

## Preplanned Studies

## Tobacco Use and Cessation Among College Students — China, 2021

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### Summary

#### What is already known about this topic?

Previous studies about tobacco use among college students in China were conducted at the school level or city level, with fewer than 5,000 students participating.

#### What is added by this report?

In 2021, China CDC conducted a national tobacco survey targeting students enrolled in the public higher education system. Overall, 124,119 students from 220 colleges and universities in 31 provincial-level administrative divisions participated in this survey. Current cigarette smoking, current daily smoking, willingness to quit, and smoking cessation among college students were explored.

#### What are the implications for public health practice?

The current daily cigarette smoking rate of college students was significantly higher than that of senior high school students, especially higher vocational college students. Tobacco control interventions, such as a smoke-free school policy and smoking cessation services, need to be reinforced on college campuses.

Cigarette smoking is one of the leading causes of preventable morbidity and mortality globally (1). The report of 2018 China-Global Adult Tobacco Survey (GATS) showed that the average age to initiating daily smoking for daily smokers was 21.1 years old (2), around the average age of a university student. However, previous GATS investigations excluded those who lived in collective housing, such as student dormitories, and previous studies among college students were mostly conducted at the school or city level (3–4). To fill this gap and provide evidence for policymaking, China CDC conducted the first round of a national tobacco survey in 2021. By using a multi-stage stratified cluster for a random sampling designed survey, China CDC aimed to achieve a nationally representative sample, targeting all college students enrolled in the public higher education system. Using a

modified electronic questionnaire based on the GATS questionnaire, 124,119 college students from 220 colleges were asked about cigarette smoking prevalence, intention to quit, smoking cessation rate, etc.

For the first stage, all colleges in the mainland of China were divided into nine strata by region (east, middle, and west) and school attributes [Colleges Directly Under the Central Ministries and Commissions or Colleges Co-sponsored by Province and Ministry (CCMC/CCPM), Provincial Colleges (PC), and Higher Vocational Colleges (HVC)]. The number of sampling schools in each stratum and the survey schools were selected using a proportionate student size. For stage two, under an estimated ratio of 1:2 of students in the arts:sciences and each class having no less than 40 students, 3 classes (one for arts and two for science) were randomly sampled for each grade within the selected schools. All the students in the selected class would be sampled. Post hoc stratification adjusted the proportion of school attributes and gender. In this survey, an electronic survey system was used for data collection. Under the coordination of the local education departments, trained investigators came to the selected classes, asked the college students to fill out and submit the questionnaire independently through the WeChat mini-program. The data were further checked by provincial quality controllers and would be reinvestigated if a large proportion of duplicate reports existed.

Parts of the GATS questionnaires were tailored for college students. Questions included basic information (school, grade, major, gender, race, etc.), cigarette and e-cigarette use, smoking cessation, secondhand smoke exposure, price, tobacco control propaganda, smoking cognition, and attitudes. By asking the participants, “Do you currently smoke tobacco on a daily basis, less than daily, or not at all?”, current smokers (CS) were defined as those who answered “daily” and “less than daily”, and current daily smokers (CDS) were defined as those who answered “daily”. For current non-

smokers, “In the past, have you smoked tobacco on a daily basis, less than daily, or not at all?” was asked. The smoking cessation was defined as those who answered “daily” and “less than daily.” Willingness to quit referred to the intention of current smokers to quit smoking within the next month, within the next or after 12 months.

A total of 220 colleges in 31 provincial-level administrative divisions (PLADs) were covered in this survey, with 124,119 participants completing the individual questionnaires. The overall response rate was 95.9%. The data were processed by checking logic issues, missing values, and outliers for final analysis. Prevalence rates and chi-square test for differences were calculated and reported in this study. Statistical analysis was performed using SAS 9.4 software (SAS Institute Inc., Cary, NC, USA).

CS prevalence rate among college students was 7.8%, with 3.0%, 5.0%, and 11.6% for CCMC/CCPM, PC, and HVC students, respectively, and higher rates in males (4.9%, 9.8%, and 21.2%)

than in females (1.0%, 0.9%, and 1.4%) ( $p<0.05$ ). The overall prevalence of CDS was 4.7%, with the highest among HVC (7.1%), and then PC (2.9%) and CCMC/CCPM (1.6%), with higher in males (9.2%) than in females (0.5%) ( $p<0.05$ ). The prevalence of CS and CDS among students increased with the grade level, with first year (3.6%, 1.9%), second year (4.6%, 2.7%), third year (5.5%, 3.3%), and fourth year (5.6%, 3.5%) in CCMC/CCPM and PC, and with first year (11.0%, 6.3%), second year (11.2%, 6.8%), and third year (12.6%, 8.2%) in HVC ( $p<0.05$ ). Significant regional disparities existed between schools for CS rates. The highest CS rate was observed in the western region (10.0%), then the middle (7.2%), and the eastern region (7.0%) ( $p<0.05$ ). In the western region (6.1%), the CDS rate was also observed higher than that in the eastern (4.3%) and middle region (4.2%) ( $p<0.05$ ) (Table 1). For CS and CDS, the average number of cigarettes smoked was 7.3 [95% confidence intervals (CI): 7.0–7.5] and 10.2 (95% CI: 9.9–10.6) sticks/day, respectively.

TABLE 1. Current cigarette uses among college students in China, 2021.

Region	Characteristics	Total				Males				Females			
		Current smokers		Current daily smokers		Current smokers		Current daily smokers		Current smokers		Current daily smokers	
		N	%	N	%	N	%	N	%	N	%	N	%
	Overall	9,642	7.8	5,830	4.7	8,964	15.0	5,518	9.2	678	1.1	312	0.5
Total	School type												
	CCMC/CCPM	150	3.0	79	1.6	129	4.9	70	2.7	21	1.0	9	0.4
	PC	3,362	5.0	1,995	2.9	3,065	9.8	1,868	6.0	297	0.9	127	0.4
	HVC	6,130	11.6	3,756	7.1	5,770	21.2	3,580	13.2	360	1.4	176	0.7
East	Overall	3,789	7.0	2,325	4.3	3,439	13.4	2,158	8.4	350	1.3	167	0.6
	School type												
	CCMC/CCPM	82	2.5	44	1.4	69	3.8	38	2.1	13	1.0	6	0.5
	PC	1,306	4.2	755	2.4	1,124	8.5	679	5.1	182	1.2	76	0.5
	HVC	2,401	11.3	1,526	7.2	2,246	19.8	1,441	12.7	155	1.6	85	0.9
Middle	Overall	2,618	7.2	1,537	4.2	2,446	13.5	1,458	8.1	172	1.0	79	0.5
	School type												
	CCMC/CCPM	25	3.0	13	1.6	24	5.4	12	2.7	1	0.3	1	0.3
	PC	842	4.4	503	2.6	792	8.1	479	4.9	50	0.6	24	0.3
	HVC	1,751	10.1	1,021	5.9	1,630	19.7	967	11.7	121	1.4	54	0.6
West	Overall	3,235	10.0	1,968	6.1	3,079	19.4	1,902	12.0	156	1.0	66	0.4
	School type												
	CCMC/CCPM	43	5.0	22	2.5	36	9.6	20	5.3	7	1.6	2	0.5
	PC	1,214	6.8	737	4.1	1,149	14.0	710	8.7	65	0.8	27	0.3
	HVC	1,978	14.0	1,209	8.5	1,894	25.0	1,172	15.4	84	1.3	37	0.6

Abbreviations: CCMC/CCPM=Colleges Directly Under the Central Ministries and Commissions or Colleges Co-sponsored by Province and Ministry; PC=Provincial Colleges; HVC=Higher Vocational Colleges.

## DISCUSSION

Among students who were currently cigarette smokers, 67.5% reported that they were willing to quit smoking, with 31.2% planning to quit in the next month. The proportion willing to quit smoking next month was higher among males (31.5%) than females (27.2%), and higher in the western region (34.4%) than in the middle (31.0%) and eastern region (28.5%) ( $p<0.05$ ). It was higher in HVC (33.9%) than those in PC (26.4%) and CCMC/CCPM (16.9%) ( $p<0.05$ ). Smoking cessation rate among college students in China was 26.0%, with female students (49.0%) higher than male students (23.2%) ( $p<0.05$ ); it was significantly higher in the western region (27.2%) than in the eastern (25.6%) and middle region (25.2%) ( $p<0.05$ ). The highest proportion of smoking cessation was reported in CCMC/CCPM (32.1%), followed by PC (30.3%) and HVC (23.5%) ( $p<0.05$ ) (Table 2).

In this survey, CS and CDS rates among college students were 7.8% and 4.7%, respectively. Males, HVC students, and western region students had higher CS and CDS rates. CS and CDS rates among western region male students in HVC were 25.0% and 15.4%, respectively. College is a crucial stage of developing behavior and lifestyle, and it is also a stage in which smoking behaviors increased significantly. Several studies have shown that tobacco use is becoming prevalent among college students (5). This was in line with this study that the CDS rate among college students was double that of senior high school students (2.1%) surveyed in 2019 ( $p<0.05$ ) (6). This may be partially due to the existence of some restrictions on smoking for youth under the age of 18. To protect the health of college students and to achieve a future

TABLE 2. Smoking cessation and current smokers' willingness to quit smoking next month in China, 2021.

Region	Characteristics	Total				Males				Females			
		Planned to quit smoke next month*		Smoking cessation		Planned to quit smoke next month*		Smoking cessation		Planned to quit smoke next month*		Smoking cessation	
		N	%	N	%	N	%	N	%	N	%	N	%
	Overall	3,008	31.2	3,389	26.0	2,820	31.5	2,736	23.2	188	27.2	653	49.0
Total	School type												
	CCMC/CCPM	26	16.9	69	32.1	26	20.2	48	27.1	0	0.0	21	50.0
	PC	898	26.4	1,441	30.3	838	27.2	1,186	27.9	60	19.9	255	46.2
	HVC	2,084	33.9	1,879	23.5	1,956	33.8	1,502	20.7	128	35.3	377	51.2
East	Overall	1,083	28.5	1,298	25.6	1,005	29.2	1,011	22.5	78	21.9	287	45.0
	School type												
	CCMC/CCPM	13	15.4	43	35.0	13	18.8	30	30.3	0	0.0	13	50.0
	PC	333	25.1	555	30.2	298	26.4	427	27.5	35	18.8	128	41.3
Middle	HVC	737	30.6	700	22.6	694	30.8	554	19.8	43	27.7	146	48.5
	Overall	812	31.0	885	25.2	759	31.1	727	22.7	53	30.0	158	47.9
	School type												
	CCMC/CCPM	4	15.9	14	37.2	4	16.7	9	27.3	0	0.0	5	83.3
West	PC	206	24.2	360	30.2	196	24.6	316	28.5	10	19.6	44	46.8
	HVC	602	34.2	511	22.6	559	34.2	402	19.8	43	34.7	109	47.4
	Overall	1,113	34.4	1,206	27.2	1,056	34.3	998	24.4	57	36.2	208	57.1
	School type												
West	CCMC/CCPM	9	20.3	12	22.1	9	25.0	9	20.0	0	0.0	3	30.0
	PC	359	29.4	526	30.6	344	29.8	443	27.8	15	23.1	83	56.1
	HVC	745	37.5	668	25.3	703	36.9	546	22.4	42	50.0	122	59.2

Abbreviations: CCMC/CCPM=Colleges Directly Under the Central Ministries and Commissions or Colleges Co-sponsored by Province and Ministry; PC=Provincial Colleges; HVC=Higher Vocational Colleges.

\* Current smokers who planned to or were thinking about quitting in the next month.

reduction in tobacco use across the whole population, some targeted tobacco control interventions are needed. The smoke-free school policy can be applied on college campuses, for example, prominently displayed “smoke-free campus” or “no-smoking” signs at school entrances, no tobacco advertising or tobacco sales in schools, and strictly enforcing smoke-free regulations (7). In addition, tobacco-related topics can be required incorporated into the curriculum to increase students’ recognition of tobacco hazards (8).

The 2018 report of China-GATS showed that, among people aged 15–24 years, the proportion of current smokers who intended to quit in the next month and the smoking cessation rate were 9.3% and 8.1%, respectively (2), significantly lower than that in college students (31.2%, 26.0%) ( $p < 0.05$ ). This difference may be due to the higher education levels of college students and their higher levels of awareness of tobacco hazards. Several longitudinal studies indicated that tobacco control policies and professional smoking cessation services significantly reduced smoking behaviors (9). Therefore, actively providing professional smoking cessation services within the student health center and encouraging students and school staff to participate in school-based tobacco control and cessation programs would be effective (10).

A potential limitation is that the self-reported questionnaires may cause observer bias, which might underreport the prevalence rates. Underreporting surveys could be conducted in the future to explore whether potential observer bias exist.

In conclusion, the prevalence of current daily cigarette smoking among college students was much higher than that of senior high school students, and the rate in HVC was significantly high. College students were more willing to quit smoking and had higher smoking cessation rate, thus, the tobacco control interventions, such as smoke-free school policy and smoking cessation services, need to be reinforced on college campuses.

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