A Survey of Sexual Knowledge, Attitudes, Desire and Behavior among University Students

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Running Head: Sexual knowledge and behavior among university students
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Abstract—*Sexual health (SH) and sexual behavior of young people have become a growing public concern. But few studies have been conducted to investigate the prevalence and psychosocial correlates of this phenomenon.*

Purpose: *To understand college students' sexual knowledge (SK), sexual attitudes (SA), sexual desire (SD) and sexual behavior (SB).*

Methods: *A self-reported questionnaire survey on SK, SA, SD, and SB was conducted among 520 university students. Their demographic data, SK, SA, SD, and SB were assessed.*

Results: *A total of 500 students completed the questionnaire. The SKS total score had a mean of 23.05; 105 (21.0%) subjects had had premarital sex; 121 (24.2%) had a partner; 117 (23.4%) had a medical educational background. The results demonstrated an increased risk of premarital sex amongst males and subjects with the risk factors of smoking, drinking, having a partner, and having higher levels of SD and SK and more open SA.*

Conclusions: *This study provides support for the idea that university students lack SK (especially regarding contraception knowledge), even though the students had a medical educational background. Additionally, a considerable amount of them engaged in premarital SB. Our findings also suggest that university students need sex education, particularly in combining sexuality with their life, in relating to others maturely as a sexual individual, in employing contraception, and in preventing sexually transmitted diseases (STDs). Our study suggests that interventions aimed at expanding university students' SK and other related skills are required.*

Keywords-- University students; Sexual behavior; Sexual knowledge; Sexual attitude

I. INTRODUCTION

Problems resulting from sexual activity, such as sexually transmitted diseases (STDs), unwanted pregnancies, have been increasing among young people. Jones data reports that men who pay for sex in Britain remain at greater risk of STI acquisition and onward transmission than men who do not. They also point out high numbers of partners, but the minority is paid partners. They are an important core group in sexually transmitted infection transmission.[1]

STDs, especially human immunodeficiency virus infection (HIV) and acquired immunodeficiency syndrome (AIDS), are one of the most imperative and urgent public health concerns facing governors and the public all over the world. A study showed that the SB of adolescents is highly related to various public health issues.[2] For instance, sexual intercourse without protection among adolescents leads to unexpected pregnancies, abortions, pregnancy-related problems, and STDs including HIV/AIDS.[3]

By 2011, the number of HIV patients had risen to 22,020 (8,413 of whom had developed full-blown AIDS with 3,360 deaths) in Taiwan. An analysis of risk factors showed that highest proportion (72.2%) of HIV infections was a result of unsafe sexual transmission with men who have sex with men (MSM). Second largest proportion (17%) of infections was heterosexual contact[4] In the last decade, adolescents were found to undertake sexual activity at a younger age.[5]

Young generations in Taiwan have become increasingly broadminded about sex and are becoming more and more sexually active. One-night stand has become prevalent among adolescents, where many of them meet through the Internet. With the documented prevalence of an earlier sexual debut, multiple partners, lack of consistent condom use and the subsequent increase of STDs among adolescents. And in the absence of vaccine and effective anti-retroviral drugs, prevention of risky sexual behavior remains an essential intervention strategy. With the increased opening up of society, more young people have more open SA and SB, but their knowledge of sexuality has not improved accordingly, especially regarding the use of contraceptive methods or safe sex. This has resulted in more pregnancies out of wedlock and STIs. Therefore, educational institutions need to pay more attention to exploring the phenomenon and further improving knowledge and awareness of sexuality. The purposes of this study were to (1) understand the SK, SA, SD, and SB of college students; (2) probe the current knowledge status of students regarding safe sex for the propose a plan for improvement; (3) analyze the impact of students' sexual experiences to investigate why premarital sex occurs; (4) explore the impact of obesity on students' SB and SD.

II. METHODOLOGY

A cross-sectional community based observational descriptive study was conducted about SK, SA, SD, and SB among college students of Chang Gung University of Science and Technology, Tzu Chi College of Technology, and National Dong Hwa University carried out in 2013. Data for this study was collected from 500 students studying in 3 universities in north and eastern of Taiwan. The scientific committee which includes ethical review board of Chang Gung University of Science and Technology has approved the proposal and was in accordance with the Declaration of Helsinki. All participants had given informed written consent.

Undergraduate students enrolled in Taiwan universities in 2013 academic year were included for the study. Purposive sampling was used. The participants were not limited to specific departments, but had to be over 20 years old.

2.1 Procedure

Self-reported questionnaire was used for data collection. There was a cover letter on the questionnaire describing the purpose of the study and stressing the confidentiality of the given information. The IRB consent form was signed by the participants before they started to fill out the questionnaire. The participants were asked to indicate their height, weight, body mass index (BMI), lifestyle, SA, SK, SD,

and SB in the questionnaire. The participants were placed in a quiet room to complete the anonymous self-administered survey.

2.2 Assessment instruments

Following instruments were used in this study

- **Demographic questionnaire**

This questionnaire included 16 items, which were mainly of multiple choices. There were 16 demographic items, including gender, age, relationship condition, educational category, religion, cardiovascular disease (CVD) history, smoking and drinking habits, awareness of one's health condition, relation to a partner, and so forth. Data were gathered using self-reported questionnaires and in-person interviews. Data on height, weight and BMI, were recorded by the researcher. BMI is a statistical measurement defined as the body weight (in kilograms) divided by the square of the height (in meters). The Taiwanese Department of Health (DOH) defines overweight as a person's BMI is greater than 24 and obese as one's BMI is greater than 27. These definitions differ from those of WHO-Asia, which defines overweight as a person's BMI greater than 23 and obese as one's BMI greater than 25.[6] The Taiwanese obesity definition was used in this study.

- **Sexual Knowledge Scale (SKS) and Sexual Attitudes Scale (SAS)**

The SKS and SAS, developed by Lin,[7,8] were utilized to measure SK and SA constructs. The Cronbach's alpha of SKS was 0.80, and the Cronbach's alpha for SAS was 0.71.

- **Sexual Desire Inventory (SDI)**

The Chinese version of SDI (SDI-C) was based on Spector's 14-item SDI,[9,10] and it was used to measure SD in this study. Based on the factor analysis results of Lee et al, the 14-item scale was categorized into 3 factors, namely solitary, dyadic, and mixed factors. The fit indices were p=0.68 and GFI=0.93 for the 3-factor model.

- **Sexual Behavior Scale (SBS)**

The SBS includes 13 items concerning social as well as physical sexual activity in terms of frequency. The frequency of sexual activity may be chosen from never, less than once per month, once to twice monthly, once weekly, and daily during the past year, whilst sexual activity includes hugging, holding hands, embracing, kissing, caressing, masturbation and sexual intercourse.[11]

2.3 Statistical Analysis

Univariate descriptive statistics included the frequency of distributions for categorical demographic variables with means and standard deviations for measurement of SB, SD, SK and SA. Associations was inferred by Chi-square test. Some of each demographic variables were not in a normal distribution, so Mann-Whitney U (M-W U) test or Kruskal-Wallis H (K-W H) test were used to find out the difference in means. Data analyses were conducted with SPSS for Windows version 18 (SPSS, Chicago Illinois, USA). The divergence among groups was considered significant if the p-value was less than 0.05.

III. RESULTS

3.1 Subject characteristics

Subjects were between 20 to 27 years old with mean age 20.71 ± 0.96 years with M:F ratio1:2.8. Of the 500 participants, 121(24.2%) had a sexual partner , 383 (76.6%) participants had a medical educational background, 74 (14.8%) of the participants performed at least once heterosexual oral sex in the previous month and about 105 (21.0%) had at least one penetrative vaginal intercourse in the last month. Approximately 7.2% of subjects were obese and 61.0% of subjects had a religious belief. About 12.0% of the participants had a drinking habit and 4.6% had a smoking habit (Table 1)

Table 1
Descriptive Characteristics of the Study Population

Characteristics		Number (N=500)	Percentage (%)
Gender	Male	131	26.2
	Female	369	73.8
Religious belief	Yes	305	61.0
	No	195	39.0
BMI	<27	464	92.8
	≥ 27	36	7.2
Medical Educational Background	Yes	383	76.6
	No	117	23.4
Smoking	Yes	23	4.6
	No	477	95.4
Drinking	Yes	60	12
	No	440	88
Partner	Yes	121	24.2
	No	179	75.8
Intercourse	Yes	105	21
	No	395	79

BMI=body mass index

3.2 Sexual knowledge

Sexual knowledge was tested with 30 items. Scores were calculated by gaining one point for every correctly answered question (Table 2). Only 3 (~0.6%) of the 500 participants correctly answered all 30 questions. The results showed a SK mean score of 23.05 ± 4.46, which is fairly low. Knowledge of contraception was very low, especially low on the item asking if pregnancy is possible two weeks before the menstrual cycle (the correct answer rate was only 23.8%). The second lowest item is "whether oral contraceptives should not be taken only before every sexual intercourse" (the correct answer rate was only 47.0%) (Table 2).

Table 2
Correct Sexual Knowledge wise distribution of Study Population (N=500)

S. No.	Characteristics	Percentage (%)
A	**Knowledge of Reproduction**	
1	Fetus's gender is decided by the sperm	**73.8**
2	Pregnancy is impossible if the sperm do not enter the vagina	**50.4**
3	Women in the post-menstrual cycle have reproductive capability	**73**
4	Men less than 16 years old still have reproductive capability	**69.6**
5	Women in the early period of pregnancy have no menstruation	**83.8**
6	Sperm is not produced by the penis	**73.8**
7	Whether pregnancy is achieved or not is related to the wife and husband	**96.6**
8	Pregnancy is possible if intercourse does not reach a climax	**88.8**
9	There may be a small amount of sperm even if the sexual ability is normal	**79.6**
10	Reproductive ability is unrelated to the size of the penis	**86.6**
B	**Knowledge of Contraception**	
1	Oral contraceptives should not be taken only before every sexual intercourse	**47**
2	The condom is used to prevent sperm from entering the vagina	**92**
3	All contraceptive methods are not 100% effective	**88**
4	Sperm can survive in the vagina about 2~3 days	**73.4**
5	We can buy oral contraceptives and condoms in the drug store	**85.6**
6	Pregnancy is possible if intercourse occurs only once	**83.6**
7	Pregnancy is possible if the female menstrual cycle is irregular	**61.2**
8	Pregnancy is possible if intercourse occurs during the two weeks before the MC	**23.8**
C	**Knowledge of Sexual Health**	
1	Women should take a shower during their menstruation period	**82**
2	Masturbation is not harmful	**56.2**
3	Sperm cannot be transformed into blood and is not a source of power	**70**
4	Nocturnal emissions will not affect health and sexual ability	**67.2**
5	Consanguineous marriage will lead to a high possibility of a defective fetus	**86.8**
6	The probability of pregnancy for women with normal sexual intercourse decreases with age, especially after 35 years old	**67.8**
D	**Knowledge of AIDS**	
1	AIDS may be transmitted to anyone, not only among homosexuals	**94.8**
2	Mothers with HIV will transmit AIDS to the fetus	**88.6**
3	AIDS will be transmitted by sharing needles	**92.4**
4	AIDS is not transmitted by speaking with, shaking hands with, hugging an HIV carrier	**88.4**
5	The probability of transmitting AIDS can be reduced by using a condom	**89.2**
6	HIV carriers look like normal people	**91**

Mean score: 23.05 ± 4.46

3.3 Association of Medical educational background and Sexual activity with other variables

When relationship between age, BMI, Sexual attitude, sexual desire, sexual knowledge with sexual intercourse and medical education background of study population was revealed sexual intercourse was found significant in all studied variables except with knowledge of reproduction and AIDS. Likewise medical education background was found significant in all studied variables except with BMI and Sexual desire.

In general, the non-sexual intercourse students had a low level of SD (including total scores, solitary, dyadic and comparative items), SK (including total scores, contraception and sexual health items) and more conservative SA. The participants with sexual intercourse experience had a significantly higher level of SK, SD and more open SA ($p < 0.05$) (Table 3)

Table 3
Relationship between age, BMI, sexual attitude, sexual desire, sexual knowledge score with sexual intercourse and medical educational background of Study Population (N=500)

Variables	Sexual intercourse		P value	Medical Educational background		P value
	No (n=395)	Yes (n=105)		No (n=117)	Yes (n=383)	
BMI	21.56±3.64	21.30±3.64	**0.336** [a]	21.95±4.03	21.37±3.50	**0.231** [a]
Sexual attitude	23.97±3.78	25.55±2.96	**<0.001** [a]*	25.03±3.75	24.08±3.62	**0.003** [a]*
Sexual desire total score	17.42±19.48	41.39±18.83	**<0.001** [a]*	26.13±24.24	21.33±20.71	**0.149** [a]
Solitary	4.17±6.51	7.78±8.20	**<0.001** [a]*	5.96±7.38	4.61±6.92	**0.064** [a]*
Dyadic	9.37±10.55	24.52±10.59	**<0.001** [a]*	14.22±13.63	12.05±11.74	**0.284** [a]
Comparative	3.87±4.32	9.09±3.97	**<0.001** [a]*	5.95±5.23	4.67±4.55	**0.048** [a]*
Sexual knowledge total score	22.77±4.58	24.10±3.79	**0.006** [a]*	21.06±5.38	23.66±3.95	**<0.001** [a]*
Reproduction	7.71±1.79	7.96±1.50	**0.343** [a]	7.09±2.10	7.97±1.56	**<0.001** [a]*
Contraception	5.45±1.47	5.90±1.25	**0.005** [a]*	5.11±1.68	5.68±1.33	**0.001** [a]*
Sexual health	4.20±1.50	4.68±1.34	**0.003**[a]*	3.69±1.62	4.49±1.38	**<0.001** [a]*
AIDS	5.42±1.11	5.55±0.94	**0.122** [a]	5.17±1.37	5.53±0.95	**0.003** [a]*

[a] Using Mann-Whitney U test * Significantly different (p-value < 0.05)
BMI= body mass index AIDS= acquired immunodeficiency syndrome

3.4 Relation between Sexual activity with Demographic variable

When relationships between sexual intercourse and demographics variables were further analyzed it was found that the relationships between sexual intercourse and gender (χ^2=4.494; p <0.05), smoking (χ^2=40.687; p <0.001), drinking (χ^2=10.087; p <0.001), and having a partner (χ^2=405.914; p <0.001) were significantly greater among the sexual intercourse subjects than among those without sexual intercourse experience (Table 4). Because 99.7% of subjects without partner had no sexual intercourse experience, having a partner almost predicted sexual intercourse in univariate logistic regression analysis. Hence, after excluding having a partner, only smoking was significantly related and sexual intercourse when gender, smoking and drinking were put in multiple logistic regression model (Table 4).

Table 4

Logistic regression analysis of sexual intercourse and gender, smoking status, drinking status, partner

Variables		Sexual intercourse		Chi-square	P Value
		No (N=395)	Yes (N=105)		
Gender	**Male**	95 (72.5)	36 (27.5)	χ^2=4.494	0.034*
	Female	300 (81.3)	69 (18.7)		
Smoking	**No**	389 (81.6)	88 (18.4)	χ^2=40.687	<0.001*
	Yes	6 (26.1)	17 (73.9)		
Drinking	**No**	357 (81.1)	83 (18.9)	χ^2=10.087	<0.001*
	Yes	38 (63.3)	22 (36.7)		
Partner	**No**	378(99.7)	1(0.3)	χ^2=405.914	<0.001*
	Yes	17(14.0)	104(86.0)		

Univariate logistic regression analysis of sexual intercourse and related variables

Variables	B	SE	P-Value	OR	95% CI of OR
Gender	0.499	0.237	0.035*	1.65	(1.04, 2.62)
Smoking	2.528	0.489	<0.001*	12.53	(4.80, 32.68)
Drinking	0.912	0.294	0.002*	2.49	(1.40, 4.43)
Partner	7.746	1.035	<0.001*	2312.47	(304.19, 17579.72)

Multivariate logistic regression analysis of sexual intercourse and related variables

Variables	B	SE	P-Value	OR	95% CI of OR
Constant	-1.622	0.144	<0.001		
Gender	0.242	0.256	0.346	1.27	(0.77, 2.11)
Smoking	2.286	0.504	<0.001*	9.83	(3.66, 26.42)
Drinking	0.592	0.323	0.067	1.81	(0.96, 3.41)

* Significantly related (*p*-value < 0.05)

IV. DISCUSSION

Sexuality is an important component of health and well-being in a human's life, but high rates of risky SB and unplanned pregnancies have been observed amongst Taiwanese juvenile female prisoners. Youth SB is greatly related to various public health problems.[12] Tang's study pointed out that unsafe sexual contact among youth leads to unnecessary pregnancies, abortions, pregnancy-related problems, and STIs, including HIV/AIDS.[13] In this study, we investigated SA, SK and SB among university students in Taiwan. The results revealed that 21.0% (105) of university students had had penetrative

vaginal contact at least once. This number was significantly higher than that of a Beijing study in 1999, which showed merely 17% male and 12% female university students had premarital sex experience,[14] and higher than that in Chiao's 2012 study from Taiwan, which reported that 16% of college students had experienced premarital sex.[12] However, our result was lower than that in a 2010 study, which reported 43% of males conscripted into the military in Taiwan had experienced premarital sex,[8] and lower than that in Yip's study of unmarried youth in Hong Kong, which reported 41.5% had experienced premarital sex.[15] In our study, the percentage of unmarried university students having a partner was 24.2% and 76.6% of all participants had a medical educational background. As prior research suggests,[16] higher levels of SK, SA and SD were significantly related to premarital sex in university students. Maybe a higher level of SK allowed participants to have a more open SA. In modern world, there is easier approach to information (via the internet and social media). Students today can get more information and interact about sex, thereby enhancing their SD and SK and allowing them to have a more open SA. Our study results also showed that experience with cigarette smoking and alcohol use among male university students was significantly related to premarital sex. These findings were coherent to previous results indicating a positive relation between alcohol use and premarital sexual activity,[13] and consistent with the results of Bandason's and Tu's studies that found a positive association between premarital sex and smoking.[17] These studies point out that SB is related to nonsexual risky behaviors, particularly with smoking, drinking, and drug use, so we need to consider that risky behaviors among teenagers, such as smoking, alcohol use, drug use and unprotected SB, are issues of main public health concern. Our data also were consistent with data from China showing that 12.6% (15.4% of males versus 8.6% of females) of responding students stated having premarital heterosexual intercourse. [18] Present study also showed that medical-related university students had an open SA, a high level of SK and more SD in comparative item than university students without a medical educational background.

Sexuality is fundamental in human life, and affects behaviors, thoughts and emotions. STDs, unexpected pregnancies and other problems resulting from sexual activity have increased among teenagers. This study shows a SK means score of 23.05 ± 4.46, which is somewhat low; only 3 of the participants answered all questions correctly. This lack of SK may lead to a bigger number of adolescent pregnancies, abortions, and other depressing issues. University students both with and without a medical educational background in this study revealed a low level of SKS. This may denote that health education in Taiwan provides little knowledge to students on sexual issues[8].

V. CONCLUSIONS

This study examined SK, SA and SB among university students in Taiwan. The results show that the university students lacked SK (especially regarding contraception knowledge), even though they had a medical educational background and a considerable percentage of them were engaged in premarital SB. There is also a cultural taboo against sex education and education about the use of contraception among adolescents and youth, resulting in a limited availability of such information for them. The majority of university students gain SK mainly through school education peer groups and mass media, but their knowledge is inadequate. Without correct SK, unprotected SB is more likely to set off the increase of HIV infection, to increased baby abortions, unwelcome childbearing, or early and unnecessary marriage. Therefore, various interventions that aim to improving SK and related skills are required. Our findings may provide some important information for education and promotion of sexual health.

CONFLICT

None declared till date.

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