had smoked temporarily (<one year) and had stopped, and the former smokers were defined as those who had smoked for more than one year and had stopped. In an observation of dose-response relationships, current smokers were divided into three categories; Mild smokers who smoked <15 cigarettes per day, moderate smokers who smoked 15 to 24 cigarettes per day, and heavy smokers who smoked more than or equal to 25 cigarettes per day.

Odds ratios (ORs) of being former smokers or current smokers vs. non-smokers between observed factors and their 95% confidence intervals (CIs), which we computed with the test-based method15), were calculated. All the odds ratios were adjusted for age by using the Mantel-Haenszel method16). An OR with 95% CI that did not include 1.0 was considered as statistically significant.

RESULTS

A total of 5036 males were the subjects of the survey, and 3826 (76.0%) responded the questionnaire survey. Table 1 shows the distribution of smoking habits according to age. For all ages, 24.2% were non-smokers, 22.3% former smokers, and 53.5% current smokers. The proportion of current smokers decreased according to aging, and that of the former smokers increased.

Table 2 shows the relationships between habitual exercise and smoking habits. In comparison with those having a habit of exercise, those not having were less likely to be former smokers (OR=0.62; 95% CI=0.49-0.77), and so were those being unable to have without statistical significance. Whether to engage in habitual exercise did not relate to the current smoking status.

As shown in Table 3, daily physical activity did not affect

Table 1. Smoking habits among males according to age, The 1990 National Cardiovascular Survey in Japan.

<table>
<thead>
<tr>
<th>age (year)</th>
<th>non-smoker</th>
<th>smoking habits</th>
<th>current smoker</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>165 (21.9)</td>
<td>107 (14.2)</td>
<td>482 (63.9)</td>
<td>754 (100)</td>
</tr>
<tr>
<td>40-49</td>
<td>245 (25.9)</td>
<td>161 (17.0)</td>
<td>541 (57.1)</td>
<td>947 (100)</td>
</tr>
<tr>
<td>50-59</td>
<td>255 (29.3)</td>
<td>177 (20.3)</td>
<td>439 (50.4)</td>
<td>871 (100)</td>
</tr>
<tr>
<td>60-69</td>
<td>134 (18.0)</td>
<td>225 (30.2)</td>
<td>386 (51.8)</td>
<td>745 (100)</td>
</tr>
<tr>
<td>70+</td>
<td>127 (25.0)</td>
<td>183 (36.0)</td>
<td>199 (39.1)</td>
<td>509 (100)</td>
</tr>
<tr>
<td>total</td>
<td>926 (24.2)</td>
<td>853 (22.3)</td>
<td>2047 (53.5)</td>
<td>3826 (100)</td>
</tr>
</tbody>
</table>

percentage in parentheses.

Table 2. The relationship between habitual exercise and smoking habits among males, The 1990 National Cardiovascular Survey in Japan (odds ratios in comparison with non-smokers and their 95% confidence intervals).

<table>
<thead>
<tr>
<th>habitual exercise</th>
<th>no.</th>
<th>former smoker</th>
<th>smoking habits</th>
<th>current smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>having</td>
<td>837</td>
<td>1.00 (reference)</td>
<td>1.00 (reference)</td>
<td></td>
</tr>
<tr>
<td>not-having</td>
<td>2771</td>
<td>0.62 (0.49-0.77)</td>
<td>0.93 (0.76-1.13)</td>
<td></td>
</tr>
<tr>
<td>unable</td>
<td>218</td>
<td>0.70 (0.45-1.07)</td>
<td>0.81 (0.56-1.18)</td>
<td></td>
</tr>
</tbody>
</table>

95% confidence intervals in parentheses. adjusted for age.
Table 3. The relationship between physical activity and smoking habits among males, The 1990 National Cardiovascular Survey in Japan (odds ratios in comparison with non-smokers and their 95% confidence intervals).

<table>
<thead>
<tr>
<th>physical activity</th>
<th>no.</th>
<th>former smoker</th>
<th>smoking habits</th>
<th>current smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1896</td>
<td>1.00 (reference)</td>
<td>1.00 (reference)</td>
<td></td>
</tr>
<tr>
<td>II, III, and IV</td>
<td>1930</td>
<td>0.97 (0.80-1.18)</td>
<td>1.19 (1.01-1.39)</td>
<td></td>
</tr>
</tbody>
</table>

95% confidence intervals in parentheses. Adjusted for age.

Table 4. The relationship between alcohol drinking habits and smoking habits among males, The 1990 National Cardiovascular Survey in Japan (odds ratios in comparison with non-smokers and their 95% confidence intervals).

<table>
<thead>
<tr>
<th>drinking habits</th>
<th>no.</th>
<th>former smoker</th>
<th>smoking habits</th>
<th>current smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-drinker</td>
<td>1446</td>
<td>1.00 (reference)</td>
<td>1.00 (reference)</td>
<td></td>
</tr>
<tr>
<td>former drinker</td>
<td>262</td>
<td>4.12 (2.76-6.14)</td>
<td>2.68 (1.83-3.91)</td>
<td></td>
</tr>
<tr>
<td>habitual drinker</td>
<td>2118</td>
<td>2.81 (2.30-3.44)</td>
<td>3.34 (2.84-3.94)</td>
<td></td>
</tr>
</tbody>
</table>

95% confidence intervals in parentheses. Adjusted for age.

DISCUSSION

In this study, we have shown the relationship between smoking habits and alcohol drinking habits. Former drinkers were more likely to be former and current smokers. Habitual drinkers were also likely to be former and current smokers. Figure shows the dose-response relationships between the two habits. Heavy drinkers had higher ORs for current smokers than mild drinkers. Mild drinkers were more likely to be mild smokers than to be moderate or heavy smokers; Among the mild drinkers, ORs were 3.32 (95% CI=2.44-4.53) for mild smokers, 2.59 (95% CI=2.07-3.24) for moderate smokers, and 1.84 (95% CI=1.41-2.39) for heavy smokers. Heavy drinkers had similar ORs for three levels of current smoking (4.76 for mild smokers, 4.01 for moderate smokers, and 5.27 for heavy smokers). Former drinkers were more likely to be former smokers and mild smokers than moderate and heavy smokers. All the ORs in the Figure were statistically significant.

The proportion of current smokers among males is extremely high in comparison with other developed countries, which has been pointed out so far. The proportion was 53.5% (Table 1) and this is similar to former data in this country. In addition, the tendency that the proportion of current smokers decreased according to aging is also comparable. This fact indicates that the examined population of the study represented the whole Japanese males.

Our data suggested that those with an exercise habit were more likely to stop smoking than those without the habit (Table 2). The result implies that habitual exercises affects the smoking habits. For example, if one starts exercise habitually and becomes short of breath because of the exercise, and then one quit smoking, the observed phenomenon is reasonable.

Habitual drinkers were 3.34 times as likely to be current smokers as non-drinkers (Table 4). The relationship has been pointed out in former studies in Western counties, and we have shown the relationship quantitatively as well. Besides, these are the first data in Japanese male population, in which the proportion of current smokers is as high as more than 50%. The previous and current studies indicate that smoking habits and alcohol consumption are related each other so that they should be treated as confounding factors each other in an epidemiologic study. The OR of 3.34 shows a large magnitude as the confounders. Other smoking and drinking status, such as ex-smoking and ex-drinking, are also related.

The OR between former smokers and former drinkers was the highest in Table 4. This may be due to the fact that those who stopped both smoking and alcohol drinking include patients that physicians ordered to stop them and peoples who had to give up them according to bad physical conditions.

As shown in the Figure, heavy drinking did not relate to the amount of cigarettes in the current smokers. On the other hand, mild drinkers were more likely to be mild smokers than to be moderate and heavy smokers. ORs of heavy smokers were higher than those of mild drinkers in any levels of smoking habits; accordingly there is a dose-response relationship...
between the two habits. Former drinkers were more likely to be mild smokers than mild drinkers were. This implies that some patients or those with bad physical conditions had stopped alcohol consuming and reduced the number of cigarettes a day.

In conclusion, we have shown the relationship between smoking habits and alcohol drinking habits quantitatively among Japanese males using a large random-sampling study.

**REFERENCE**