



# Effectiveness of school-based smoking intervention in middle school students of Linzhi Tibetan and Guangzhou Han ethnicity in China



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## HIGHLIGHTS

- Smoking situation of Linzhi Tibetan is more serious than that of Guangzhou Han.
- The intervention was effective in increase of knowledge in both two ethnic groups.
- The intervention did not change smoking behavior in either ethnic group.
- The intervention changed attitude toward smoking in Tibetan but not so in Han.
- This intervention was more effective for Tibetan when compared with Han ethnic group.

## ARTICLE INFO

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## ABSTRACT

**Purpose:** The purpose of this paper is to assess the effectiveness of school-based intervention aimed to increase knowledge, to change attitudes and to reduce smoking-related behavior in both Linzhi Tibetan and Guangzhou Han middle school students in China.

**Design:** A concurrent intervention study was conducted in both Linzhi and Guangzhou. Two schools were randomly chosen and one was randomly assigned to the intervention group and the other to the control group in both settings.

**Setting/participants:** Participants were grade one and grade two middle school students drawn from two schools in Linzhi, Tibet Autonomous Region (southwest China) and two schools in Guangzhou, Guangdong Province (south China).

**Intervention:** The intervention program lasted for one year and covered three aspects: health policies in school, health environment in school and personal health skills.

**Main outcome measures:** Primary outcomes were smoking-related knowledge, attitudes and behavior (including ever smoking, daily smoking, weekly smoking and current smoking) and were measured by a self-administered questionnaire before and after the intervention.

**Results:** This intervention increased smoking-related knowledge in both Tibetan ( $\beta = 1.32$ , 95% CI (0.87–1.77)) and Han ethnic groups ( $\beta = 0.47$ , 95% CI (0.11–0.83)). It changed attitudes toward smoking in Tibetan ( $\beta = 1.47$ , 95% CI (0.06–2.87)) but not so in Han ( $\beta = -0.33$ , 95% CI (-1.68–1.01)). The intervention changed the prevalence of smoking in neither ethnic groups ( $P > 0.05$ ).

**Conclusions:** The impact of school-based smoking intervention is different among Tibetan and Han students. This intervention was more effective for Tibetans when compared with the Han ethnic group. More research is needed on how intervention can be adapted to address ethnic and cultural differences.

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## 1. Introduction

### 1.1. Smoking is a grave concern globally

Health problems caused by tobacco usage are still severe (WHO, 2008, 2009c). The World Health Organization (WHO) estimates that there are about one billion smokers worldwide (WHO, 2010). Almost 6 million people die from tobacco use or exposure each year, accounting

for 6% of all female deaths and 12% of all male deaths in the world (WHO, 2009a).

### 1.2. Adolescent smoking status is severe

Adult smoking habits are mostly formed in adolescence (Warren, Jones, Eriksen, & Asma, 2006). Monitoring the Future study in 2012 shows that 19% of 12th graders were current smokers in the U.S. (Johnston, Malley, Bachman, & Schulenberg, 2012). The European School Survey Project on Alcohol and Other Drugs (ESPAD) in 2011 shows that on average, 28% of the students in the ESPAD countries had used cigarettes during the past 30 days (Hibell et al., 2011). The Global Youth Tobacco Survey (GYTS) from Indonesia showed that 41.0% of the boys and 3.5% of the girls currently smoked cigarettes (WHO, 2009b).

### 1.3. Smoking status in China

China is the world's largest tobacco producer, consumer and one of 14 countries of high burden of tobacco use (Hsia et al., 2010). Previous research of adolescents reported that 28% to 43% of males and 1% to 11% of females identified themselves as smokers (Chen et al., 2006). Additional data suggest that smoking rates in adolescents have been on the rise, and the age of smoking initiation is becoming younger (Zhang, Tian, Hou, & Li, 2003). Reducing the prevalence of tobacco use among adolescents remains a key public health priority in China (Hastings & Angus, 2008).

### 1.4. Difference exists among ethnic groups

People of different ethnic groups usually have different dialects and culture, resulting in disparities in behaviors among ethnic groups (Caraballo, Yee, Gfroerer, & Mirza, 2008). Thus, the effects of the smoking intervention program may be distinct between ethnic groups. For example, one study reported that the non-Arab American students were 23% less likely to smoke cigarettes as compared to Arab American youths (Rice, Weglicki, Templin, Jamil, & Hammad, 2010). In another study, Hispanics were more likely than whites to quit smoking (Kahende, Malarcher, Teplinskaya, & Asman, 2011).

China is a multi-ethnic country covering a vast territory. The Han nationality is the majority group with a population of over 1.2 billion, which accounts for 91.5% of the Chinese population. Tibetans have a population of over 5.41 million, which ranks eighth among all minorities (National Bureau of Statistics of China, 2010). Few studies have examined Tibetan adolescents' smoking rate. However, one study in Linzhi, Tibet showed that 14.8% of middle school students were current cigarette smokers (Chen et al., 2010), indicating a need for greater clarity about smoking rates. Furthermore, there are no reported intervention studies targeting Tibetan adolescents' smoking status.

### 1.5. Background on school-based smoking intervention

School-based smoking intervention programs are considered to be one of the most effective strategies for reducing smoking prevalence among adolescents (Gingiss, Roberts-Gray, & Boerm, 2006). Such programs aim at providing smoking-related health information, and pursue strategies based on social competence or social influence (Wiehe, Garrison, Christakis, Ebel, & Rivara, 2005). School-based smoking intervention programs have shown evidence to improve adolescents' smoking knowledge, attitudes (Lee, Wu, Lai, & Chu, 2007; Park, 2006) and decrease smoking behaviors both in China and globally (Chen, Fang, Li, Stanton, & Lin, 2006; Sun, Miyano, Rohrbach, Dent, & Sussman, 2007).

### 1.6. Purposes and hypothesis of this study

The purposes of the current study are to examine the smoking status of middle school students at two sites (Linzhi and Guangzhou) between two ethnic groups (Tibetan and Han), and to compare the effectiveness of the intervention among students of these two ethnic groups. We hypothesize that the intervention is effective in controlling and preventing smoking in both locations and that the size of the effect vary depending on distinct ethnic characteristics.

## 2. Methods

### 2.1. Settings

The study was conducted in Linzhi of Tibet Autonomous Region (southwest China) and Guangzhou of Guangdong Province (south China). Linzhi is located in the southeast of Tibet Autonomous Region with a total population of 140,000, of which more than 90% are Tibetans. Guangzhou is the capital city of Guangdong Province with a population of 12.7 million, the majority of which is Han.

### 2.2. Study design

A school-based intervention study was conducted from September 2008 to September 2009 in both Linzhi and Guangzhou, with intervention group and control group at each site. School-based tobacco control intervention was given to the intervention group while no specific intervention was given to the control group. Differences in attitudes, knowledge and behaviors between the intervention and control groups were compared each site separately before and after the intervention. In addition, the intervention effects between the two study sites were compared.

### 2.3. Participants

Participants of the study were first and second year middle school students. Randomization occurred at the school level to avoid contamination between groups. Two out of seven middle schools were randomly selected in Linzhi and two were randomly selected in Guangzhou. The two chosen schools of each site were then randomly assigned to the intervention or control group. All students of first and second years of the selected schools (712 in Linzhi and 1,105 in Guangzhou) were invited and all of them agreed to participate in the study. Written informed consent was obtained from school teachers and verbal informed consent was obtained from the students. Approval for the design and data collection procedures was obtained beforehand from the ethic committee of the School of Public Health, Sun Yat-sen University.

### 2.4. Data collection

Questionnaire surveys were conducted on all study objects before and after the intervention (i.e., the baseline survey in September 2008 and the follow-up survey in September 2009). Research assistants were recruited from the school of public health at the medical colleges at each site and received trainings on how to collect data and perform quality control. Surveys were completed in classrooms under supervision of qualified research assistants. Pre-post surveys were anonymous, and matched on sex, school, ethnicity, first letters of family name and first name. Pre-post surveys which could not be matched were excluded. A total of 709 and 1098 matched questionnaires were collected in Linzhi (correspondence rate 99.6%) and Guangzhou (correspondence rate 99.4%) respectively.

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