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 senior high school students, especially for higher vocational colleges 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 | % |
| Overall |                | 9,642 | 7.8 | 5,830 | 4.7 | 8,964 | 15.0 | 5,518 | 9.2 | 678 | 1.1 | 312 | 0.5 |
| School type |                |            |       |       |     |       |     |       |     |     |     |     |    |
| Total   | 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 |
| 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 |                |            |       |       |     |       |     |       |     |     |     |     |    |
| East    | 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 |
| 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 |                |            |       |       |     |       |     |       |     |     |     |     |    |
| Middle  | 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 |
| 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 |                |            |       |       |     |       |     |       |     |     |     |     |    |
| West    | 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.
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).

### 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 | % |
| Overall | 3,008 | 31.2 | 3,389 | 26.0 | 2,820 | 31.5 | 2,736 | 23.2 |
| School type | | | | | | | | |
| Total | | | | | | | | |
| CCMC/CCPM | 26 | 16.9 | 69 | 32.1 | 26 | 20.2 | 48 | 27.1 |
| PC | 898 | 26.4 | 1,441 | 30.3 | 838 | 27.2 | 1,186 | 27.9 |
| HVC | 2,084 | 33.9 | 1,879 | 23.5 | 1,956 | 33.8 | 1,502 | 20.7 |
| Overall | 1,083 | 28.5 | 1,298 | 25.6 | 1,005 | 29.2 | 1,011 | 22.5 |
| School type | | | | | | | | |
| East | | | | | | | | |
| CCMC/CCPM | 13 | 15.4 | 43 | 35.0 | 13 | 18.8 | 30 | 30.3 |
| PC | 333 | 25.1 | 555 | 30.2 | 298 | 26.4 | 427 | 27.5 |
| HVC | 737 | 30.6 | 700 | 22.6 | 694 | 30.8 | 554 | 19.8 |
| Overall | 812 | 31.0 | 885 | 25.2 | 759 | 31.1 | 727 | 22.7 |
| School type | | | | | | | | |
| Middle | | | | | | | | |
| CCMC/CCPM | 4 | 15.9 | 14 | 37.2 | 4 | 16.7 | 9 | 27.3 |
| PC | 206 | 24.2 | 360 | 30.2 | 196 | 24.6 | 316 | 28.5 |
| HVC | 602 | 34.2 | 511 | 22.6 | 559 | 34.2 | 402 | 19.8 |
| Overall | 1,113 | 34.4 | 1,206 | 27.2 | 1,056 | 34.3 | 998 | 24.4 |
| School type | | | | | | | | |
| West | | | | | | | | |
| CCMC/CCPM | 9 | 20.3 | 12 | 22.1 | 9 | 25.0 | 9 | 20.0 |
| PC | 359 | 29.4 | 526 | 30.6 | 344 | 29.8 | 443 | 27.8 |
| HVC | 745 | 37.5 | 668 | 25.3 | 703 | 36.9 | 546 | 22.4 |

| 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. |

**DISCUSSION**

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
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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