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Susceptibility to initiate smoking among junior and senior high school nonsmokers in Taiwan ☆

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ABSTRACT

Objectives. Most smokers begin using tobacco in their teens and recent reports indicate that smoking prevalence is climbing among youth in Taiwan. The purpose of this paper was to determine the associated factors of susceptibility of youth smoking by different types of schools.

Methods. A total of 4689 junior high students and 3918 senior high students participated in a school-based survey to determine the associated factors of susceptibility of youth smoking through anonymous self-administered questionnaire in 2004–2005.

Results. Susceptibility to initiate smoking ranged from 11.3% for junior high to 12.7% for general senior high and 12.4% for vocational senior students. For all/male smoking-susceptible students, more junior high students had one or more parents or best friends who smoked than did general or vocational senior high students. For all/female smoking-susceptible students, significantly more junior high students experienced secondhand smoke in public places than did non-susceptible students.

Conclusions. Developing tailored, comprehensive smoking-prevention programs for junior high students should involve establishing tobacco-free households and communities.

Introduction

The worldwide burden of tobacco-related deaths has shifted in the past decade from developed to developing countries, where smoking prevalence is rising and tobacco markets are now open to foreign companies. With this trend, 46.8% of adult men and 4% of adult women in Taiwan are smokers. Furthermore, the age at which people in Taiwan start smoking has declined (Cheng et al., 2003). After Taiwan opened its tobacco market to foreign companies, the smoking prevalence for young adult males increased 13% (Wen et al., 2005).

To reduce smoking prevalence, a necessary step in comprehensive tobacco control efforts is preventing the onset of smoking. Susceptibility, defined as the absence of a firm decision not to smoke, has been associated in western countries with positive attitudes toward tobacco use, peer smoking, and not feeling social pressure to not smoke cigarettes (Pierce et al., 1996; Buller et al., 2003; Castrucci et al., 2002). However, little is known about the susceptibility to initiate smoking among Asian youth, particularly the effects of school type.

Methods

Sample

Schools were selected for participation proportional to enrollment by school type, and classes were selected through systematic random selection within schools in 2004 and 2005, respectively. Of the 52 junior and 53 senior high schools selected, all participated for a response rate of 100%. Of the 4834 junior high and 4195 senior high students, 4689 and 3918 completed usable surveys, for response rates of 97.0% and 93.4%, respectively. For senior high schools, 2074 students attended general schools and 1844 attended vocational schools.

Measures

The Chinese-version GYTS questionnaire with adequate validity and reliability was developed using a cross-cultural adaptation process (Chen et al., 2008a). The Cronbach's alpha of subscale related with susceptibility was 0.94. Formal invitation letters were mailed to principals of all participating schools by the Ministry of Education. Passive consent was obtained from every student by delivering parent-notification letters to their parents before data collection. Student respondents' anonymity was ensured by anonymous self-administration of questionnaires.

Statistical analyses

Chinese-version GYTS data were weighted to adjust for sample selection, non-response, and post-stratification of the sample relative to grade and sex distribution in the total population. Weighted estimates and their standard errors were computed using SUDAAN, version 7.5 (Shah et al., 1997).

Abbreviation: GYTS, Global Youth Tobacco Survey.

☆ Author contributions: PC participated and supervised the design and administration of the study and performed the statistical analysis. WH participated in the design and administration of the study, helped perform the statistical analysis. KC conceived of the study and participated in the design of the study. All authors read and approved the final manuscript.

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Results

Never smokers and smoking susceptibility

Overall, the proportion of never smokers decreased from 74.5% among those in junior high to 66.0% for those in general senior high and 53.3% for those in vocational high school (Table 1). Among junior high students overall and for girls, the percentage of never smokers decreased significantly from grades 1 to 3. For junior high boys, the proportion of never smokers decreased significantly from grades 1 to 2. Among senior high students of both genders, the percentage of never smokers decreased from grades 1 to 3, but not significantly. Junior high and general senior high girls were significantly more likely than their male peers to have never smoked. However, no gender differences were found between students in general and vocational high schools in grades 1, 2, and 3. Significantly more girls in general senior high school (75.8%) were never smokers than girls in vocational senior high (57.8%).

Among never smokers, susceptibility to initiate smoking in the next year ranged from 11.3% overall among junior high students to 12.7% for general senior high students and 12.4% for vocational senior students (Table 1). Junior high girls overall and in grade 1 were significantly less susceptible to initiate smoking than boys, but no gender differences were found for grades 2 and 3. At the senior high school level, smoking susceptibility did not differ significantly by gender.

Never smokers exposed to environmental tobacco smoke

Among susceptible students or boys overall, more junior high school students (56.7%) had one or more parents who smoked than general senior high students (36.8%) or vocational senior high students (55.4%; Table 2). Among susceptible female students, however, more vocational senior high students (62.6%) had one or more parents who smoked, compared to 53.2% and 34.5% junior high and general senior high school girls, respectively. Although susceptible and non-susceptible junior high students did not differ significantly in terms of having one or more parents who smoked, significantly more susceptible junior high students (58.3%) than non-susceptible students (43.9%) of both genders were exposed to secondhand smoke at home. Significantly more susceptible junior high students overall (4.2%) or boys (5.1%) than non-susceptible students (overall: 1.4%; boys: 1.5%) had best friends who smoked. Significantly more susceptible junior high students overall (64.7%) and girls (68.8%) than non-susceptible students (overall: 54.8%; girls: 56.8%) were exposed to secondhand smoke in public places.

Discussion

This study found that the majority of students in Taiwan were nonsmokers in their first year of junior high school (74.5%), but this percentage decreased to 59.9% in the highest grade of general senior high school and even lower (45.0%) in the highest grade of vocational senior high school. The social expectations for students and the campus ambiance are quite different for these two types of schools. In fact, the percentage of never smokers among Taiwanese vocational high students in 2001 (53.3%) was even lower than among young adults, ages 18 to 24 (65.4%) (Cheng et al., 2003).

Our study results indicate that the percentage of junior (11.3%) or senior (12.7%) high school students susceptible to smoking in Taiwan is lower than that of the US (21.3% and 22.9% for US junior and senior high, respectively) (Marshall et al., 2006), consistent with the lower smoking prevalence among Taiwan teenagers (5.5% for junior high, 10.1% for general senior high, Chen et al., 2008b than for US teens (8.7% for eighth-grade students, 14.5% for tenth graders, and 21.6% for twelfth graders (Johnston et al., 2007). However, the susceptibility to initiate smoking in Taiwan was higher than that of neighboring countries such as Thailand (9.0%) and China (7.0% in Shanghai, 6.8% in Tianjin, 5.7% in Zhuhai) (CDC, 2008).

Our study found that 2 to 3 times more smoking-susceptible than non-susceptible students had best friends who smoked cigarettes. The smoking experience of significant others such as parents and peers

Table 1
Distribution of never smokers and smoking-susceptible youth in Taiwan by gender and grade, Global Youth Tobacco Survey, 2004 (junior high) and 2005 (senior high).

[Sample size]	Never smokers[a] (%)			Susceptible to smoking[b] (%)		
	Total (95% CI)	Males (95% CI)	Females (95% CI)	Total (95% CI)	Males (95% CI)	Females (95% CI)
Junior high	74.5	69.2	80.2	11.3	13.6	9.5
[4689]	(72.2–76.6)	(67.0–71.3)	(77.8–82.4)	(10.1–12.7)	(11.5–16.0)	(8.0–11.1)
Grade 1	80.0	76.1	84.6	9.4	12.6	6.3
[1654]	(76.7–82.9)	(72.3–79.6)	(80.9–87.8)	(7.9–11.2)	(10.1–15.5)	(4.8–8.2)
Grade 2	73.6	67.6	80.0	13.4	15.2	12.0
[1632]	(69.7–77.2)	(63.1–71.8)	(76.3–83.3)	(11.8–15.1)	(13.0–17.6)	(9.4–15.3)
Grade 3	69.7	63.8	76.2	11.5	13.4	10.0
[1335]	(65.3–73.8)	(58.3–69.0)	(72.1–79.8)	(9.2–14.2)	(9.6–18.5)	(7.2–13.7)
Senior high — general	66.0	56.7	75.8	12.7	14.8	11.4
[2074]	(56.8–74.2)	(44.5–68.2)	(69.8–80.9)	(10.1–15.9)	(11.0–19.5)	(8.6–15.1)
Grade 1	72.9	63.8	81.4	11.9	16.6	8.9
[705]	(61.6–81.9)	(44.1–79.8)	(68.8–89.7)	(7.6–18.2)	(10.3–25.9)	(5.4–14.2)
Grade 2	64.4	57.5	73.9	13.4	15.0	12.1
[711]	(51.7–75.3)	(41.5–72.1)	(61.9–83.1)	(9.6–18.3)	(9.3–23.2)	(7.9–18.1)
Grade 3	59.9	46.9	71.0	13.1	11.2	14.2
[658]	(48.3–70.5)	(33.6–60.6)	(60.2–79.8)	(8.8–19.2)	(4.5–25.2)	(9.2–21.2)
Senior high — vocational	53.3	49.6	57.8	12.4	12.5	12.3
[1844]	(46.8–59.7)	(41.9–57.4)	(49.5–65.7)	(9.8–15.6)	(8.4–18.2)	(9.0–16.4)
Grade 1	55.4	55.0	56.9	13.0	14.3	11.2
[690]	(45.6–64.8)	(41.0–68.2)	(45.8–67.4)	(8.9–18.6)	(9.1–21.8)	(6.1–19.8)
Grade 2	57.6	50.1	63.7	10.5	10.0	11.2
[662]	(46.2–68.3)	(34.1–66.1)	(49.4–75.9)	(6.4–16.8)	(4.0–23.0)	(6.3–19.0)
Grade 3	45.0	40.5	50.0	14.5	12.2	16.0
[492]	(36.8–53.4)	(31.6–50.0)	(37.3–62.6)	(7.8–25.5)	(2.8–40.4)	(8.7–27.5)

[a] Students who have never smoked cigarettes, even one or two puffs.
[b] Students who have never smoked cigarettes but will smoke if their best friends offered a cigarette in the next 12 months.

Table 2
Distribution of never smoking students in Taiwan exposed to environmental tobacco smoke by susceptibility, gender, and grade, Global Youth Tobacco Survey, 2004 (junior high) and 2005 (senior high).

	Never smokers[a] (%)					
	Susceptible[b] (%)			Not susceptible to smoking (%)		
	Total (95% CI)	Male (95% CI)	Female (95% CI)	Total (95% CI)	Male (95% CI)	Female (95% CI)
Students with one or more parents who smoked						
Junior high	56.7 (51.0–62.3)	59.4 (52.2–66.3)	53.2 (44.8–61.4)	50.7 (48.1–53.3)	49.4 (45.7–53.2)	51.8 (48.7–55.0)
Senior high — general	36.8 (28.1–46.6)	39.2 (26.3–53.9)	34.5 (25.0–45.6)	43.7 (39.3–48.1)	43.7 (36.2–51.6)	43.9 (38.5–49.4)
Senior high — vocational	55.4 (45.2–65.1)	45.6 (27.5–65.0)	62.6 (43.6–78.4)	51.2 (45.3–57.1)	47.9 (38.4–57.6)	54.3 (45.7–62.6)
Students whose best friends smoked						
Junior high	4.2 (2.6–6.6)	5.1 (2.9–8.7)	3.0 (1.4–6.5)	1.4 (1.0–1.9)	1.5 (1.0–2.3)	1.1 (0.7–1.9)
Senior high — g eneral	4.9 (1.8–12.3)	5.9 (1.8–12.3)	3.9 (1.0–13.7)	2.2 (0.9–4.9)	3.7 (1.3–9.8)	1.1 (0.4–2.9)
Senior high — vocational	6.9 (2.1–20.3)	6.9 (1.4–27.5)	7.0 (1.1–33.7)	3.6 (1.7–7.4)	4.6 (2.0–10.0)	2.6 (1.1–6.3)
Students exposed to secondhand smoke at home						
Junior high	58.3 (53.2–63.1)	56.7 (48.7–64.3)	60.4 (50.9–69.2)	43.9 (41.4–46.3)	41.1 (37.6–44.8)	46.2 (43.2–49.3)
Senior high — g eneral	41.4 (30.4–53.3)	45.7 (33.6–58.3)	37.2 (22.4–54.9)	34.4 (30.5–38.5)	32.6 (25.3–40.7)	35.7 (28.8–43.2)
Senior high — vocational	53.2 (39.0–66.9)	41.7 (21.8–64.7)	62.9 (49.3–74.6)	47.5 (39.2–55.9)	40.6 (32.8–48.9)	53.3 (41.9–64.3)
Students exposed to secondhand smoke in public places						
Junior high	64.7 (58.2–70.7)	61.7 (53.3–69.4)	68.8 (61.1–75.6)	54.8 (53.1–56.5)	52.6 (50.3–54.8)	56.8 (54.2–59.3)
Senior high — g eneral	73.7 (63.3–82.0)	72.9 (59.1–83.4)	74.4 (60.7–84.5)	59.9 (54.6–65.1)	63.7 (55.6–71.1)	56.9 (52.3–61.4)
Senior high — vocational	70.4 (56.1–81.6)	65.5 (44.4–81.8)	75.2 (57.6–87.1)	59.6 (51.5–67.3)	56.3 (48.7–63.6)	62.8 (52.4–72.1)

[a] Students who have never smoked cigarettes, even one or two puffs.
[b] Students who have never smoked cigarettes but would smoke if their best friends offered a cigarette in the next 12 months.

evidently had a stronger impact on the potential smoking rate of junior high than senior high students. Therefore, when school personnel make plans to help junior high school students say no to the allure of tobacco, they should consider the influence of significant others. Another factor significantly related to future smoking initiation among junior high school students was their exposure to secondhand smoke.

This study found no significant gender difference in never smokers among vocational high school students, even though the smoking prevalence for teenage girls in Taiwan is far lower than for teenage boys (Chen et al., 2008b). Furthermore, no gender difference was found for smoking susceptibility among vocational and general senior high students. These findings suggest that the female smoking population in Taiwan may increase rapidly in the future. Future studies should continue to monitor the smoking behaviors of female vocational high students and to investigate the factors that will affect their smoking behaviors, e.g., tobacco advertisements, media exposure, and workplace training.

Conclusion

This study suggests the need to monitor the future smoking behaviors of junior high students after they enter senior high or vocational high schools. More smoking-susceptible junior high school students than senior high school students were impacted by the smoking experience of significant others such as parents and peers. Developing tailored, comprehensive smoking-prevention programs for junior high students should involve establishing tobacco-free households and communities. Tobacco-prevention strategies should also be tailored to another high-risk group, female vocational students.

Conflict of interest statement
The authors declare that they have no competing interests.

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