

Preplanned Studies

Cigarette Package Warnings for Adult Smoking Cessation — China, 2018

Lin Xiao^{1,†}; Xinbo Di¹; Yi Nan¹; Tianchu Lyu¹; Yuan Jiang¹

Summary

What is already known about this topic?

After the framework convention on tobacco control (FCTC) came into force, the health warnings on cigarette packaging in the mainland of China had been changed in three rounds. But the warning label is still only pure text and without descriptions of specific health consequences caused by tobacco use.

What is added by this report?

Although there were two rounds of changes from 2010 to 2018, current health warning labels did not work in increasing Chinese smokers' smoking cessation intention compared with the previous one. Large pictorial warning labels were more effective than the current health warning label in stimulating Chinese smoker's willingness to quit.

What are the implications for public health practice?

Pictorial health warnings could play a great role in promoting the realization of the tobacco control goals of Healthy China 2030. Pictorial health warnings should be printed on cigarette packs in the mainland of China as soon as possible.

Plenty of evidence shows well-designed health warnings and messages are part of a range of effective measures to communicate health risks and increase the motivation of tobacco users to quit and decrease their tobacco consumption (1–4). Thus, Article 11 of the World Health Organization's (WHO) Framework Convention on Tobacco Control (FCTC) pointed out the requirement of packaging and labelling of tobacco products (5). After the FCTC came into force, health warnings on cigarette packaging in China had been changed in three rounds. In January 2009 (6), plain text health warnings were required to account for 30% of the front, back, and bottom area of the cigarette packaging, including two general warnings. The warning information on the back of the cigarette pack was required to be in English. In April 2012 (7), the text warning on the back of the cigarette pack was

adjusted from English to Chinese; the font size was doubled (the height of text was required to be not less than 4 mm), but the overall size of the warning did not change. In October 2016 (8), a new version of the text health warning took effect, requiring the area of the warning to reach 35% of the cigarette pack. The font requirement was changed to 4.5 mm and three new text warnings were added. This study examined the effects of current health warning labels on smoking cessation intention and explored the different influence between the current health warning label and pictorial health warning labels.

Data used in this paper were from the Global Adult Tobacco Survey (GATS) China Project, which used a global standardized methodology and was conducted in 2018 (9). A multi-stage, geographically clustered sample design was used to produce nationally representative data. In total, 200 monitoring counties/districts were sampled coming from 31 provincial-level administrative divisions (PLADs) of the mainland of China. Nationally, a total of 24,370 households were sampled and one individual was randomly selected from each participating household to complete the survey. The household survey method was adopted, and the investigator used the digital tablet to collect data through in-person inquiry. The subjects of this survey were the Chinese residents aged 15 and above who used the household as their primary residence in the previous month before the survey and excluded those who lived collectively in places like student dormitories, nursing homes, military camps, prisons, or hospitals.

All of the participants were asked "In the last 30 days, did you notice any health warnings on cigarette packages?", and smokers were asked "In the last 30 days, have warning labels on cigarette packages led you to think about quitting?". Then the digital tablet will randomly present five imitated pictorial health warnings and ask smokers "If you see such a health warning on a cigarette package, would you consider stopping smoking?" In addition, all of the participants were asked "Do you support printing such a pictorial



FIGURE 1. Five imitated pictorial health warning labels randomly selected by digital tablet.

warning on cigarette packages?” As showed in Figure 1, pictorial health warning 1 was “Smoking and secondhand smoke cause lung cancer” and used pictures of lungs of non-smokers and smokers for comparison. Pictorial health warning 2 was “Smoking causes chronic obstructive pulmonary disease (COPD)” with a picture of an actual patient with COPD caused by smoking. Pictorial health warning 3 was “Smoking causes the yellowing of teeth, bad breath, and periodontal disease” using a picture of diseased teeth and gum. Pictorial health warning 4 was “Smoking causes erectile dysfunction” using curved cigarettes to symbolize the symptom. Pictorial health warning 5 was “Smoking causes peripheral vascular diseases” using a picture of a diseased foot from a patient.

Due to the complex survey sample design for the surveys, each responding unit was assigned a unique survey weight that was used to produce estimates of population parameters, and 2018 population data were used for post-stratification, which was provided by National Statistics Bureau of China. All computations were performed using the SAS software (version 9.4, SAS Institute Inc., Cary, USA) complex survey data analysis procedure. Percentage or proportion was used for descriptive statistics. The difference of values with no overlap in confidence interval(CI) was identified to be statistically significant between subgroups.

Out of a total of 24,370 selected households, 3,193 empty households were eliminated and 21,177 remained. Out of these, 19,640 households completed the survey and a total of 19,376 people completed the final individual survey. The overall response rate was 91.5%. The 19,376 people surveyed represented a total of 1,156,987,000 men and women aged 15 and over in the mainland of China. There were 9,109 men and

10,267 women in the sample, representing 50.6% of men and 49.4% of women in the target population, respectively. In terms of age distribution, there were 930, 5,128, 8,652, and 4,666 respondents in the 15–24, 25–44, 45–64, and ≥ 65 years old groups, respectively.

The results showed that within the 30 days prior to the survey, 88.2% of smokers had seen the health warnings on the cigarette package, within whom 36.3% said that they would consider quitting smoking because they saw the current health warnings on the cigarette package. In addition, the proportion of non-smokers who saw the health warning on the cigarette packaging was 53.4%. The percentage of people who saw the health warnings on cigarette packaging was highest among young people (15–24 years old), both among smokers (98.1%) and non-smokers (64.5%).

The results showed that 56.1% of smokers said they would consider quitting smoking after seeing such pictorial health warnings, which was much higher than seeing the current health warnings on the cigarette package. For each age group, the proportion of smokers considering quitting after seeing the pictorial health warning labels were higher than those who saw current health warning labels. This was also true for smokers with different education levels, and smokers living in urban and rural areas (Table 1).

In addition, the proportions of smokers who considered quitting smoking after seeing pictorial health warnings varied based on which image they saw. The proportion of smokers who intended to quit smoking after seeing the pictorial warning of “Smoking causes chronic obstructive pulmonary disease” was the highest among the 5 pictorial health warning labels (61.9%); while “Smoking causes erectile dysfunction” had the lowest rate (49.3%). Between them were

TABLE 1. Percentage of adults aged 15 years or older who noticed health warnings on cigarette packages and considered quitting because of the different health warnings.

Demographic characteristics	Non-smokers who noticed health warnings on cigarette package [percentage (95%CI)]	Current smokers* [percentage (95%CI)]		
		Noticed health warnings on cigarette package	Thought about quitting because of warning labels	Thought about quitting because of pictorial health warnings
Overall	53.4(50.9–55.9)	88.2(86.2–90.0)	36.3(33.5–39.2)	56.1(52.5–59.6)
Gender				
Male	59.2(55.8–62.6)	88.9(86.9–90.7)	36.2(33.4–39.1)	56.2(52.6–59.8)
Female	50.3(47.7–52.9)	70.7(61.9–78.1)	38.4(27.7–50.4)	52.9(41.3–64.1)
Age (years)				
15–24	64.5(59.5–69.2)	98.1(93.6–99.5)	30.3(22.2–39.9)	59.3(48.4–69.3)
25–44	64.0(60.2–67.6)	91.4(88.3–93.8)	40.1(36.2–44.1)	60.1(55.2–64.9)
45–64	46.8(44.0–49.7)	86.6(84.2–88.8)	35.8(32.6–39.1)	54.8(50.9–58.6)
≥65	28.7(26.3–31.2)	74.8(70.6–78.6)	29.3(24.6–34.6)	45.1(39.2–51.2)
Residence				
Urban	56.3(53.5–59.0)	92.2(90.5–93.7)	32.6(29.4–36.0)	52.9(48.3–57.5)
Rural	48.8(44.4–53.1)	83.0(79.1–86.4)	41.5(37.1–46.1)	61.4(56.5–66.1)
Education level				
Primary school or less	32.4(29.7–35.3)	75.1(71.6–78.4)	33.7(29.5–38.3)	51.3(46.5–56.1)
Attended secondary school	62.0(58.0–65.9)	91.0(87.9–93.3)	38.5(34.4–42.9)	58.7(54.2–63.0)
High school graduate	64.0(60.1–67.8)	92.8(90.0–94.9)	38.5(33.4–43.7)	56.7(50.3–63.0)
College graduate or above	57.2(53.5–60.9)	94.2(89.7–96.8)	36.1(30.1–42.5)	55.4(48.2–62.3)

Abbreviation: CI=confidence interval.

*Includes daily and occasional (less than daily) smokers.

“Smoking and second-hand smoke cause lung cancer”, “Smoking causes peripheral vascular diseases”, and “Smoking causes the yellowing of teeth, bad breath, and periodontal disease”, which had a rate of 58.2%, 55.8%, and 54.9%, respectively. Compared with the other 4 pictorial health warnings, fewer smokers wanted to quit after seeing the “Smoking causes erectile dysfunction”, which used a symbolic image rather than graphic depictions of the syndrome.

The results also showed that 69.6% of the subjects supported the printing of pictorial health warnings on cigarette packaging including 65.2% of smokers and 71.1% of non-smokers.

DISCUSSION

Although there were two rounds of changes from 2010 to 2018 (Figure 2), only 36.3% of smokers who had seen the health warnings on the cigarette packages in the past 30 days said they would consider quitting because of the current health warnings on the cigarette packages, which has not changed in comparison with the number in 2010 (36.4%) (10). This indicates that current health warning labels on the cigarette packages

are not enough to encourage smokers to quit and did not work in increasing Chinese smokers' smoking cessation intention compared with the previous one.

In contrast, 56.1% of smokers said they would consider quitting smoking after seeing pictorial health warnings, which was much higher than seeing the current health warnings on the cigarette package. For each age group, the proportion of smokers considering quitting after seeing the pictorial health warning labels were higher than those who saw current health warning labels. This indicates that pictorial health warnings are more effective than current pure text health warnings for increasing the willingness of smokers to quit smoking. This is consistent with the results of studies in multiple countries (11–15).

Many studies discovered symbolic warnings and images depicting the social and emotional impact of warnings might be less effective than graphic images (16). In our study, the rate of smokers considering quitting smoking after seeing the warning “Smoke leading to erectile dysfunction” was lower than others. This also suggests pictorial warnings featuring “graphic” depictions of disease were significantly more effective than symbolic images.



FIGURE 2. Evolution history of health warnings on cigarette package in China.

Studies have shown that health warnings for cigarette packaging is an explicit, low-cost effective way to promote the awareness of the harms induced by tobacco use to smokers and non-smokers. Health warnings are effective tools for increasing the awareness of smoking hazards, reducing tobacco consumption, and reducing smoking rates (1–4). The results of this study showed that the public had a relatively high exposure rate to health warnings on cigarette packages. Even among non-smokers, the exposure rate was still as high as 53.4%. For young people aged 15–24, both smokers and non-smokers had a higher exposure rate.

Healthy China 2030 set the goal of “reducing the smoking prevalence of people over 15-year-old to 20% by 2030”. To achieve this, encouraging smokers to quit is crucial, but the number of new smokers also needs to be reduced. Pictorial health warnings have strong effects in both aspects, and the public’s support for the adoption of pictorial health warnings was high. Furthermore, 91 countries (52% of the world’s population) have adopted comprehensive graphic pack warning requirements (17). Therefore, pictorial health warnings have a great role in promoting the realization of tobacco control goals of Healthy China 2030, and China should print pictorial health warnings on cigarette packs as soon as possible.

This study is subject to a few limitations. In the survey, smokers were asked if he or she noticed health warning on cigarette package in the last 30 days; and if the warning labels led him or her think about quitting, which might have led to recall bias. However, the same questions were used in the 2010 GATS survey and

2018 GATS survey, so the proportions of the smokers considering quitting because of warning labels are comparable. In addition, the survey was conducted based on households where all of the people in a participating household were registered and one individual was randomly selected from the household to complete the survey. Because of population shifts, more young people have moved to larger cities and fewer young people were interviewed in the survey, especially in rural areas. To account for this, weighting and post-stratification adjustment were used in this study.

Acknowledgements: The project described in this paper was funded by the WHO (WPCHN1814405). Thanks to all of the experts of the United States Center for Disease Control and Prevention (US CDC) for providing guidance and assistance for 2018 GATS CHINA. Our thanks go to the national project office and provincial survey teams for their hard work.

Conflict of interests: The authors declare no competing interests.

doi: [10.46234/ccdcw2020.101](https://doi.org/10.46234/ccdcw2020.101)

Corresponding author: Lin Xiao, xiaolin@chinacdc.cn.

¹ Tobacco Control Office, Chinese Center for Disease Control and Prevention, Beijing, China.

Submitted: May 17, 2020; Accepted: May 22, 2020

REFERENCES

- Fathelrahman AI, Omar M, Awang R, Borland R, Fong GT, Hammond D, et al. Smokers’ responses toward cigarette pack warning

- labels in predicting quit intention, stage of change, and self-efficacy. *Nicotine Tob Res* 2009;11(3):248 – 53. <http://dx.doi.org/10.1093/ntr/ntn029>.
2. Ngo A, Cheng KW, Shang C, Huang JD, Chaloupka FJ. Global evidence on the association between cigarette graphic warning labels and cigarette smoking prevalence and consumption. *Int J Environ Res Public Health* 2018;15(3):421. <http://dx.doi.org/10.3390/ijerph15030421>.
 3. Kamyab K, Nonnemaker JM, Farrelly MC. Public support for graphic health warning labels in the U.S. *Am J Prev Med* 2015;48(1):89 – 92. <http://dx.doi.org/10.1016/j.amepre.2014.07.032>.
 4. Green AC, Driezen P, Noar SM, Hammond D, Fong GT. Impact of adding and removing warning label messages from cigarette packages on adult smokers' awareness about the health harms of smoking: findings from the ITC Canada Survey. *Tob Control* 2019;28(e1):e56 – 63. <http://dx.doi.org/10.1136/tobaccocontrol-2018-054885>.
 5. World Health Organization. WHO framework convention on tobacco control. Geneva: the WHO Document Production Services. <https://apps.who.int/iris/bitstream/handle/10665/42811/9241591013.pdf;jsessionid=0CBEF9FC1B9F32464CF46622BE9AD3BB?sequence=1>.
 6. State Tobacco Monopoly Administration. Provisions of the People's Republic of China on cigarette packaging marks 2008: 4. <https://wenku.baidu.com/view/b5ecbfe8998fcc22bcd10dd5.html>. [2020-05-19]. (In Chinese).
 7. China National Tobacco Corporation. Notice of China Tobacco Corporation on Further Strengthening the warning signs of cigarette packaging. 2011. http://www.tobacco.gov.cn/html/49/3829706_n.html. [2020-05-19]. (In Chinese).
 8. State Tobacco Monopoly Administration. Interpretation of the regulations of the People's Republic of China on the packaging and marking of cigarettes. 2016. http://www.tobacco.gov.cn/html/27/2703/4916673_n.html. [2020-05-19]. (In Chinese).
 9. Li XH. China Adult tobacco survey 2018 report. Beijing, China: People's Medical Publishing House, 2020. (In Chinese).
 10. Yang GH. Global adult tobacco survey (GATS) China 2010 country report. Beijing, China: Three Gorges Press, 2011. (In Chinese).
 11. Yong HH, Borland R, Thrasher JF, Thompson ME, Nagelhout GE, Fong GT, et al. Mediation pathways of the impact of cigarette warning labels on quit attempts. *Health Psychol* 2014;33(11):1410 – 20. <https://pubmed.ncbi.nlm.nih.gov/24977309/>. DOI: 10.1037/hea0000056.
 12. Hammond D, Fong GT, McDonald PW, Cameron R, Brown KS. Impact of the graphic Canadian warning labels on adult smoking behaviour. *Tob Control* 2003;12(4):391 – 5. <http://dx.doi.org/10.1136/tc.12.4.391>.
 13. Stewart DW, Cano MÁ, Correa-Fernández V, Spears CA, Li YS, Waters AJ, et al. Lower health literacy predicts smoking relapse among racially/ethnically diverse smokers with low socioeconomic status. *BMC Public Health* 2014;14: 716. <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-14-716>.
 14. Kennedy RD, Spafford MM, Behm I, Hammond D, Geoffrey TF, Borland R. Positive impact of australian 'blindness' tobacco warning labels: findings from the ITC four country survey. *Clin Exp Optom* 2012;95(6):590-8. <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1444-0938.2012.00789.x>.
 15. Van Mourik DJA, Candel MJJM, Nagelhout GE, Willemsen MC, Yong HH, van den Putte B, et al. How the new European Union's (pictorial) tobacco health warnings influence quit attempts and smoking cessation: findings from the 2016-2017 International Tobacco Control (ITC) Netherlands Surveys. *Int J Environ Res Public Health* 2019;16(21):4260. <http://dx.doi.org/10.3390/ijerph16214260>.
 16. Hammond D, Thrasher J, Reid JL, Driezen P, Boudreau C, Santillán EA. Perceived effectiveness of pictorial health warnings among Mexican youth and adults: a population-level intervention with potential to reduce tobacco-related inequities. *Cancer Causes Control* 2012;23(S1):57 – 67. <http://dx.doi.org/10.1007/s10552-012-9902-4>.
 17. World Health Organization. WHO report on the global tobacco epidemic 2019. https://www.who.int/tobacco/global_report/en/. [2019-05-19].