Priority Health Behavior Practices Among Chinese Undergraduate Students

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Abstract

English:

This study examined the priority health behaviors among Chinese youth by administering a questionnaire to 1,917 undergraduates enrolled in three universities in China. The response rate was 89.7%. This survey found that 75.2% of the participants tried cigarettes at least once during their lifetime, over half had their first cigarette and alcoholic drink before age 15, and over 80% had their first cigarette and alcoholic drink by age 18. During the month preceeding the survey, 50.6% consumed five or more alcoholic drinks on a single occasion and 8.1% carried a weapon at least once. Twenty-two percent had at least three servings of fruits and vegetables the day before the survey, 35.3% engaged in vigorous physical activity on three or more of the seven days preceding the survey, 66.9% rarely or never wore motorcycle helmets, 13.4% seriously considered attempting suicide, and 3.9% had an STI. Results were analyzed by sex, age, and hometown.

Results show that many Chinese college students have engaged in behaviors that put their health in danger. Effective health education programs are needed to reduce health risks leading to deaths and disabilities among Chinese youth.

Spanish:

Este estudio examino los comportamientos de salud prioritarios entre la juventud China por medio de una encuesta administrada entre 1,917 estudiantes universitarios de licenciatura enrolados en tres universidades de China. El indice de respuesta fue de 89.7%. Este cuestionario encontró que 75.2% de los participantes han probado cigarrillos por lo menos una vez en sus vidas, mas de la mitad probo su primer cigarrillo y bebida alcohólica antes de los 15 años de edad y mas del 80% probo su primer cigarrillo y bebida alcohólica antes de los 18 años. Durante el mes antes de la encuesta, 50.6% consumió cinco o mas bebidas alcohólicas en una sola ocasión y 8.1% porto armas por lo menos una vez. Veintidós porciento consumió por lo menos tres raciones de frutas y vegetales el día antes de la encuesta, 35.3% realice alguna actividad fisica vigorosa tres o mas de los siete días antes de realizarse la encuesta, 66.9% raramente o nunca utilizaron cascos para motocicletas, 13.4% seriamente consideraron suicidarse y 3.9% tuvieron una infección de transmisión sexual. Los resultados fueron analizados por género, edad y ciudad de residencia.

Los resultados demuestran que muchos estudiantes universitarios Chinos participan en comportamientos que ponen su salud en peligro. Programas para educación de la salud que sean efectivos, son necesarios para reducir los factores de riesgo en salud que llevan a muerte e incapacidad entre la juventud China.

Chinese:

本文采用问卷调查的方式去了解中国大学本科生的健康行为。研究对象为位于华东三所大学中的1917名本科生。问卷回收率为89.7%。结果显示在被调查的本科生中曾经吸烟者达75.2%，半数以上在不足十五岁时就以经吸过烟或饮过酒，80%以上在不足十八岁时就以经吸过烟或饮过酒。半数以上曾经饮酒者在回答问卷前30天酗酒(连续饮用至少五杯酒)至少一次。在回答问卷前一天，22%的本科生进食至少三个水果或三份蔬菜。在被调查的本科生中，每周至少参加三天强烈体育活动者达35.3%，在过去一年中骑摩托车时从未带过头盔者达66.9%，在过去一年中曾经很认真的考虑过试图自杀着达13.4%，曾经患过性病者达3.9%。

以上结果显示，很多中国大学本科生从事危害他们身心健康的行为。有效的健康教育项目必需尽快建立以便减少中国青少年从事这些导致死亡及病残的有害行为。

Key Words: Chinese, College Students, Health Behaviors

Introduction

The burden of chronic disease is increasing at a rapid pace worldwide. According to a report from the World Health Organization (WHO), chronic disease was a contributing factor in approximately 60% of the 56.5 million reported deaths globally and contributed approximately 46% to the spread of disease worldwide in 2001 (WHO, 2002). Numerous studies conducted in the United States have demonstrated that the leading causes of death in the U.S., such as heart disease, cancer, and injuries, are largely caused by a relatively small number of preventable behaviors. These behaviors (such as drinking alcohol, smoking cigarettes, unhealthy diet and physical inactivity, unintentional injuries, and unprotected sexual intercourse) identified by the Centers for Disease Control and Prevention (CDC) are often interconnected, started during youth, and extended into adulthood (CDC, 2003; Mokdad, Marks, Stroup, & Gerberding, 2004; Sorof, Lai, Turner, Poffenbarger, & Portman, 2004).

Contrary to common belief, a chronic disease epidemic is emerging in the developing countries (WHO, 2003). Similar patterns of risk behaviors that contribute to chronic diseases, such as diet and physical inactivity, have also been observed in the developing countries. Chio, Bonita, and McQueen (2001) suggested that chronic diseases are sometimes communicable at risk factor level because like an infectious disease, the patterns of risk behavior practices travel across countries and are transferable from one population to another affecting disease patterns worldwide (WHO). Today in China, obesity is an increasing trend, unintentional injuries and some health problems related to smoking and lack of exercise are becoming more frequent (Yu, 2002), accidental injury is the number one cause of death among adolescents (Ye, 1997), and sexually transmitted infections (STIs) including HIV/AIDS are spreading rapidly (Gao, Lu, Shi, Sun, & Cai, 2001; Ye).

Specifically, China is the leading country in cigarette consumption in the world (Kumra & Markoff, 2000). An estimated 330 million Chinese smokers had smoked daily for six months or longer during their lives (Yang, et al., 1999), equal to the number of smokers in all developed countries combined. Similar to the pattern observed in the U.S. (Hesketh, Ding, & Tomkins, 2001), a very small proportion of youth started smoking at a very young age in China, increased rapidly from 5-13, and peaked at 14-15 years of age (Chen, et al., 2001). By the time Chinese reach 25 years of age, two thirds of the men become daily smokers (Yang, et al.). As a result, smoking kills 700,000 people each year and deaths caused by lung cancer have rapidly increased from 30,000 in 1975 to 250,000 in 2003 in China (Watts, 2004). If current rates of new smokers persist in China, tobacco will kill one third of all Chinese men currently under 30 (about 100 million) before they reach 70 years of age (GLOBALink, 1997).

Similarly, alcohol use has been a serious problem in China. The reported rates of having consumed alcohol among Chinese were 70% among 6th, 8th, and 10th graders (Li, Fang, Stanton, Feigelman, & Dong, 1996), 72.9% among female and 92.7% among male college students (Han, Wang, & Ye, 1994). Lu, Engs, and Hanson (1997) found that 10% of male Chinese college students reported drinking alcohol daily, 19.1% weekly, 33.6% monthly, and only 8.2% abstained; whereas 2.6% of female Chinese college students reported drinking alcohol daily, 7.6% weekly, 24.4% monthly, and 52.6% abstained. The rate of current alcoholic drinking is much higher (45.2%: 82.6% for males and 25.6% for females) among Chinese adults 15-65 years old with, and 45.2% overall (Hao, Young, Xiao, & Li, 2000).

The limited number of studies conducted in China has revealed the serious patterns of tobacco and alcohol use among the Chinese population. However, few studies conducted in China examined other risk behaviors contributing to chronic diseases and major social problems such as unhealthy diets and physical inactivity, behaviors contributing to unintentional injuries and violence, and sexual behaviors contributing to unintended pregnancy and STI/HIV. To assess health behaviors among Chinese college students, this study was designed to examine the six priority health behaviors identified by CDC (2003): tobacco use, alcohol and other drug use, dietary behaviors, physical activity, behaviors contributing to unintentional injuries and violence, and sexual behaviors contributing to unintended pregnancy and STD/HIV.

Method

A cross-sectional survey was employed to examine the six priority health behaviors among undergraduate students enrolled in three large universities in eastern China. An approval of research involving human participants was obtained from the Institutional Review Board at a U.S. institution where the researcher was employed. The survey instrument was based on the National College Health Risk Behavior Survey (CDC, 1997). The researcher who is a native Chinese and proficient in English translated the instrument into Chinese. A second professional health educator whose native language is Chinese and proficient in English verified the Chinese version of the instrument. Although reliability data on most of the items that measure the six groups of priority health behaviors in this survey

were reported elsewhere (Berner, Collins, Kann, Warren, & Williams, 1995), tests for Cronbach coefficient reliabilities were conducted because the instrument was translated into Chinese and used for the Chinese population. It is noted that a few Cronbach alphas in Table 1 fell below 0.60. However, in social science studies, coefficient alpha reliabilities under 0.60 have been reported frequently in the literature (Hatcher & Stepanski, 1994). To reduce response bias, one item asking the respondent whether he or she answered the questions truthfully was included at the end of the survey.

Study Setting and Sample Selection

The setting of the study was three large comprehensive universities in eastern China. Convenience sampling was used to identify study participants. One contact person, usually the student health service coordinator or the student affairs coordinator, in each university was identified and informed of the study purpose and procedures for data collection. The contact person identified 3-15 student leaders in each university to assist in data collection. The student leaders were told the purpose of the study and received training in data collection. Because student leaders in Chinese schools and universities are elected by students and highly respected, their assistance in data collection would encourage participation of fellow students.

Table 1. Cronbach Coefficient Alpha

Dependent Variables	# of Items	Cronbach Coefficient Alpha
Overall	45	0.81
Cigarette use	6	0.69
Cigar use	1	na
Alcohol use past 30 days	2	0.68
Other Drug use	3	na[1]
Dietary behavior	7	0.47
Physical activity	4	0.57
Behaviors led to Unintentional Injuries & Violence	11	0.66
Sexual behaviors	6	na[2]
Demographic Information	5	0.52

Note:

1. The 3-item Other Drug use subscale measured three different constructs: respondents' behavior of any illegal drug use, respondents' knowledge of someone who had used illegal drugs, and respondents' intention to use illegal drugs.
2. The 6-item Sexual Behavior subscale measured two different constructs with one item measuring the history of sexually transmitted disease and the remaining five items measuring sexual behaviors. Of the five items measuring sexual behaviors, four items were answered by less than 2% of the respondents (n=24) and no valid analysis could be conducted.

Data Collection and Data Analyses

In China, nearly all of the university students live in on-campus dormitories and study various subjects mostly in their home classrooms, making these places the ideal sites for data collection. The volunteer student leaders were provided with sufficient copies of the questionnaire for administration to all students either in their home classrooms during self-study time or in their dormitories in the evenings. Participants were informed that their responses would be anonymous and their participation would be completely voluntary.

Of the 1,917 questionnaires administered in the three universities, 1,719 were returned (response rate 89.7%) and 1,498 were from participants who indicated that he or she had answered the questions truthfully and were included in data analyses (78.1% usable). Data were analyzed using descriptive statistics and Chi-square tests. Frequencies and percentages by sex, age, and hometown were compared and reported.

Results

Demographic Characteristics and Background Information

Of the 1,498 respondents, 35.6% were females, 84.4% were 22 years or younger, 61.1% were from urban and suburban areas, and 1.4% were married (Table 2). Over half of the participants reported that their weight was normal and they had good health. Majority of the participants indicated that they slept seven to eight hours per day, yet felt somewhat stressed.

Table 2. Percentage Distribution of Demographic and Background Data

		Female	Male
Category	Total	35.6	64.4
Age group			
18-19 years	36.0	16.9	19.1
20-22 years	48.4	15.5	32.8
>22 years	15.6	3.2	12.5
Hometown			
Urban/Suburban	61.1	28.7	32.4
Rural/Small Town	38.9	6.9	32.0
Marital status			
Unmarried	97.7	35.0	62.7
Married	1.4	0.2	1.4
Other	0.9	0.4	0.5
Weight			
Underweight	31.4	10.4	21.0
Normal	54.2	20.3	34.0
Overweight	8.63	2.23	6.4
Unknown	5.76	2.73	3.0
Perceived health status			
Good	67.2	22.6	44.6
Average	28.0	11.2	16.8
Poor	4.8	1.9	3.0
Mean # of hours sleep/day			
<7 hrs	6.6	1.9	4.7
7-8 hrs	80.1	29.9	50.2
>8 hrs	13.3	3.81	9.5
Perceived stress level			
Very stressful	9.0	2.1	6.9
Somewhat stressful	78.5	29.9	48.6
Not stressful	12.5	3.60	8.9

Tobacco Use

Over three quarters of the respondents were lifetime smokers (having tried at least one or two puffs of cigarette during lifetime), 19.8% had smoked cigarettes daily (at least one cigarette every day for 30 days) at some time during their lifetime, 44.7% were current smokers (had smoked one or more cigarettes during the 30 days proceeding the survey), 1.5% were current frequent cigarette smokers (had smoked cigarettes on more than 20 days during the 30 days proceeding the survey), and 18.1% tried smoking a cigar during their lifetime (Table 3). When compared to their counterparts, male students, older students (≥20 years), or students from rural and small towns were significantly more likely to be lifetime smokers. Males were significantly more likely than females to be lifetime daily smokers. Lifetime daily smokers did not vary by age or hometown.

Among the lifetime smokers, 22.6% tried their first cigarette under age 11, 28.2% had their first cigarette between ages 11 and 14, and 30.8% smoked for the first time between ages 15 and 18 (Table 4). The age of becoming a lifetime smoker varied significantly by gender, age, and hometown. Nearly 16% of the lifetime daily smokers had smoked cigarettes regularly (at least one cigarette every day for 30 days at some time during their lifetime) before they reached age 11, 14.1% became lifetime daily smokers between ages 11 and 14, and 32.7% started smoking cigarettes regularly between ages 15 and 18. The age of first becoming a lifetime daily smoker varied significantly by gender and age group (Table 4).

Alcohol and Other Drug Use

Nearly nine of ten respondents were lifetime drinkers (had at least one drink of alcohol sometime in their lifetime (Table 5). Male students and younger students (<20 years) were significantly more likely than their counterparts to be lifetime drinkers. Although only 2% of the respondents were current frequent alcohol drinkers (alcohol use in at least 20 of the 30 days preceding the survey), over half of the respondents reported current episodic heavy drinking (consuming five or more drinks of alcohol on at least one occasion during the past 30 days proceeding the survey).

Table 3. Percentage of Undergraduate University Students Aged ≥ 18 Years Who Reported Having Used Tobacco, by Gender, Age, and Hometown

	Cigarette use				Cigar
Category	Lifetime†	Lifetime daily‡	Current§	Current frequent¥	Ever used
Gender	χ^2=172.8***	χ^2=11.81**	χ^2=198.65***	*ns*	χ^2=57.48***
Female	54.5	7.3	8.2	0.0	7.3
Male	86.6	21.2	59.8	1.5	23.8
Age group	χ^2=9.43**	*ns*	χ^2=37.10***	*ns*	χ^2=23.53***
18-19 years	70.6	14.3	38.2	2.5	12.2
20-22 years	77.5	19.7	48.2	0.9	19.9
>22 years	79.2	26.3	60.1	1.2	26.8
Hometown	χ^2=34.32***	*ns*	χ^2=24.43***	χ^2=11.91*	*ns*
Urban/Suburban	69.7	20.2	40.6	2.8	18.4
Rural/Small Town	83.7	18.0	54.2	0.0	17.6
Overall	75.2	19.8	44.7	1.5	18.1

ns=non-significant, * $p<.05$, ** $p<.01$, *** $p<.001$

† Ever smoked at least one or two puffs of a cigarette.

‡ Ever smoked at least one cigarette every day for 30 days.

§ Smoked cigarettes on ≥ 1 of the 30 days proceeding the survey.

¥ Smoked cigarettes on >20 of the 30 days proceeding the survey.

Male students or students from rural and small towns were significantly more likely than their counterparts to be engaged in current frequent drinking of alcohol. When compared to their counterparts, respondents who were males, older than 22 years of age, or from rual and small towns were significantly more likely to engage in current episodic heavy drinking of alcohol behavior. Among all respondents, 32.4% had their first drink of alcohol at age 10 or younger, 19.7% between ages 11 and 14, and 27.1% between ages 15 and 18. In other words, 80% of the respondents had their first drink of alcohol when they were age 18 or younger.

A small percentage of the respondents (2%) reported having tried an illegal drug during their lifetime (Table 5). Male students were significantly more likely than female students to have tried illegal drugs.

Dietary Behaviors and Physical Activity

A small proportion of all the respondents (22%) reported having eaten three or more servings of fruits and vegetables during the day preceding the survey (Table 6). Female students or students from urban and suburban areas were significantly more likely than their counterparts to have eaten three or more servings of fruits and vegetables during the day preceding the survey. Having breakfast daily during the 30 days preceding the survey was reported by 37.6% of the respondents. Female students were significantly more likely than male students to have had breakfast daily during the 30 days preceding the survey.

Table 4. Percentage of Undergraduate University Students Aged ≥ 18 Years Who Reported the Age of First Cigarette Use, by Gender, Age, and Hometown†

	Ever used			Lifetime daily‡		
Category	≤ 10 years	11-14 years	15-18 years	≤ 10 years	11-14 years	15-18 years
Gender		$\chi^2=18.65$**			$\chi^2=29.68$***	
Female	21.1	41.0	27.0	41.2	29.4	23.5
Male	22.9	26.3	31.3	8.8	13.1	35.1
Age group		$\chi^2=36.30$***			$\chi^2=27.46$*	
18-19 years	22.3	34.1	33.6	17.4	21.7	47.8
20-22 years	23.0	26.4	31.5	9.9	12.1	30.8
>22 years	21.8	23.2	24.7	14.3	11.9	23.8
Hometown		$\chi^2=14.87$*			*ns*	
Urban/Suburban	22.2	30.2	27.4	14.4	15.5	35.1
Rural/Small Town	23.1	23.1	34.1	11.0	13.4	31.7
Overall	22.6	28.2	30.8	15.6	14.1	32.7

ns=non-significant, * $p<.05$, ** $p<.01$, *** $p<.001$

† Among the 75.2% of respondents who reported having ever tried cigarette smoking.

‡ Ever smoked at least one cigarette every day for 30 days.

Among all respondents, 35.3% reported having engaged in vigorous physical activity "that made you sweat and breathe hard" for at least 20 minutes on three or more of the seven days preceding the survey and 15.9% reported having participated in moderate physical activity such as walking or bicycling for at least 30 minutes at a time on five or more of the seven days preceding the survey (Table 6). Participation in vigorous physical activity was significantly higher among male students than among female students, but did not vary significantly by age group or hometown. Students who were younger than age 20 or older than 22 or came from urban and suburban were significantly more likely to participate in moderate physical activities than their counterparts. Moderate physical activity did not vary significantly by gender.

Unintentional Injury

Since the vast majority of the Chinese do not own an automobile, this section focused on students' behaviors when they use other means of transportation such as bicycles, motorcycles, and being driven by someone else. Of the 18% of respondents who rode a motorcycle during the 12 months proceeding the survey, nearly two-thirds (66.9%) rarely or never wore motorcycle helmets (Table 7). It was found that 92.2% of the respondents reported having ridden bicycles during the 12 months proceeding the survey. One-quarter (25.6%) of the bicycles riders reported having had at least one bicycle accident with 23% requiring treatment by a doctor or nurse (Table 7). The

older university students (>22 years old) were significantly more likely than the younger students to have more severe bicycle injuries that required medical attention.

Table 5. Percentage of Undergraduate University Students Aged ≥ 18 Years Who Reported Having Drunk Alcohol or Used Any Illegal Drugs, by Gender, Age, and Hometown

Category	Alcohol use			Lifetime any illegal drug use¥
	Lifetime†	Current frequent‡	Current episodic heavy drinking§	
Gender	χ^2=50.00***	χ^2=121.04***	χ^2=70.25***	χ^2=8.85*
Female	80.9	0.9	24.2	0.6
Male	92.6	2.4	58.8	2.9
Age group	χ^2=64.95***	*ns*	χ^2=24.87**	*ns*
18-19 years	85.6	1.3	42.2	2.4
20-22 years	90.4	1.9	52.7	1.3
>22 years	89.4	4.1	63.8	3.6
Hometown	*ns*	χ^2=13.17*	χ^2=15.96**	*ns*
Urban/Suburban	87.8	1.2	45.4	1.4
Rural/Small Town	89.5	3.2	58.3	3.1
Overall	88.5	2.0	50.6	2.0

ns=non-significant, * $p<.05$, ** $p<.01$, *** $p<.001$,
† Ever drank at least one drink of alcohol.
‡ Drank alcohol on >20 of the 30 days proceeding the survey.
§ Drank ≥ 5 drinks of alcohol on at least one occasion on ≥ 1 of the 30 days proceeding the survey.
¥ Ever tried any illegal drugs.

Of all respondents, 9.4% had ridden in a car dirven by someone who had been drinking alcohol the 30 days proceeding the survey, male students, students under 20 years of age, or students from urban and suburban hometowns were significantly more likely than their counterparts to have ridden in a car dirven by someone who had been drinking alcohol. Among 14.5% respondents who reported having driven a car, 31.5% had driven a car without a driver's license. Driving without a driver's license did not vary significantly by gender, age group, or hometown location.

International Injury

Among all respondents, 8.1% reported carrying a weapon, such as a gun, knife, or club, at least one day during the 30 days proceeding the survey; and 10.6% had been involved in at least one physical fight during the 12 months proceeding the survey (Table 8). Male students were significantly more likely than female students to have carried a weapon and had a fight. Students younger than 20 years were significantly less likely to fight than those aged 20 years or older. Carrying a weapon did not vary significantly by age group. Where students came from did not have a significantly impact on the behavior of carrying a weapon or having a physical fight. Nearly one third (32.7%) of the respondents who reported having had at least one physical fight during the 12 months proceeding the survey were injuried at least once and needed treatment by a doctor or nurse. Injuries from fighting that required medical attention did not vary significantly by gender, age group, or hometown.

Students were asked about suicide thoughts and attempts during the 12 months proceeding the survey. Among all respondents, 13.4% reproted having seriously considered attempting suicide, 4.0% made a suicide plan, and 1.6% attempted suicide at least once. Of those who reported having seriously considered attempting suicide, 29.1% had made specific plans to attempt suicide, and 12.4% had attempted suicide (Table 9). Suicide thoughts and attempts did not vary significantly by gender, age group, or hometown

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Table 6. Percentage of Undergraduate University Students Aged ≥ 18 Years Who Participated in Selected Dietary Behaviors and Physical Activities, by Gender, Age, and Hometown

Category	Had ≥ 3 servings of fruits and vegetables†	Daily breakfast‡	Participated in virgorous physical activity§	Participated in moderate physical activity¥
Gender	$\chi^2=32.86$***	$\chi^2=94.85$***	$\chi^2=101.81$***	*ns*
Female	30.3	21.8	15.4	53.0
Male	17.5	42.5	16.2	29.1
Age group	*ns*	*ns*	*ns*	$\chi^2=24.82$*
18-19 years	25.1	32.3	16.2	39.9
20-22 years	21.1	35.2	15.3	37.4
>22 years	17.7	42.7	16.5	32.7
Hometown	$\chi^2=36.74$***	*ns*	*ns*	$\chi^2=21.50$**
Urban/suburban	27.29	34.4	18.9	40.0
Rural/Small Town	13.85	36.6	11.2	34.0
Overall	22.0	37.6	35.3	15.9

ns=non-significant, * $p<.05$, ** $p<.01$, *** $p<.001$

† During the day proceding the survey.

‡ Had breakfast daily for the 30 days proceeding the survey.

§ Activities that caused sweating and hard breathing for ≥ 20 minutes on three or more of the seven days proceeding the survey.

¥ Walked or bicycled for ≥ 30 minutes on five or more of the seven days proceeding the survey.

Sexual Behaviors

Among all respondents, 11.5% reported having had sexual intercourse and 3.9% indicated being told by a doctor or nurse that they had an STI (Table 10). Respondents who were males, older than 22, or from rural and small towns were significantly more likely than their counterparts to have had sexual intercourse. Students from rural and small towns were significantly more likely to have been diagnosed with an STI in their lifetime. Although there were items measuring other sexual behavior (e.g., age of the first sexual intercourse, condom use, alcohol use before sexual intercourse, contraception use in last intercourse, and the number of lifetime sexual partners), less than 2% of the respondents (n=24) answered these items.

Discussion and Conclusion

This study revealed that many college students in China had engaged in several risk behaviors that left them vulnerable to serious health problems. Such risk behaviors include the top three actual causes of death in the United States (U.S.) in 2000 (tobacco use, alcohol use, and diet and physical inactivity) that contributed to over one third (38%) of all U.S. deaths (Mokdad, et al., 2004). This study found that 75% of the participants reported having tried cigarettes during their lifetime, over half of them (51%) tried their first cigarette before they reached age 15, and 82% tired their first cigarette before age 18. Such a pattern of first use was similar to U.S. youth reported by the U.S. Surgeon General in 1995 (USDHHS, 1995) and among Chinese youth (Chen, et al., 2001; Hesketh, et al., 2001). When compared to the 1995 U.S. National College Health Risk Behavior Survey (CDC, 1997), the prevalence of lifetime daily smokers and current frequent smokers were lower among Chinese college students (20% vs. 31% and 2% vs. 17%, respectively), but the percentage of current smokers was much higher among Chinese college students (45% vs. 29%). The U.S. Surgeon General indicates that the earlier the age when young people begin using tobacco, even with low levels of tobacco use, the higher the risk of long-term addiction and the more likely young people are to have negative respiratory and non-respiratory health consequences (USDHHS, 1995). The survey results confirm that reducing the number of new smokers remains a major public health challenge in China (Cole, 1999).

Table 7. Percentage of Undergraduate University Students Aged ≥ 18 Years Who Participated in Selected Behaviors that Contributed to Unintentional Injury, by Gender, Age, and Hometown

Category	Rarely/never wore motorcycle helmets†	Had ≥1 bicycle accident‡	Had ≥1 bike injury to be treated by a doctor/nurse‡	Rode in a car driven by someone who had been drinking alcohol§	Had driven a car without a driver's license¥
Gender	*ns*	*ns*	*ns*	$\chi^2=15.22$**	*ns*
Female	67.5	28.7	17.8	27.5	27.5
Male	66.8	24.0	24.9	32.1	32.1
Age group	*ns*	*ns*	$\chi^2=34.94$***	$\chi^2=26.33$**	*ns*
18-19 years	61.5	24.5	19.8	33.8	33.8
20-22 years	65.1	26.4	18.3	30.2	30.2
>22 years	80.0	25.3	46.1	30.6	30.6
Hometown	*ns*	*ns*	*ns*	$\chi^2=13.89$*	*ns*
Urban/Suburban	34.7	26.3	20.4	35.0	35.0
Rural/Small Town	31.6	24.4	26.2	26.3	26.3
Overall	66.9	25.6	23.0	9.4	31.5

ns=non-significant, * *p*<.05, ** *p*<.01, *** *p*<.001

† Among the 18.0% of respondents who rode a motorcycle during the 12 months proceeding the survey.

‡ Among the 92.2% of respondents who rode a bicycle during the 12 months proceeding the survey.

§ During the 30 days proceeding the survey.

¥ Among 14.5% who had ever driven a car.

Table 8. Percentage of Undergraduate University Students Aged ≥ 18 Years Who Participated in Selected Behaviors that Contributed to Intentional Injury, by Gender, Age, and Hometown

Category	Carried a weapon†	Participated in a physical fight‡	Injured in a fight ≥1 time to be treated by a doctor/nurse§
Gender	$\chi^2=18.36$**	$\chi^2=47.77$***	*ns*
Female	4.6	2.3	55.0
Male	10.6	15.3	28.5
Age Group	*ns*	$\chi^2=16.27$*	*ns*
18-19 years	7.9	9.0	27.5
20-22 years	8.3	11.8	28.1
>22 years	11.5	14.2	47.4
Hometown	*ns*	*ns*	*ns*
Urban/Suburban	9.2	11.5	31.1
Rural/Small Town	8.0	14.3	32.9
Overall	8.1	10.6	32.7

ns=non-significant, * *p*<.05, ** *p*<.01, *** *p*<.001

† Weapons such as a gun, knife, or club on ≥ 1 of the 30 days proceeding the survey.

‡ Fighting one or more times during the 12 months proceeding the survey.

§ Among the 10.6% who reported having had a physical fight during the 12 months proceeding the survey.

This study revealed that Chinese college students had a serious problem with their alcohol use behavior, especially the age of first use. The majority (80%) of the Chinese college students surveyed reported having had at least one drink when they were age 18 or younger. It is more troublesome that nearly one-third of the participants had their first drink of alcohol at the age of 10 or younger because research in the U.S. has discovered that the younger the age when people begin drinking alcohol, the more likely they will become alcohol dependent later in life (Grant & Dawson, 1997). The over consumption of alcohol, in turn, will result in negative health problems. Although the prevalence of having one or more drinks of alcohol in at least 20 days during the past month was lower among Chinese college students than that among U.S. college students (2% vs. 4%), a much higher proportion of Chinese college students consumed five or more drinks of alcohol on a single occasion during the past month than their U.S. conterparts (51% vs. 35%) (CDC, 1997).

For dietary behaviors and physical activities, only 22% of the Chinese college students consumed at least three servings of fruits and vegetables. The majority of Chinese participants (62%) did not have breakfast daily during the past month. When compared with U.S. college students (CDC, 1997), a smaller proportion of Chinese college students participated in vigorous or moderate physical activity (35% vs. 38% and 16% vs. 20%, respectively). Although most of the Chinese students surveyed reported riding bicycles in the past year (92%), few of them walked or bicycled for at least 30 minutes at a time on five or more days in the past week, indicating that bicycles were used primarily as a means of transportation rather than for recreation or exercise. This is consistent with the report by Hu, et al. (2002) that among the adults who engaged in moderate physical activities regularly (53% of the respondents), 77% of them were commuters. When the majority of the Chinese college students surveyed failed to consume adequate amount of fruits and vegetables, have daily breakfast, and be physically active, Chinese youth may face the same problems of overweight that Americans have experienced. Such findings indicate that the epidemic of obesity is no longer a problem limited to industrialized nations (WHO, 2000). Developing countries such as China may see a trend toward increasing overweight and obesity among their residents.

Chinese college students surveyed seemed to be more likely than their U.S. counterparts to have engaged in behaviors that place them at high risk of unintentional injuries. This study revealed that the proportion of Chinese college students surveyed who rarely or never wore motorcycle helmets were nearly two times higher than that among U.S. college students (67% vs. 34%) (CDC, 1997). Nearly all of the bicycle accidents reported by Chinese participants resulted in injuries that required medical attention. This indicates that there were more severe bicycle injuries. Although the location of any bicycle injury was not examined in this study, it is reasonable to speculate that there were more head injuries because bicycle helmets were not used or promoted in China and the road conditions were not safe. Another problem behavior identified was that many Chinese students reported driving without a driver's license.

The proportion of responding Chinese students engaged in behaviors that contributed to intentional injuries was similar to that among U.S. college students for carrying a weapon (8.1% vs. 8.0%) and for participating in a physical fight (10.6% vs. 10.2%) (CDC, 1997). When compared with U.S. college students (CDC), a higher proportion of the Chinese participants had seriously considered suicide (13% vs. 10%), a smaller percentage of Chinese respondents made a suicide plan (4% vs. 7%) and similar percentage of the Chinese participants attempted suicide at least once in the past year (1.6% vs. 1.5%).

It seems that Chinese college students surveyed were less likely to be sexually active than their U.S. counterparts. This survey found 12% of the Chinese students had sexual intercourse compared to 86% of the U.S. college students (CDC, 1997). Because of the very low response to the items measuring other sexual behaviors (i.e., number of sex partners, condom and contraceptive use), no valid analyses could be conducted to identify how many Chinese college students engaged in risky sexual behaviors. However, a very small percentage of the Chinese students surveyed indicated being married (1.4%) at the time of the survey, indicating that some Chinese college students might have exposed themselves to an unnecessary risk of an STI. Such a low response rate to items measuring sexual behaviors might have been caused by embarrassment of the participants. Traditionally, Chinese do not discuss their sexual behaviors in public nor reveal them to an "outsider." This could also be caused by their lack of knowledge. In this survey, 36% of the participants reported having been taught sexuality and STI/HIV prevention. It is reasonable to question the effectiveness of sex education in Chinese schools.

Table 9. Percentage of Undergraduate University Students Aged ≥ 18 Years Who Reported Having Thought Seriously about Attempting Suicide and Who Reported Suicidal Behavior, by Gender, Age, and Hometown

Category	Seriously considered attemping suicide†	Made a suicide plan†§	Attempted suicide at least once†§
Gender	*ns*	*ns*	*ns*
Female	16.0	22.4	5.3
Male	12.9	32.4	15.8
Age group	$\chi^2=8.12$*	*ns*	*ns*
18-19 years	11.8	24.5	8
20-22 years	13.4	29.7	11.5
>22 years	20.3	35.7	17.9
Hometown	*ns*	*ns*	*ns*
Urban/Suburban	15.3	31.5	12.4
Rural/Small Town	11.8	24.5	10.4
Overall	13.4	29.1	12.4

ns=non-significant, * $p<.05$, ** $p<.01$, *** $p<.001$

† During the 12 months proceeding the survey.

§ Among the 13.4% who reproted having seriously considered attempting suicide during the 12 months proceeding the survey.

Table 10. Percentage of Undergraduate University Students Aged ≥ 18 Years Who Reported Selected Sexual Behaviors, by Gender, Age, and Hometown

Category	Ever had sexual intercourse	Ever had an STD†
Gender	$\chi^2=44.00$***	*ns*
Female	3.3	3.5
Male	15.5	4.0
Age group	$\chi^2=51.46$***	*ns*
18-19 years	6.2	3.9
20-22 years	11.9	3.7
>22 years	22.7	4.3
Hometown	$\chi^2=21.83$**	$\chi^2=3.81$*
Urban/Suburban	8.7	3.0
Rural/Small Town	15.6	5.2
Overall	11.5	3.9

ns=non-significant, * $p<.05$, ** $p<.01$, *** $p<.001$

† Had ever been told by a doctor or nurse.

Similar to the findings from the 1995 U.S. National College Health Risk Behavior Survey (CDC, 1997), certain subgroups of Chinese college students were more likely to engage in certain risk behaviors. Among the Chinese college students surveyed, males were significantly more likely than females to participate in current frequent smoking, current frequent drinking, current episodic heavy drinking, and physical fights. Male students were significantly more likely than female students to have tried a cigarette, a cigar, an illegal drug; had a drink of alcohol in their lifetime; had less than three servings of fruits and vegetables; skipped daily breakfast; ridden in a car driven by someone who had been drinking alcohol; carried a weapon; and had sexual intercourse. By contrast, females were significantly more likely than males to have their first cigarette smoke and become a lifetime daily smoker at a younger age and not participate in vigorous physical activity.

The survey results confirmed the findings reported by other researchers that cigarette smoking was significantly more prevalent among males than among females in China (Hesketh, et al., 2001; Li, Fang, & Stanton, 1996; Zhu, et al., 1992). The proportion of males and females who drank alcohol was similar to those reported elsewhere (Han, et al., 1994; Li, Fang, Stanton, Feigelman, et al., 1996; Liu, 1997; Lu, et al., 1997; Wei, et al., 2000).

Students older than 22 years of age were significantly more likely than those aged 22 years or younger to have tried a cigarette or a cigar in their lifetime, be a current frequent smoker, participate in current episodic heavy drinking or physical fight, have bicycle injuries, seriously consider suicide, and have ever had sexual intercourse. Students from rural and small towns were significantly more likely than those from urban and suburban hometowns to have tried a cigarette in their lifetime, be a current frequent smoker, be a current frequent drinker, participated in current episodic heavy drinking, had fewer than three servings of fruits and vegetables, not participated in moderate physical activity, and ridden in a car driven by someone who had been drinking alcohol.

Limitations and Recommendations

As with all studies, this one is subject to certain limitations. First, although this study has a relatively large sample size and high response rate, the participants were selected conveniently. Therefore, the generalization of the survey results to students in other colleges and universities in China should be done with caution. Future studies should employ randomized sampling methods, such as the one used in the 1995 U.S. National College Health Risk Behavior Survey (CDC, 1997), to have a representative sample of all Chinese college students.

Second, very few participants responded to the items measuring their sexual behavior, making it impossible to examine the patterns of sexual behavior practice among Chinese college students. This could have been caused by the lack of appropriate sex education programs in Chinese schools. Therefore, effective sex education should be introduced in schools, colleges and universities in China to increase Chinese youth's knowledge of human sexuality and develop effective communication skills for them to discuss sex related issues honestly and openly. Future studies should continue to examine the behaviors that lead to unintended pregnancy and STIs including HIV/AIDS.

Third, although the overall prevalence of any illegal drug use was very low, no additional items were included to examine the commonly used illicit drugs among Chinese college students. Similarly, no items were included to examine the weight problem, means of controlling weight, or high fat diet behavior among Chinese college students. Since the Chinese government opened its door to the western world, western lifestyles (both positive and negative), along with science and technology have swamped the country. Because the patterns of risk behavior practices travel across countries and are transferable from one population to another (Chio, et al., 2001), Chinese youths may engage in illegal drug use, have overweight problems, and eat high fat diet. Future studies need to examine these areas.

Even with the above limitations, this survey revealed that many Chinese college students engaged in behaviors that put their health at risk and lives in danger. The current status of health education programs on Chinese college campuses is unclear and need to be examined in future studies. Comprehensive health education programs that address the priority health behaviors need to be developed and implemented on Chinese college campuses. Organized campaigns must be further strengthened to prevent the initiation of tobacco and alcohol use, especially in the youth. Chinese colleges and universities should examine and adapt effective health education strategies and programs developed in the U.S. and avoid the negative lessons that U.S. youth have experienced.

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