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ORIGINAL

Factors which influence pupils to smoke in Japan

Asae OURA[1)], Masakazu WASHIO[1)], Shang ERHUA[1)],
Shuichi WATANUKI[2)], Mika IWATA[3)], Mitsuru MORI[1)]

[1)] Department of Public Health, School of Medicine, Sapporo Medical University (Chief: Prof. M. Mori)

[2)] Faculty of Science Division, Tokyo University of Science

[3)] Human Development and Educational Practice, Graduate school of Education, Hokkaido University

ABSTRACT

The goal of the present study was to investigate the factors related to student tobacco smoking. From December 2003 to March 2004, 426 students (94.9% of those asked) answered a questionnaire. Adjusted for sex, department, and knowledge about smoking, students who had experiences with alcohol consumption were revealed to be at significant risk of experiencing smoking up to the 3rd grade of elementary school (OR=20.69), up to the 6th grade of elementary school (OR=3.88), up to the 3rd grade of junior high school (OR=5.57), and up to the 3rd grade of senior high school (OR=5.93). Adjusted for the same factors, those having a brother who smoked were revealed to be at a significant risk (OR=2.74) of smoking. Additionally, having a friend who smoked was revealed to be associated with significant risk of being introduced to smoking for first time up to the 3rd grade of elementary school (OR=16.35), from the 4th to 6th grades of elementary school (OR=9.00), throughout junior high school (OR=6.11), and throughout senior high school (OR=2.78). It is known that tobacco smoking is highly addictive, and therefore, the Japanese Government should intervene to find ways to help smokers quit smoking and additionally promote an anti-smoking education for pupils and students.

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Key words: Smoking, Alcohol Drinking, Tobacco, Pupil, Child

1 INTRODUCTION

In 1970, the World Health Association (WHA) made a global proclamation about the adverse effects of smoking[1)]. Previous reports showed smoking to be harmful to one's health[2,3)]. Smoking is one of the major risk factor associated not only with different type of cancers[2,3)], but also for other chronic diseases such as coronary disease[4)]. According to the World Health Organization (WHO)[3)], 4 million people die every year as a result of smoking which is more than the combined number of deaths caused by malaria, tuberculosis, AIDS, and several major maternal and childhood conditions. As adolescent smoking has increased worldwide[5)], health education programs have been designed with the aim of prevention.

In Japan, pupils begin to learn the damage caused by cigarettes from the 5th grade of elementary school[6)]. Though smoking under 20 years old is prohibited by law in Japan, it is reported that many junior and senior high school students experience smoking[7,8)]. Dependency on nicotine from cigarettes develops very quickly, therefore educating students is very important to prevent smoking among adolescents. The present study was aimed at investigating the factors related to early experiences of smoking among students.

2 METHODS

2.1 Subjects

Six university students in Japan helped to administer the study: students from 2 universities in Hokkaido, Japan, formerly of the school of medicine and dentistry before beginning professional training, and students from five other universities who were formerly students of non-medical courses in Hokkaido and Tokyo, Japan. We handed out a self-administered questionnaire to 449 students from December 2003 to March 2004, and 426 students (94.9%) answered the questionnaire. The students were 306 males (71.8%) and 120 females (28.2%) with a mean age (± standard deviation; SD) of 20.4 (± 2.1) years old. Current smokers included 74 students (17.4%).

2.2 Questionnaire

All students were questioned about their experiences regarding cigarette smoking and alcohol drinking in elementary school, junior high school, senior high school,

and university as well as their current status. Other questions included: who smokes at home, the smoking situation of close friends pertaining to each school age, and personal knowledge about long-term effects of tobacco smoking.

2.3 Analysis

Statistical analyses were performed using the Statistical Package for Social Science (SPSS). The Chi-square test and Fisher's exact probability test were used to compare each group. The Odd ratios (OR) of smoking experience by school age and 95% confidence intervals (CIs) were estimated with logistic regression analysis. A level of 0.05 was determined to be the critical level of significance.

3 RESULTS

The rate of experience by school age and the rate of current smokers among university students are shown in Fig. 1. For male students, 131 (42.8%) had experienced smoking, including 64 (20.9%) current smokers. The rate of students who had experienced smoking increased as students advanced in grade: 9 students (2.9%) up to the 3rd grade of elementary school (up to 9 years old), 25 students (8.2%) up to the 6th grade of elementary school (up to 12 years old), 65 students (21.2%) up to the 3rd grade of junior high school (up to 15 years old), and 104 students (34.0%) up to the 3rd grade of senior high school (up to 18 years old). For female students, 23 (19.2%) had experienced smoking, including 10 (8.3%) current smokers. The rate of students who had the experience of smoking increased as students advanced in grade: 1 student (0.8%) up to the 3rd grade of elementary school, 1 student (0.8%) up to the 6th grade of elementary school, 5 students (4.2%) up to the 3rd grade of junior high school, and 15 students (12.5%) up to the 3rd grade of senior school. Male students who had experienced smoking were more prevalent up to the 6th grade of elementary school, the 3rd grade of junior high school, and up to the 3rd grade of senior school. Additionally, the study showed more males currently smoking than females. A result not shown in the table is that students who had stopped smoking experienced smoking for the first time as follows; 7 students (8.7%) up to the 3rd grade of elementary school, 8 students (10.0%) from the 4th to 6th grade of elementary school, 19 students (23.8%) through-

Table 1 Comparison between drinking experience and no drinking experience by each school age; smoking experience rate by each school age

Strata	Gender	Drinking status	Smoking experience rate by each school age	P-value[#1]	Odd ratio[#2](95%CIs)
E3	male	Drinking experience (n=39)	6 (15.4%)	<0.01	20.69
		No drinking experience (n=267)	3 (1.1%)		(5.00, 85.55)
	female	Drinking Experience (n=13)	1 (7.7%)	0.11	
		No drinking experience (n=107)	0 (0%)		
E6	male	Drinking Experience (n=78)	13 (16.7%)	<0.01	3.88
		No drinking experience (n=228)	12 (5.3%)		(1.70, 8.86)
	female	Drinking experience (n=17)	1 (5.9%)	0.16	
		No drinking experience (n=103)	0 (0%)		
J3	male	Drinking experience (n=133)	49 (36.8%)	<0.01	5.57
		No drinking experience (n=173)	16 (9.2%)		(3.05, 10.18)
	female	Drinking experience (n=36)	3 (8.3%)	0.16	
		No drinking experience (n=84)	2 (2.4%)		
S3	male	Drinking experience (n=214)	95 (44.4%)	<0.01	5.93
		No drinking experience (n=92)	9 (9.8%)		(3.11, 11.30)
	female	Drinking experience (n=74)	11 (14.9%)	0.40	
		No drinking experience (n=46)	4 (8.7%)		

#1: Chi-square test or Fisher's exact probability test
#2: adjusted for sex, department of medicine and dentistry, and knowledge about long-term effects of cigarette smoking
E3: up to the 3rd grade of elementary school
E6: up to the 6th grade of elementary school
J3: up to the 3rd grade of junior high school
S3: up to the 3rd grade of senior high school

out the entirety of junior high school, and 27 students (12.5%) throughout the entirety of senior high school. Students who were still smoking experienced smoking for the first time as follows; 3 students (4.1%) up to the 3rd grade of elementary school, 8 students (11.0%) from the 4th to 6th grade of elementary school, 25 students (34.2%) throughout the entirety of junior high school, and 22 students (30.1%) throughout the entirety of senior high school. There was no significant relationship between students who stopped smoking and students who were still smoking in reference to age at the first time.

Table 1 presents a comparative analysis linking the rate of smoking experience with the rate of drinking experience for each school age. For male students, experience with drinking alcohol was positively associated with smoking experience up to the 3rd grade of elementary school, the 6th grade of elementary school, the 3rd grade of junior high school, and up to 3rd grade of senior high school. Adjusted for sex, department, and knowledge about smoking, students who had experience with alcohol consumption were found to be at a significantly high risk of experiencing smoking up to the 3rd grade of elementary school (OR=20.69, 95%CIs=(5.00,85.55)), the 6th grade of elementary school (OR=3.88, 95%CIs=(1.70,8.86)), the 3rd grade of junior high school (OR=5.57, 95%CIs=(3.05,10.18)), and the 3rd grade of senior high school (OR=5.93, 95%CIs=(3.11, 11.30)).

Table 2 shows the relationship between smoking experience of student and his/her family smoking. Male students who had experienced smoking were more likely to have a brother or sister who smoked than students who had no experience smoking. Female students who had experienced smoking were more likely to have a mother or brother who smoked than those without experience of smoking. Adjusted for sex, department, and knowledge about smoking, having a brother who smoked was posi-

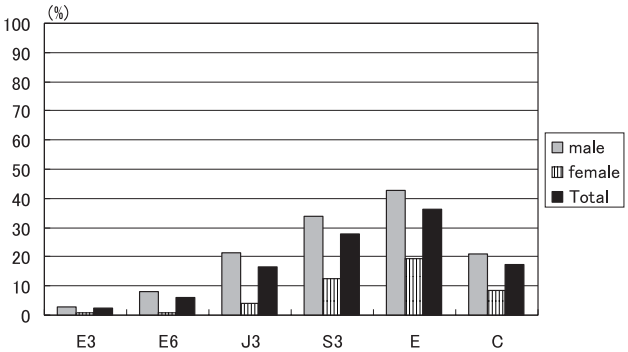

Fig1 The rate of smoking experience by school age and the rate of current smokers among university students

E3: up to the 3rd grade of elementary school
E6: up to the 6th grade of elementary school
J3: up to the 3rd grade of junior high school
S3: up to the 3rd grade of senior high school
E: smoking experience until now
C: current smoker

Table 2 Comparison between having a family member who smoked and not; smoking experience rate

Relation	Gender	Smoking status of family member	Smoking experience rate	P-value#1	Odd ratio#2(95%CIs)
Father	male	Smoked (n=133)	52 (39.1%)	0.25	0.79
		Did not smoke (n=173)	79 (45.7%)		(0.52, 1.21)
	female	Smoked (n=47)	8 (17.0%)	0.81	
		Did not smoke (n=73)	15 (20.5%)		
Mother	male	Smoked (n=38)	15 (39.5%)	0.66	1.43
		Did not smoke (n=268)	116 (43.3%)		(0.63, 2.69)
	female	Smoked (n=13)	6 (46.2%)	0.02	
		Did not smoke (n=107)	17 (5.6%)		
Brother	male	Smoked (n=60)	38 (63.3%)	<0.01	2.74
		Did not smoke (n=246)	93 (37.8%)		(1.61, 4.66)
	female	Smoked (n=22)	8 (36.4%)	0.04	
		Did not smoke (n=98)	15 (15.3%)		
Sister	male	Smoked (n=18)	12 (66.7%)	0.05	2.17
		Did not smoke (n=288)	119 (52.2%)		(0.90, 5.21)
	female	Smoked (n=6)	1 (16.7%)	1.00	
		Did not smoke (n=114)	22 (19.3%)		

#1: Chi-square test, Fisher's exact probability test
#2: adjusted for sex, department of medicine and dentistry, and knowledge about long-term effects of cigarette smoking

Table 3 Comparison between having friends who smoked and not by each school age; smoking for first time by each school age

Strata	Gender	Smoking Status of a friend	Smoking for the first time	P-value[#1]	Odd ratio[#2](95%CIs)
L_E3	male	Had a friend who smoked (n=6)	2 (33.3%)	0.01	16.35
		Did not have a friend who smoked (n=300)	7 (2.3%)		(2.57, 103.88)
	female	Had a friend who smoked (n=1)	0 (0%)	1.00	
		Did not have a friend who smoked (n=119)	1 (0.8%)		
E4_E6	male	Had a friend who smoked (n=38)	8 (21.1%)	<0.01	9.00
		Did not have a friend who smoked (n=268)	8 (3.0%)		(3.07, 26.42)
	female	Had a friend who smoked (n=6)	0 (0%)	-	
		Did not have a friend who smoked (n=114)	0 (0%)		
J1_J3	Male	Had a friend who smoked (n=203)	36 (17.7%)	<0.01	6.11
		Did not have a friend who smoked (n=103)	4 (3.9%)		(2.11, 17.68)
	female	Had a friend who smoked (n=50)	4 (8.0%)	0.03	
		Did not have a friend who smoked (n=70)	0 (0%)		
S1_S3	male	Had a friend who smoked (n=237)	34 (14.3%)	0.15	2.78
		Did not have a friend who smoked (n=69)	5 (7.2%)		(1.52, 5.07)
	female	Had a friend who smoked (n=78)	10 (12.8%)	0.01	
		Did not have a friend who smoked (n=42)	0 (0%)		

#1: Chi-square test or Fisher's exact probability test
#2: adjusted by sex, department of medicine and dentistry, and knowledge about long-term effects of cigarette smoking
L_E3: before the 3rd grade of elementary school
E4_E6: from the 4th to 6th grades of elementary school
J1_J3: from the 1st to 3rd grades of junior high school
S1_S3: from the 1st to 3rd grades of senior high school

tively associated with a significant risk of experiencing smoking (OR=2.74, 95%CIs=(1.61, 4.66)).

Distribution of each school age in which students smoked for the first time, and the association with having a friend who smoked are shown in Table 3. Male students who had experienced smoking were more likely to have a friend who smoked up to the 3rd grade of elementary school, from the 4th to 6th grades of elementary school, and throughout the entirety of junior high school. Female students who had experienced smoking were more likely to have a friend who smoked during the subjects' tenure as a junior and senior high school student. Adjusted for sex, department, and knowledge about smoking, having a friend who smoked was positively associated with a significant risk of smoking for first time up to the 3rd grade of elementary school (OR=16.35, 95%CIs=(2.57,103.88)), from the 4th to 6th grades of elementary school (OR=9.00, 95%CIs=(3.07, 26.42)), throughout the entirety of junior high school (OR=6.11, 95%CIs=(2.11, 17.68)) and the entirety senior high school (OR=2.78, 95%CIs=(1.52, 5.07)).

4 DISCUSSION

In the present study, of the 426 students surveyed. 131 male students (42.8%) had experienced smoking and 23 female students (34.0%) had experienced smoking. Nicotine dependency is known to occur as a result of cigarette smoking, making it difficult to stop smoking once one begins. As defined by the International Classification of Diseases (ICD)-10, cigarette dependency is categorized in the same manner as dependency on drug or alcohol. It is listed under the category of "Mental and behavioral disorders due to psychoactive substance use". Since the 1960s in both Europe and the United States the negative health issues associated with cigarette smoking have been clearly defined, positive non-smoking support and education promoting the prevention of smoking have been performed, and the lung cancer death rates among young people have decreased[9]. In Japan however also, the death rate associated with lung cancer has actually increased among those 55 years old and older[9]. In the present study, 10 students (2.3%) had experienced smoking before reaching the 3rd grade of elementary school. Thus, a health education program with the explicit aim of preventing smoking among elementary and junior high school students should be initiated immediately, as it may be too late to start anti-smoking education from the 5th grade of elementary school for many pupils.

Previous studies[8,10] have shown the connection between drinking and smoking among high school students, which supports the results of our study. Our previous study[11] showed that students generally started drinking alcohol earlier than smoking and that smoking and drinking had some connection. In fact, the present study showed that for students of all school ages, drinking experience had a positive association with a significant risk of smoking experience. If adults adopt the notion that smoking is worse than drinking, as it pertains to their child's health, they are more prone to condone their child to drink. However, children who experience drinking are more likely to experience smoking. Thus, it is necessary to warn adults of the consequences of giving children the opportunity to drink.

The present study revealed a positive association between having a brother who smoked and being at significant risk (OR=2.74) of having a smoking experience. Zhu et al[12] reported that having brother or sister who smoked was revealed as a positive association with being at risk of smoking. The result of the present study was consistent with those of the previous study. In the previous study[13], a mother's smoking habit was found to influence whether a child would have a smoking experience. Although relevance was examined by analysis only for a female student in this study, after making adjustments, the relevance faded way. Smoking at home is not only a problem concerning passive smoking, but also affects the student's tendency to develop a smoking habit.

Those who had friends who smoked were more likely to experience smoking themselves. These findings may mirror those of the previous study[14]. If a student declines the offer to smoke when offered a cigarette by a friend, he or she may be afraid of being rejected or alienated from the friend. Therefore, even if a student has no interest in smoking, they might be pressured into doing it by their peers. In future research we would like to investigate the reasons that motivate a student to smoke for the first time. The percentage of senior high school students from countries around the world who partake in smoking have been reported as follows: 25.5% in Japan[15], 21.0% in China[16], 28% in the USA[17], and 27% in Australia[18]. It is evident that the Japanese Government should take more affirmative measures in promoting anti-tobacco campaigns, particularly targeting young students.

Certain limitations to our study should be disclosed. First, the design of the present study was cross-sectional and therefore it was hard to understand the inter-relational factors in terms of cases or results. Second, this study does not geographically represent the entirety of Japan. Third, the number of subjects was insufficient.

5 CONCLUSION

Students who experienced smoking were more likely to have some experience drinking alcohol. Also, having a brother who smokes had some influence on whether the student sibling experienced smoking. Similarly, having a friend who smoked was also positively associated with whether a student experienced smoking.

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Correspondence:
Asae Oura
Department of Public Health, School of Medicine, Sapporo Medical University
Chuo-ku Minami-1 Nishi-17, Sapporo, Hokkaido, 060-8556, Japan

青少年の喫煙行動に及ぼす関連要因

大浦麻絵[1)]，鷲尾昌一[1)]，尚　爾華[1)]，
綿貫秀一[2)]，岩田美香[3)]，森　満[1)]

[1)] 札幌医科大学医学部公衆衛生学（主任　森満　教授）

[2)] 東京理科大学理学部教育学

[3)] 北海道大学大学院教育学研究科

青少年の喫煙行動に関連する要因を明らかにする目的で，2003年12月から2004年1月まで調査を行い，計426人（94.9％）の大学生から回答を得た．性，医療系非医療系，喫煙に関する知識を補正した後，小学3年生まで，小学6年生まで，中学校3年まで，高校3年までに飲酒を経験していた者はその学齢までに喫煙を経験していた者が多かった．各Odd比は，小学3年生まで（OR = 20.69），小学校6年生まで（OR = 3.88），中学校3年まで（OR = 5.57），高校3年まで（OR = 5.93）であった．同じ要因を補正後，兄弟が喫煙をしている者は喫煙経験をしている者が多かった（OR = 2.74）．同じ要因を補正後，各学齢時に友人が喫煙している場合，その学齢時に初めての喫煙行動をする者が多かった．各Odd比は，小学校3年まで（OR = 16.35），小学校4年から6年までの間（OR = 9.00），中学1年から3年までの間（OR = 6.11），高校1年から3年までの間（OR = 2.78）であった．青少年期の喫煙が健康に及ぼす影響が大きいことより，青少年に対する喫煙防止教育を推進することが望まれる．