

# A CROSS-SECTIONAL STUDY OF SMOKING RISK FACTORS IN JUNIOR HIGH SCHOOL STUDENTS IN HENAN, CHINA

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**Abstract.** This study was conducted to determine the predictors of tobacco use among junior high school students in Henan. Two thousand seven hundred sixty-three students (from grades 7 to 9) were studied. Demographic, smoking-related, and other predictor variables was investigated. Overall, 6.6% of students were current smokers; 8.7% students reported having tried cigarettes before; and 42.1% of current smokers and 34.2% of triers experimented with smoking during ages 10-12. Of the factors associated with student tobacco use, mother and peer smoking were the strongest independent predictors. The school's negative attitude towards smoking was an important protective factor for preventing student smoking behavior. These findings revealed that effective smoking prevention interventions needed to be comprehensive.

## INTRODUCTION

Tobacco use has led health researchers to predict a worldwide pandemic of smoking-related illnesses and death beginning early in this century. An estimated 500 million people alive today will die from smoking-related disease and death (Peto *et al*, 1994). Age at the start of cigarette smoking is a major determinant of subsequent tobacco-related disease risk. In Doll and Peto's study (Doll and Peto, 1981), lung cancer rates at age 60 were about fourfold higher in subjects who started smoking before age 15 than in those who started after 25. Subjects who had not started smoking by age 20 to 25 had a relatively low rate of starting smoking later in life.

In recent decades, there has been a rapid and substantial increase in tobacco consumption in China. Research has shown that the prevalence of smoking is alarmingly high in the adult population, and tobacco use poses a major threat to the health of future generations in China. About 100 million of the 0.3 billion males age 0-29 will eventually die of smoking-related

diseases if urgent tobacco-control measures are not instituted to prevent this growing epidemic (Anonymous, 1997; Liu *et al*, 1998).

The objective of this study was to assess the predictors of tobacco use among junior high school students in Henan Province, along with the specific aim of providing data for the design of intervention programs.

## MATERIALS AND METHODS

The data presented here was collected from a smoking survey in four junior high schools in Henan Province. A cluster sampling method was used. A total of 2,763 students (grades 7 to 9) were selected, including 1,396 boys (50.5%) and 1,367 girls (49.5%). The mean age was 13.6.

Students were requested to complete a self-reported anonymous questionnaire in class. The trained interviewers described the purpose and process of the survey to the students, gave standardized instructions for completing the questionnaire, and emphasized the confidentiality and anonymity of the responses. Teachers and other school staffs were asked to leave the classroom during the process. Under the supervision of interviewers, the questionnaires were completed and collected.

The smoking status of the student was classified into three stages based on the self-report:

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1) "never smokers" were defined as those who reported having never tried cigarettes, 2) "triers" were defined as anyone who reported having tried smoking before, and 3) "current smoking" was defined as anyone who currently smoked. This was evaluated in a yes/no response format. Of the students who responded in the affirmative, questions were asked regarding the amount and frequency of tobacco consumed.

The smoking-related attitude was measured by four questions with a three-point scale from disagree to agree (Cronbach  $\alpha = 0.57$ ). These questions were "Refusal of other's offering is unfriendly", "Smoking is an easy way to approach another person", "Smoking can make you appear mature", and "Smoking is a symbol of independence and personality".

A knowledge of the harmful effects of smoking was measured with two items. Participants were asked whether they believed that smoking was associated with lung cancer, or bronchitis. A three-point scale response (yes, don't know, no) was used (Cronbach  $\alpha = 0.56$ ).

There were a series of questions about the father, mother, or other relatives who lived with the student; and of peer and teacher smoking status. The items were not grouped according to the type of question so the individual influence of each variable could be examined. The gender and grade were considered in the analysis to mediate the demographic factors which had an influence on other variables.

Statistical analysis was performed using a SPSS program. Frequencies and cross-tabulations of variables were used to estimate the smoking rates. Logistic regression analysis was used to estimate the risk factors associated with students' tobacco use. The dependent variables, and smoking status, were divided into "ever smoked" and "never smoked", with "ever smoked" including "current smokers" and "triers."

## RESULTS

Of the 2,763 students who answered the questionnaire, nearly 6.6% of the students were current smokers. Eight point seven percent of the students reported having tried cigarettes be-

fore. Forty-two point one percent of the "current smokers" and 34.2% "triers" had experimented with smoking during ages 10-12.

Tables 1 reveals a significant difference in smoking prevalence between boys and girls ( $p < 0.001$ ). Smoking increased with increasing grades ( $p < 0.001$ ). The experimental smoking

Table 1  
Factors associated with smoking among school students (%).

	Nonsmoker (n = 2,341)	Trier (n = 241)	Smoker (n = 181)	p-value
Gender				
Male	44	84.2	90.6	<0.001
Female	56	15.8	9.4	
Grade				
7 <sup>th</sup>	34.3	16.2	12.7	<0.001
8 <sup>th</sup>	32.8	34.0	35.9	
9 <sup>th</sup>	32.9	49.8	51.4	
Per week pocket money (¥)				
≤ 5	48.9	42.7	30.4	<0.001
6-10	32.9	33.6	37.6	
>10	18.2	23.7	32.0	
Father who smokes				
No	39.2	27.4	30.4	<0.001
Yes	60.8	72.6	69.6	
Mother who smokes				
No	99.2	96.7	94.5	<0.001
Yes	0.8	3.3	5.5	
Other family member(s) who smokes				
No	55.0	34.9	33.7	<0.001
Yes	45.0	65.1	66.3	
Peer(s) who smokes				
No	66.4	38.2	26.0	<0.001
Yes	33.6	61.8	74.0	
Teacher(s) who smokes				
No	44.0	22.4	8.3	<0.001
Yes	56.0	77.6	91.7	
Having refusal skills				
Yes	76.2	70.5	55.8	<0.001
No	23.8	29.5	44.2	
Parents' attitude towards smoking				
Disapproval	92.9	85.9	85.6	<0.001
Not sure	6.6	12.9	8.8	
Approval	0.5	1.2	5.5	
School's attitude towards smoking				
Disapproval	92.0	83.0	84.0	<0.001
Not sure	7.3	15.8	10.5	
Approval	0.7	1.2	5.5	

Table 2  
Attitude and knowledge regarding smoking (%).

	Nonsmoker (n = 2,341)	Trier (n = 241)	Smoker (n = 181)	p-value
Perceived benefits of smoking (% agree)				
Refusal of other's offering is unfriendly	11.6	15.8	30.9	<0.001
Smoking is an easy way to approach other persons	12.2	24.1	34.8	<0.001
Smoking can appear mature	3.2	4.1	12.7	<0.001
Smoking is a symbol of independence and personality	4.6	10.0	14.9	<0.001
Knowledge of the harmful effect of smoking (% agree)				
Smoking has an association with lung cancer	82.2	90.9	86.7	0.015
Smoking has an association with bronchitis	87.2	90.5	88.4	<0.001

Table 3  
Logistic regression analysis predicting ever/never smoking status among students.

	OR	95% CI	p-value
Perceived benefits of the harmful effect of smoking scale	1.3035	(1.1257 1.5094)	0.0004
Knowledge of the harmful effects of the harmful effect of smoking scale	0.9136	(0.6996 1.1931)	0.5071
Father's smoking	1.3460	(1.0374 1.7464)	0.0254
Mother's smoking	3.7934	(1.6255 8.8523)	0.0020
Other relatives' smoking	1.8652	(1.4530 2.3943)	0.0000
Peers' smoking	2.5249	(1.9452 3.2772)	0.0000
Teachers' smoking	1.9974	(1.4557 2.7407)	0.0000
Parents' attitude towards smoking	1.2607	(0.8884 1.7890)	0.1945
School's attitude towards smoking	2.0563	(1.4952 2.8278)	0.0000
Having refusal skills	1.5854	(1.2196 2.0610)	0.0006
Per week pocket money (¥)	1.2223	(1.0472 1.4267)	0.0109
Grade	1.4941	(1.2649 1.7649)	0.0000
Gender	0.1062	(0.0775 0.1456)	0.0000

rate increased from 16.2% during Grade 7 to 49.8% during Grade 9, and current smoking prevalence rose from 12.7% to 51.4% over the same grades. Smoking rates increased with increasing pocket money per week ( $p < 0.001$ ). Smokers and triers were far more likely than nonsmokers to be surrounded by people who smoked, such as family members, teachers, and peers ( $p < 0.001$ ). Five point five percent of smokers and 1.2% of triers reported a parental or school lenient attitude regarding smoking behavior ( $p < 0.001$ ).

Table 2 shows the attitude and knowledge regarding smoking among students. Thirty point nine percent of smokers and 15.8% of triers felt

that refusing of another's offer is unfriendly ( $p < 0.001$ ). Thirty-four point eight percent of smokers and 24.1% triers felt that smoking is an easy way to approach another person, which was the most frequently cited reason for tobacco use ( $p < 0.001$ ). Students revealed a great knowledge regarding the harmful effects of smoking.

Table 3 displays the results of logistic regression analyses. All the variables entered the model except for harmful knowledge scale and parents' attitude towards smoking. Of the factors, which were associated with student tobacco use, mother and peer smoking were the strongest independent predictors. The school's negative attitude towards smoking was an im-

portant protective factor for preventing student smoking.

## DISCUSSION

Adolescence is a transitory period characterized by important physiological and psychological changes that may have long-term consequences on physical and mental health (Friedman and Sarles, 1980). In this study, smoking onset was most prevalent during ages 10-12, and the smoking rate increased with increasing grade. The odds of smoking were greatly increased when peers smoked. A possible explanation for this is that they are their beginning social activities in which they are vulnerable to environmental influences. During this developmental phase, adolescents naturally have an interest in trying something new. They tend to explore themselves and their environment by making new friends. However, without appropriate refusal skills and stable norms, they are particularly susceptible to peer pressure and influence. In this study, adolescent smoking was positively related to the amount of pocket money per week, which suggests that the availability of money is a risk factor for adolescent tobacco use. Pocket money provides the ability to purchase cigarettes. This result is consistent with another research finding, which had found that students with more pocket money per week were more likely to be smokers than students with less pocket money (Rissel *et al*, 1999).

Our results also indicate that smoking family members and smoking teachers were significant predictors for adolescent tobacco use, especially maternal smoking. This may be because the students is given the message nonverbally that tobacco use is desirable, socially acceptable, safe, healthy, and prevalent in society (Conrad *et al*, 1992; Dusenbury *et al*, 1992; Botvin *et al*, 1994). Mothers, in children's eyes, have an influential role, and are a provider of knowledge, who steer the student in the right direction. Therefore, by setting a good example of healthy living, parents can help their children make healthy choices in the life. In our study, a surprising finding was the uncertain parental attitude regarding their children's tobacco use. This

needs further student to understand the cause. The school's negative attitude towards smoking was a strong protective factor for preventing student smoking. Thus, a non-smoking school environment combined with a strict rule against smoking likely leads to a lower prevalence of tobacco use among school students.

Environmental factors determine the extent of adolescent smoking, while their attitudes and knowledge of tobacco use influence their individual perspective about how to interpret and respond to situations that may precipitate smoking (Vartiainen *et al*, 1994; Pamela *et al*, 1995; Paavola *et al*, 1996). Our study showed the majority of students understood the harmful effects of tobacco, but this had a limited effect on smokers' attitudes about smoking and their behavior. They held lenient attitudes toward smoking and initiated it at an early age. Hence the results indicated that a prevention policy should be targeted more at associating smoking with negative images. Improving a students' attitudes and beliefs about smoking would be a first step towards facilitating behavior change.

In summary, our study suggests that effective strategy for preventing teenagers from smoking should be comprehensive. As the limits of purely educational approaches to prevent smoking in the youth become more widely understood, more programs are realizing that the larger social environment in which students live should also be addressed to produce lasting behavior change (Flynn *et al*, 1994; Vartiainen *et al*, 1998). Therefore, prevention should not be confined to the classroom. It should extend across the school and into the community. Community-wide health promotion using local mass media can have an influence by reaching not only adolescents, but also their parents, and other adults who are in the community, with healthy-behavior messages. This approach has played a critical part in the success of Finland's large-scale, long-term intervention to reduce the prevalence of smoking among youth (Vartiainen *et al*, 1994, 1998).

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