



The nonmedical use of prescription medicines among high school students: A cross-sectional study in Southern China



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ARTICLE INFO

Article history:

Received 15 November 2013

Received in revised form 18 March 2014

Accepted 12 April 2014

Available online 23 April 2014

Keywords:

High school students

Nonmedical prescription medicine

NMUPM

Adolescents

ABSTRACT

Objectives: The objective of this study was to examine the prevalence of the nonmedical use of prescription medicines (NMUPM) and the association between NMUPM and demographic, family and school factors. **Methods:** A cross-sectional study was conducted from 2007 to 2009. A total of 21,672 middle and high school students were surveyed in seven cities of Guangdong Province. Self-reported NMUPM and information regarding family and school factors were collected. Multilevel logistic regression analyses were used to explore potentially influential factors.

Results: Of the total sample, the mean age was 16 (± 1.9) years. Approximately 6.0% of respondents reported lifetime NMUPM. The most common nonmedically used prescription drug among NMUPM users was scattered analgesics, at approximately 3.9%, followed by cough medicine with codeine (2.1%). Multi-level logistic regression analysis indicated that living arrangements, available money, social friends, and smoking were significantly correlated with NMUPM among boys and girls. Academic achievement and family relationships were only significantly correlated with NMUPM among girls, and communication with parents was only associated with NMUPM among boys.

Conclusions: These results indicate that NMUPM represented a considerable problem for particular subgroups of adolescents. A well-established surveillance system and target intervention programs are needed given the potential long-term negative outcomes of NMUPM.

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1. Introduction

Over the past decades, increased attention has focused on the nonmedical use of prescription medicines (NMUPM) among adolescents. It is reported that psychotherapeutic drugs are a larger part of the overall U.S. drug problem (Substance Abuse and Mental Health Services Administration (SAMHSA), 2012). The increasing rate of NMUPM may contribute to the perception that prescription medication is safer and less stigmatizing than illicit drugs and is widely available (Fleary et al., 2013). Young people are less concerned about the dangers of using these prescription drugs outside of a medical regimen (SAMHSA, 2012). Schepis and colleagues

found that NMUPM was a risk factor for the onset of psychopathology, such as depressive disorder, bipolar disorders and anxiety disorder (Schepis and Hakes, 2011). The National Survey on Drug Use and Health (NSDUH) also reported that substance abuse and mental health problems commonly co-occur and that psychological problems may be a consequence of substance use. Obviously, NMUPM holds negative implications for the health and well-being of individuals.

Prior research has found a number of influential factors to be associated with NMUPM. Adolescents from single-parent or absent-parent households were at higher risk of NMUPM than were adolescents from dual-parent households (Nakawaki and Crano, 2012). Fang's research among adolescent Asian-American girls found that frequent mother–daughter communication was associated with reduced prescription drug misuse (Fang et al., 2011). Other factors including family environment, total family income and the widely described characteristics factors (sex, gender) were

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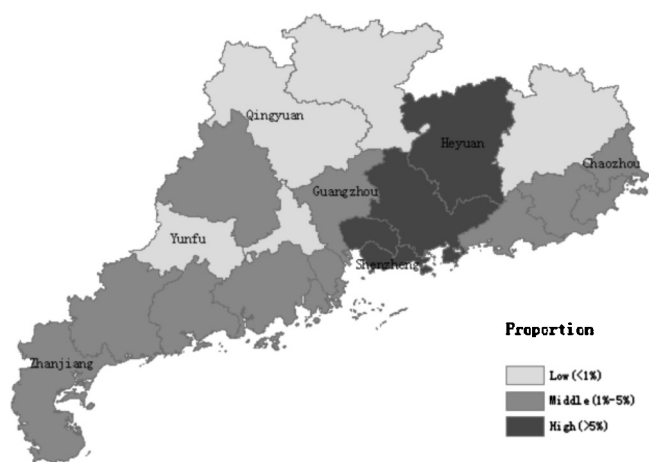


Fig. 1. Distribution of seven selected cities.

also found to be associated with NMUPM (Cummings and Davies, 2002; Herman-Stahl et al., 2006; Huebner and Howell, 2003). In addition, McCabe found a significantly greater risk for substance use among students who had poor academic achievement and also reported that school commitment predicted NMUPM (McCabe et al., 2004). It was theorized that school provides a stake in conformity, whereas substance use runs counter to that conformity (Collins et al., 2011).

Adolescent nonmedical use of prescription drugs has been well documented in Europe and America. Sporadic surveys have been conducted in China, and there is still no NMUPM surveillance system to determine the prevalence and demographics of adolescent Chinese NMUPM. We carried out this cross-sectional study among high school students in Guangdong Province. The main aims of the present study were to assess the prevalence of NMUPM within a large sample of randomly selected high school students and to determine the correlations of nonmedical use in terms of demographic characteristics, family related factors and school-related factors.

2. Methods

2.1. Sample and procedure

A cross-sectional study was conducted among high school students in Guangdong Province, located in the southeast of China. This school-level study aimed to investigate the prevalence of NMUPM as well as explore the influential factors correlated with NMUPM. Multistage stratified cluster sampling was adopted to randomly sample high school students in Guangdong Province. In Stage 1, geographic areas were selected based on surveillance data on "non-medical use of cough syrup with codeine" from the Center for ADR Monitoring and by location (see Fig. 1). Based on the surveillance data on the population of nonmedical users of cough medicine with codeine during 2007–2008, we categorized the cities in Guangdong Province into three categories: (1) high (cities accounted for more than 5% of this population); (2) middle (cities accounted for 1–5% of this population); and (3) low (cities accounted for less than 1% of this population). Combined with the geographic factors, seven cities were selected to participate in our study: Yunfu, Heyuan, Guangzhou, Shenzhen, Qingyuan, Zhanjiang, and Chaozhou. In Stage 2, schools in each city were selected. The schools in Guangdong were divided into five categories based on teaching quality: key middle/high school, regular middle/high school and vocational school. Two key high schools, two regular high schools and two vocational schools were selected in Yunfu, Heyuan and Guangzhou; two regular high schools, two key high schools, two vocational schools, three regular middle schools, and three key middle schools were selected in Qingyuan, Zhanjiang, Chaozhou and Shenzhen. In Stage 3, two classes were randomly selected from each grade within the selected schools. All students in the selected classes were invited to participate in our study.

2.2. Data collection

Data collection was carried out in two waves. In wave one, the study was conducted in Yunfu, Heyuan, and Guangzhou among high school and vocational school students. Eighteen schools with 5450 high school students participated in our study.

In wave two, 48 schools from Qingyuan, Zhanjiang, Chaozhou and Shenzhen participated. A total of 16,300 students participated in our study. The response rate was 100% for the two waves. A total of 21,750 students in the selected classes were invited to participate in this study, and 21,672 (99.6%) students provided usable information. Students were required to fill in self-administered questionnaires anonymously in classrooms in the absence of schoolteachers to avoid any potential information bias. The survey was administered under the supervision of investigators who were trained medical graduate students. Participants were informed about the objectives and procedures of the study, and their participation was entirely voluntary. Before the survey was administered, written consent from students was obtained, and a statement of their confidentiality was emphasized. All data were collected from 2007 to 2009.

2.3. Ethical statement

The study received approval from the Sun Yat-Sen University School of Public Health Institutional Review Board. Participants were fully informed of the purpose of the study and were invited to participate voluntarily. Written consent letters were obtained from the school, each participating student and one of the students' parents.

2.4. Measures

2.4.1. Dependent variable. The dependent variable was the measure of lifetime NMUPM, which was assessed with the following question: "Have you ever, even once, used any of the drugs listed below when you were not sick or just for the experience without a doctor's orders?" followed by a list of specific psychoactive medicines. The response categories were "yes" and "no". Notably, most research examines the misuse of "any" prescription drug, whereas in our research, we only involved four specific classes of medicines: cough syrup with codeine, Valium, tramadol and scattered analgesics (traditional Chinese medicine). The list of medications was developed in collaboration with medicines reported to be widely used by adolescent drug abusers in rehabilitation centers and a list provided by the Food and Drug Administration (FDA). We also believed that specific drugs were important in broadening our understanding of NMUPM.

2.4.2. Independent variables. The sociodemographic variables considered were age, grade, gender, and student's pocket money (students were asked how much pocket money on average they received per month from their parents. The rating choices for this item were (1) lower than 100 Yuan [Y]; (2) 100–299 Yuan; (3) 300 Yuan or more. Other factors were considered, including social friends (do you have friends who have dropped out of school?) and smoking (have you used more than 20 cigarettes in the past half year?).

2.4.3. Family and school-related factors. Living arrangement was assessed by asking who lived in the student's primary home. Family economic status was measured by asking the student's perception of his or her family's current economic status. Family communication was assessed by asking the students how often they communicated with their parents on the issues of everyday life (coded on a 3-point scale from often to scarcely). Parental caring was assessed by asking "Are you satisfied with the care and love you receive from your parents, based on a 3-point scale from satisfied to dissatisfied?" Family relationships were assessed by asking the students how they judged the relationships between their family members. Classmate relationships and relationships with teachers were also assessed based on the students' self-ratings of their relationships with classmates and teachers (responses were coded as "good," "general" or "bad"). Academic achievement was captured by a single item asking for a personal appraisal of students' performances relative to that of their classmates (responses were coded as "above average," "average" or "below average").

2.5. Statistical analysis

All statistical analyses were conducted using Stata 12.0. Descriptive analyses were used to describe demographic characteristics and the prevalence of NMUPM. To assess any differential relationship across gender, analyses were conducted separately for boys and girls. All factors that were statistically significant in the univariate analysis were further analyzed by multivariate analysis in order to identify variables that were independently predictive of NMUPM. Because individuals were grouped into schools, and therefore not independent, a multilevel analysis was carried out to select possible factors that could have influenced school bullying. Two-level logistic regression models were fitted in which schools were treated as clusters. Statistical significance was evaluated at the <0.05 level using two-sided tests. The questionnaires were reasonably complete; the percentage of missing data was less than 2% for all relevant variables, and missing data were eliminated in the multilevel analysis.

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