Original Research

Self-medication practices with antibiotics among Chinese university students

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ABSTRACT

Objectives: Self-medication with antibiotics (SMA) is a serious global health problem. We sought to investigate SMA behaviors and risk factors among Chinese university students, and further explore the association between SMA practices and adverse drug events (ADEs).

Study design: Cross-sectional study.

Methods: An online survey was conducted at Jiangsu University (JSU) in eastern China in July 2011 using a pretested questionnaire.

Results: Out of 2608 website visitors, 1086 participated in the survey (response rate: 41.6%), 426 respondents were excluded for not being a JSU student or repeat participation, 660 (2.2% of JSU students) were included in analysis, and 316 students (47.9) had a lifetime history of SMA. Among self-treated students, 43.5% believed that antibiotic was suitable for viral infections, 65.9% had more than one SMA episode in the previous year, 73.5% self-medicated with at least two different antibiotics, 57.1% and 64.4% changed antibiotic dosage and antibiotics during the course, respectively. Female gender, older age, and prior knowledge of antibiotics (PKA) were identified as independent risk factors of SMA. There was no difference between students with and without PKA regarding SMA frequency, use of polyantibiotics, and switching antibiotic dosage or antibiotics. ADEs happened to 13.3% of self-medicated students. Frequent change of dosage and simultaneous use of the same antibiotic with different names were independent risk practices associated with an ADE.

Conclusions: Our findings substantiate high SMA prevalence among Chinese university students. Older age and PKA are independent SMA risk factors common to Chinese

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university students and female gender is exclusive SMA risk factor for JSU students. Poor SMA practices are associated with ADEs. Strict regulations on antibiotic sales and public education reinforced by further health care reform are recommended.

Introduction

Self-medication with antibiotics (SMA), defined as antibiotic use by individuals to treat symptoms/diseases without professional advice or prescription, is a serious global health problem.[1,2] Studies on SMA in different countries involved mostly self-reported surveys; thus the true frequency of SMA practice is uncertain. The reported estimates of SMA frequencies in the general population are 3%—19% in developed countries and 9%—100% in developing countries, with consequences of masking symptoms, treatment failure, drug resistance, and adverse drug events (ADEs) including death.[1—3]

Many studies have reported SMA frequencies, poor SMA practices such as frequent change of dosage or antibiotics, and SMA risk factors mostly related to gender, age, education level, antibiotic knowledge, and income; however, these risk factors vary in different populations or countries and thus remain controversial, and SMA practices of risk populations are seldom evaluated.[1,2] ADE, defined as 'an injury resulting from the use of a drug, including harm caused by the drug (adverse drug reactions and overdoses) and harm from the use of the drug (including dose reductions and discontinuations of drug therapy)',[4] is a common consequence of SMA but rarely reported along with other consequences of SMA, due to difficulties in follow-up and critical evaluation.

Our previous study at Shantou University (STU) in southern China has demonstrated a high SMA rate and risky SMA behaviors of university students.[2] In this study, we aimed to confirm our previous findings, especially isolated risk factors (viz. prior knowledge of antibiotics [PKA], older age, and higher allowance) among university students in eastern China, and further explore the association between SMA practices and adverse drug event (ADE).

Methods

A university intranet-based online questionnaire survey was conducted over a month in July 2011 at Jiangsu University (JSU) hosting 30,535 students from 26 colleges/schools, with medical students constituting the largest proportion (10.6%). The questionnaire that we used in our previous study (available at http://www.sojump.com/jq/757672.aspx; also see Supplementary File 1),[2] included 24 questions about SMA practices and antibiotic knowledge. Students were invited to participate anonymously in the study via the JSU website, flyers, and posters with a chance to win a lucky draw as incentive for participation. Repeat participation by the same student was prevented by screening the IP address,

submission time, and answering patterns. Only completed questionnaires submitted by JSU students were included in analysis.

SMA was defined as taking over-the-counter antibiotics (without prescription) for self-treatment. PKA was defined as knowledge acquired through formal lectures about antibiotics in the medical school.

Chi-square test was used to examine the association between demographic variables (gender, age, major, education level, monthly allowance, insurance, and hometown) and SMA. The variables with significant differences were included in bivariate correlation and unconditional logistic regression analyses to identify SMA risk factors. For subgroup analysis, the participants were divided into PKA ($n = 247$) and non-PKA ($n = 337$) or ADE ($n = 42$) and non-ADE ($n = 274$) groups, based on the previously recognized risk factor PKA[2] or their experiences of ADE, respectively. The associations between PKA or ADE and antibiotic knowledge or SMA practices/attitude of self-medicated students were evaluated by Chi-square test and unconditional logistic regression as well. In logistic models, we used a propensity score as a covariate to control potential confounding factors (viz., gender, age, education level, monthly allowance, insurance, and hometown) as described previously.[5,6] In brief, propensity score for each participant was calculated through logistic models, where PKA was used as dependent variable with the confounding factors mentioned above as independent variables, generating a score which represented the possibility of having PKA for each participant. Antibiotic knowledge/SMA practices were further used as dependent variables respectively with PKA and the generated score as independent variables to investigate the influence of PKA on antibiotic knowledge/SMA practices. All the analyses were conducted in SPSS 17.0.

Results

Out of 2608 website visitors, 1086 participated in the survey (response rate 41.6%; 1086/2608). Among the respondents, 426 were excluded for not being a JSU student or repeat participation, and 660 (2.2% of JSU students) were included in analysis. The demographic characteristics of respondents and their SMA practices are shown in Table 1. Students were aged 18—45 years (median: 21, interquartile range: 21—22). Nearly half of the students (47.9%, 316/660) had a lifetime history of SMA.

Those being female, older than 23 years, majoring in medicine, or having a masters degree had higher odds of self-medication, and those receiving a monthly allowance of 501 to 1000 RMB (approximately US$ 80 to US$ 160) had lower odds of