

Factors Associated with the Timing of First Sexual Intercourse Among College Students in Busan, Korea

Young Hae Kim¹, Nam Cheol Park², Hyun Jun Park², Eun Young Yun³

¹College of Nursing, Pusan National University, ²Department of Urology, Pusan National University College of Medicine, ³Department of Biostatistics, Clinical Trial Center, Pusan National University Hospital, Busan, Korea

= Abstract =

Purpose: The purpose of this study was to predict when college students in Korea have their first sexual intercourse and to explore the factors associated with the timing of first sexual intercourse.

Materials and Methods: Data are collected by using self-report survey toward total 797 of male and female college students who are currently attending the college in Busan, Korea. Students were divided by four groups according to their age of timing of first sexual intercourse, <16 years, between 16 to under 19, over 19 years and non-experienced. To examine the difference of four groups, Chi-square test and ANOVA (analysis of variance) were used. For estimation of the timing of first sexual intercourse we used Kaplan-Meier estimation and for differences of each group we used log-rank test. To identify the factors associated with the timing of first sexual intercourse we used Cox proportional hazards model.

Results: 41.4% of college students have experienced sexual intercourse. Of four groups the early sexual intercourse group (<16 years) had high rate of cigarette smoking, alcohol drinking, drug use, open sexual attitude, and a high number of sex partner. The factors associated with the timing of first sexual intercourse among college students was identified male, open parents attitude about sex, pornography experiences, cigarette smoking, alcohol drinking.

Conclusions: This study predicts the timing of first sexual intercourse among college students in Korea. Early sexual debut is an important indicator for continued risk behavior regarding reproductive health.

Key Words: Sexual debut, Reproductive health, Kaplan-Meier estimate, Cox proportional hazards model

Introduction

The timing of first sexual intercourse is especially important, because an early sexual debut is associated with more risky sexual behaviors such as having multiple partners.¹ Furthermore, early onset of sex length-

ens the time at risk for adolescent pregnancy and sexually transmitted diseases (STDs). Early initiators are less likely to know how to prevent STDs, including HIV, or be able to negotiate condom use than are those who delay sexual intercourse.² Furthermore, early initiators have a longer period of sexual activity before they form long-term monogamous relationships,² and this is a more serious problem to them. Early initiation of sexual intercourse, particularly among pre-teens, represents an important predictor of later suicidal ideation and suicidal attempts.³

In Korea, many studies about sexual experiences, contraception methods, sexual knowledge, sexual attitudes, sexual roles, and sexual imagery⁴⁻⁷ have been

접수일자: 2011년 8월 4일, 수정일자: 2011년 8월 21일
게재일자: 2011년 8월 22일

Correspondence to: **Eun Young Yun**

Department of Biostatistics, Clinical Trial Center,
Pusan National University Hospital, 305, Gudeok-
ro, Seo-gu, Busan 602-739, Korea
Tel: 051-240-7945, Fax: 051-255-3549
E-mail: yun1251@hanmail.net

conducted. But there have been fewer studies predicting the first time of sexual intercourse among college students. Moreover, studies revealing a correlation between the first sexual intercourse and smoking, alcohol drinking, abusing drugs, and other risky behaviors are rare. Furthermore, studies investigating variables that affect the timing of first sexual intercourse and that establish a model are also very insufficient. Although Kang⁸ established a model by considering the dependent variable as sexual intercourse and using logistic regression analysis, this method does not reflect the difference in the timing of a respondent's sexual intercourse, as it analyzes all respondents who have had a sexual experience as one group. Survival analyses, which reflects differences in the first sexual experience of each respondent, are appropriate.

Therefore, in this study, we estimated the timing of first sexual intercourse among college students in Korea and examined factors associated with sexual debut among college students using a survival analysis. We provide basic information for the development of a program to enhance college student's reproductive health as well as to develop an effective policy.

Materials and Methods

1. Research design

A cross-sectional survey design was utilized.

2. Sample and Data Collection

We surveyed 829 university students aged 17~36 years at five universities and five colleges in Pusan and Kyungnam Provinces, Korea. Data collection was conducted from November 2007 to December 2007. After informed consent was obtained, data were collected using written questionnaires. We excluded 27 married students and 5 students (over 30 years) from the 829 subjects. Finally, we analyzed 797 students.

3. Ethical considerations

We conducted this study after obtaining approval from the institutional review board of the affiliated medical centers and institutions in Korea. Participants

were given an introduction to the aims and methods of the study, and written informed consent was obtained from all respondents. The participants were given the option of not participating if they wished. We provided a gift to participants.

4. Measurement instrument

The questionnaire was divided into four sections. In the first two sections, respondents were asked about their sexual knowledge and attitudes. In the third section, respondents who had already had sex were asked about their personal experiences; age of first sex, number of sexual partners, use of contraception, experience with STDs, and risky behaviors. Risky behaviors consisted of smoking, alcohol drinking, and drug use. Respondents answered "yes" or "no" for each risky behavior question.

In the last section of the questionnaire, respondents were asked about their general characteristics; age, gender, religion, family socioeconomic status, living parents, sexual attitude of their parents, and pornography experience.

Two dependent variables were used in the analyses: First, timing of first sexual intercourse was measured. Students were asked whether they had ever had sexual intercourse and, if so, the year they had sex for the first time. These were survival time data. These data included those not yet reporting an intercourse experience; those who were "right censored" in the analyses. These time-varying covariates were coded dichotomously, with 0 representing all ages preceding the event and 1 representing the age at which the event occurred and all subsequent ages.

1) Sexual knowledge: We used the instrument of Jeon et al⁹ to measure sexual knowledge, which is composed of 35 questions with six categories: eight about reproductive physiology, three about sexual psychology, eight about pregnancy, five about contraception and abortion, ten about STDs and AIDS, and one about sexual violence. A right answer scored 1, and a wrong answer or 'don't know' scored 0. The lowest score was 0, and the highest score was 100. A higher score indicated greater sexual knowledge. In the study of Jeon et al⁹ Cronbach's α was .851, and

Cronbach's α was .823 in this study.

2) Sexual attitude: We used the instrument of Kang⁸ to examine sexual attitude. This instrument is composed of 35 questions. Subcategories were sexual consciousness, sexual behavior, sexual purity, dual-sexual values, and pornography. Each question was considered on a five-point Likert scale. There were ten questions, including six about virginity and four about dual-sexual values, which were inverse questions. A higher score indicated a more open sexual attitude. The total number of points was 175. In Kang's study Cronbach's α = .875. Cronbach's α = .851 in this study.

5. Data analysis

All statistical calculations were performed using SPSS version 18.0 (SPSS Inc., Chicago, IL, USA). Statistical analysis was conducted with two-tailed tests, using an α level of .05 for determining significance.

1. Descriptive statistics were used to depict characteristics of the entire target group. Comparisons of mean values between males and female were performed using the *t*-test. The distribution between groups was compared with the chi-square or Fisher's exact test.

2. We used the chi-square test and analysis of variance to compare the differences between the four groups according to their timing of first sex (before age 16, ≥ 16 to < 19 , over 19, and inexperienced). Shéffe's multiple comparison test was used to simultaneously compare mean values between the four groups.

3. We used Kaplan-Meier estimates to estimate the sexual intercourse-free survival rate. The log-rank test was used to determine statistically significant differences between each group.

4. We used Cox proportional hazards model to identify the factors associated with the timing of first sexual intercourse.

Results

1. Study participant characteristics

Of 797 students, 512 (64.2%) were male students. Thirty-six were < 19 , 646 were 19 to 24, and 115

were 25 to 29. Minimum age was 17 and Maximum age was 29. The mean age of the respondents was 21.60-years. Of the 797 students, 450 (56.7%) practiced religion. Twenty-nine (3.7%) had a high family socioeconomic status, 692 (87.5%) were middle, and 70 (8.8%) were low. The case of having both parents was 740 (93.3%). Due to the parent's attitudes towards sex, 480 (60.6%) were conservative, 229 (28.8%) were neutral, and 86 (10.8%) were liberal. There were 599 (77.3%) respondents with pornography experience (Table 1).

Of 512 male students, 383 (74.8%) and of 285 female students, 263 (92.3%) were 19 to 24. Minimum age and Maximum age were the same (17 and 29, respectively). A significant difference in average age was observed between males and females (male, 22.39; female, 20.19; $p < .001$). More females (209, 73.6%) than males (271, 53.0%) considered their parent's attitude towards sex as conservative ($p < .001$). More males (451, 90.6%) than females (148, 53.4%) had pornography experience ($p < .001$). No difference was observed for religion, socioeconomic status, or the number of living parents (Table 1).

2. Sex-related characteristics

A total of 330 (41.4%) of the participants had experience with sexual intercourse. Among 330 students, 27 (3.4%) had experienced sex before 16-years-old, 98 (12.3%) had experienced sex at ≥ 16 to < 19 . Twenty-two (6.7%) respondents experienced STDs. 148 (18.6%) always used contraception, 135 (16.9%) sometimes used contraception, and 37 (4.6%) never used contraception. The mean sexual knowledge score was 66.14 (± 16.05), the mean sexual attitude score was 64.80 (± 7.90), the mean first time for sexual intercourse was 19.99 (± 2.43), and the mean number of sex partners was 7.23 (± 16.49). Of all participants, 221 (28.0%) were smokers and approximately 82% (650) were drinkers. Only five students (0.6%) had drug-use experience (Table 1).

The sex-related characteristics of males and females were as follows. Approximately 57% of males and 13.3% of females had already had sexual intercourse ($p < .001$). The timing of the first sexual intercourse

Table 1. Selected characteristics of students participating in the study, by gender (N=797)

Characteristics	Total N=797	Males n=512	Females n=285	χ^2 or t	p
Demographic					
Age					
< 19	36 (4.5)	21 (4.1)	15 (5.3)	51.521	< .001
19 ~ 24	646 (81.1)	383 (74.8)	263 (92.3)		
25 ~ 29	115 (14.4)	108 (21.1)	7 (2.5)		
Mean Age (SD)	21.60 (2.54)	22.39 (2.65)	20.19 (1.53)	14.826	< .001
(Min, Max)	(17, 29)	(17, 29)	(17, 29)		
Religion					
No	450 (56.7)	299 (58.6)	151 (53.2)	2.213	.156
Yes	344 (43.3)	211 (41.4)	133 (46.8)		
Socioeconomic status of family					
High	29 (3.7)	19 (3.7)	10 (3.5)		
Middle	692 (87.5)	436 (85.8)	256 (90.5)	4.490	.110
Low	70 (8.8)	53 (10.4)	17 (6.0)		
Parents living					
Yes	740 (93.3)	479 (93.7)	264 (92.6)	.335	.657
No	53 (6.7)	32 (6.3)	21 (7.4)		
Sexual attitude of parents					
Conservative	480 (60.6)	271 (53.0)	209 (73.6)		
Neutrality	229 (28.8)	171 (33.5)	58 (20.4)	33.092	< .001
Liberal	86 (10.8)	69 (13.5)	17 (6.0)		
Pornography					
Exposures	599 (77.3)	451 (90.6)	148 (53.4)	139.824	< .001
Non-exposures	176 (22.7)	47 (9.4)	129 (46.6)		
Sex-related characteristics					
Ever had sex					
No	467 (58.6)	220 (43.0)	247 (86.7)	144.100	< .001
Yes	330 (41.4)	292 (57.0)	38 (13.3)		
First Sexual Intercourse (age)	19.99 (2.43)	20.01 (2.82)	19.96 (1.54)	.316	.752
First Sexual Intercourse					
Middle teen (< 16)	27 (3.4)	25 (4.9)	2 (0.7)		
Late teen (≥ 16 , < 19)	98 (12.3)	86 (16.8)	12 (4.2)	144.324	< .001
Adult (≥ 19)	205 (25.7)	181 (35.4)	24 (8.4)		
Inexperienced	467 (58.6)	220 (43.0)	247 (86.7)		
Sexually transmitted disease					
Yes	22 (6.7)	20 (6.9)	2 (5.3)	.140	1.000*
No	307 (93.3)	271 (93.1)	36 (94.7)		
Contraception					
Always	148 (18.6)	132 (25.8)	16 (5.6)		
Sometimes	135 (16.9)	118 (23.0)	17 (6.0)	132.919	< .001
Never	37 (4.6)	32 (6.3)	5 (1.8)		
NA	477 (59.8)	230 (44.9)	247 (86.7)		
Sexual knowledge, Mean (SD)	66.14 (16.05)	64.48 (16.70)	69.14 (14.37)	- 3.965	< .001
Sexual attitude, Mean (SD)	64.80 (7.90)	66.62 (7.63)	61.53 (7.31)	9.161	< .001
Sex partners, Mean (SD)	7.23 (16.49)	7.86 (17.39)	2.67 (4.88)	3.857	< .001
Risk behavior					
Smoking					
Yes	221 (28.0)	199 (39.5)	22 (7.7)	90.667	< .001
No	567 (72.0)	305 (60.5)	262 (92.3)		
Alcohol drinking					
Yes	650 (82.2)	422 (83.4)	228 (80.0)	1.438	.230
No	141 (17.8)	84 (16.6)	57 (20.0)		
Drug use					
Yes	5 (0.6)	4 (0.8)	1 (0.4)	.559	.659*
No	784 (99.4)	501 (99.2)	283 (99.6)		

*Fisher's exact test.

for males was 20.01 years (± 2.82) and for females it was 19.96 years (± 1.54) ($p=.752$). Twenty-five (4.9%) males and two (0.7%) females had sexual intercourse before the age of 16; 86 (16.8%) males and 12 (4.2%) females experienced sexual intercourse at ≥ 16 to < 19 ; and 181 (35.4%) males and 24 (8.4%) females had sexual intercourse after the age of 19 ($p<.001$). In contrast, no differences were detected for the respondents who had experienced STDs (20, 6.9%, males and two, 5.3%, females) (Fisher's exact test, $p<1.000$). For contraception, 132 (25.8%) males and 16 (5.6%) females always used contraception; 118 (23.0%) males and 17 (6.0%) females sometimes used contraception; and 32 (6.3%) males and 5 (1.8%) females never used contraception ($p<.001$) (Table 1).

The sexual knowledge score was higher in females, with an average of 64.48 (± 16.70) in males and 69.14 (± 14.37) in females ($p<.001$). However males showed a higher sexual attitude score with an average of 66.62 (± 7.63) in males and 61.53 (± 7.31) in females ($p<.001$). Males had a greater number of sex partners with an average of 7.86 (± 17.39) and an average of 2.67 (± 4.88) ($p<.001$) in females (Table 1).

Among risky behaviors, males smoked more often (199, 39.5%) than females (22, 7.7%) ($p<.001$); however, no difference in alcohol drinking was observed (422, 83.4%, males and 228, 80.0%, females ($p=.230$)). Four (0.8%) males and one (0.4%) female had abused drugs ($p=.659$) (Table 1).

3. Differences in risky behaviors and sex-related factors among the four groups based on the timing of the first sexual intercourse

Twenty-three (85.2%) smokers had sexual intercourse before the age of 16; 60 (61.2%) experienced sexual intercourse at ≥ 16 to < 19 -years-old; and 79 (38.5%) had had sexual intercourse after the age of 19; whereas 58 (12.9%) of the respondents never experienced sexual intercourse ($p<.001$). Twenty-four (88.9%) respondents who drank alcohol had sexual intercourse before 16; 89 (90.8%) had sexual intercourse when they were ≥ 16 to < 19 -years-old; 182 (88.8%) experienced sexual intercourse after the age of 19; and 355 (77.0%) of the respondents who drank alcohol had not experienced sexual intercourse ($p<.001$). One (3.7%) in the group who abused drugs had sexual intercourse

Table 2. Chi-square test and ANOVA results for subjects grouped by the timing of first sexual intercourse

Characteristics	Middle teen (< 16) n (%)	Late teen ($\geq 16, < 19$) n (%)	Adult (≥ 19) n (%)	Inexperienced n (%)	χ^2 or F	p	Scheffe
Risk behaviors							
Smoking							
Yes	23 (85.2)	60 (61.2)	79 (38.5)	59 (12.9)	160.508	$<.001$	
No	4 (14.8)	38 (38.8)	126 (61.5)	399 (87.1)			
Alcohol							
Yes	24 (88.9)	89 (90.8)	182 (88.8)	355 (77.0)	20.340	$<.001$	
No	3 (11.1)	9 (9.2)	23 (11.2)	106 (23.0)			
Drug use							
Yes	1 (3.7)	2 (2.0)	1 (0.5)	1 (0.2)	7.706*	.029	
No	26 (96.3)	96 (98.0)	204 (99.5)	458 (99.8)			
Sex-related factors							
Sexual knowledge, Mean (SD)	58.73 (22.61)	68.10 (13.03)	65.93 (16.17)	66.25 (16.05)	2.439	.063	
Sexual attitude, Mean (SD)	70.18 ^a (8.56)	68.23 ^a (8.76)	68.16 ^a (7.27)	62.29 ^b (6.92)	44.649	$<.001$	a > b
Number of sex partners, Mean (SD)	35.25 ^a (43.50)	6.34 ^b (7.80)	2.87 ^b (3.36)	NA	153.465	$<.001$	a > b
Sexually Transmitted Disease							
Yes	2 (7.4)	12 (12.2)	8 (3.9)	NA	7.374	.022	
No	25 (92.6)	86 (87.8)	196 (96.1)	NA			

*Fisher's exact test.

before the age of 16; two (2.0%) had sexual intercourse at ≥ 16 to < 19 -years-old; one (0.5%) experienced sexual intercourse after the age of 19; and one (0.2%) had not had sexual intercourse ($p=.029$) (Table 2).

The level of sexual knowledge was not statistically significant; 58.73 (± 22.61) of this group had sexual intercourse before the age of 16; 68.10 (± 13.03) experienced sexual intercourse at ≥ 16 to < 19 -years-old; 65.93 (± 16.17) had sexual intercourse after the age of 19; and 66.25 (± 16.05) had not experienced sexual intercourse ($p=.063$). The groups who had sexual intercourse had a greater sexual attitude rate than the group who have not had sexual intercourse (62.29 ± 6.92); 70.18 (± 8.56) of those who had sexual intercourse before the age of 16; 68.23 (± 8.76) of those who had

sexual intercourse at ≥ 16 to < 19 -years-old; 68.16 (± 7.27) of those who experienced sexual intercourse after the age of 19 ($p < .001$). This result means that those who had experienced sexual intercourse had more open-minded sexual attitude. Those who had experienced sex before the age of 16 had the highest number of sexual partners with 35.25 (± 43.50); 6.34 (± 7.80) of this group had sexual intercourse at ≥ 16 to < 19 -years-old; and 2.87 (± 3.36) had sexual intercourse after 19 ($p < .001$). A significant difference was observed for experience with STDs; two (7.4%) had sexual intercourse before 16; 12 (12.2%) experienced sexual intercourse at ≥ 16 to < 19 -years-old; and 8 (3.9%) had sexual intercourse after the age of 19 ($p=.022$) (Table 2).

Table 3. The estimator of timing of first sexual intercourse by Kaplan-Meier estimation

	Total		Log-rank test statistic	p
	Median(SE)	95% CI		
Gender				
Male	21.00 (0.23)	(20.53, 21.46)	90.78	< .001
Female	NA	NA		
Religion				
No	23.00 (0.51)	(22.00, 24.00)	1.34	.246
Yes	24.00 (0.88)	(22.26, 25.74)		
Socioeconomic status of family				
High	22.00 (2.37)	(17.35, 26.64)	2.33	.311
Middle	23.00 (0.46)	(22.09, 23.91)		
Low	22.00 (0.79)	(20.43, 23.56)		
Parents living				
Yes	23.00 (0.46)	(22.10, 23.90)	2.87	.090
No	21.00 (1.05)	(18.92, 23.07)		
Sexual attitude of parents				
Conservative	24.00 (0.90)	(22.24, 25.75)	50.08	< .001
Neutrality	23.00 (0.71)	(21.59, 24.40)		
Liberal	20.00 (0.33)	(19.33, 20.66)		
Pornography				
Exposures	22.00 (0.42)	(21.17, 22.82)	44.72	< .001
Non-exposures	NA	NA		
Smoking				
Yes	19.00 (0.25)	(18.50, 19.49)	133.245	< .001
No	25.00 (0.71)	(23.59, 26.40)		
Alcohol drinking				
Yes	22.00 (0.41)	(21.19, 22.80)	24.65	< .001
No	26.00 (1.51)	(23.03, 28.96)		
Drug use				
Yes	18.00 (2.19)	(13.70, 22.29)	8.77	.003
No	23.00 (0.42)	(22.16, 23.84)		

SE: standard error, CI: confidence interval.

4. Differences between survival function of the timing of the first sexual intercourse according to relative factors

Table 3 shows the differences between the survival function of the first sexual intercourse according to relative factors. The rate of the intercourse-unexperienced according to gender is illustrated in Fig. 1. The median age at first sexual intercourse was 21.00 (SE, .23) years-old for males and not applicable for females ($p < .001$). No difference in the survival function was observed for religion ($p = .246$), socioeconomic status ($p = .311$), and whether the parents were alive or not ($p = .090$). Those with open-minded parents had a median of 20.00 (SE, .33) years for their first sexual experience ($p < .001$). Respondents who were pornography experienced had earlier sex (median: 22.00; SE, .42) than those who were inexperienced (median: NA,

SE, NA) ($p < .001$).

The rate of the intercourse-unexperienced according to smoking, alcohol drinking, and drug use are illustrated in Fig. 2. The smoking group (median: 19.00;

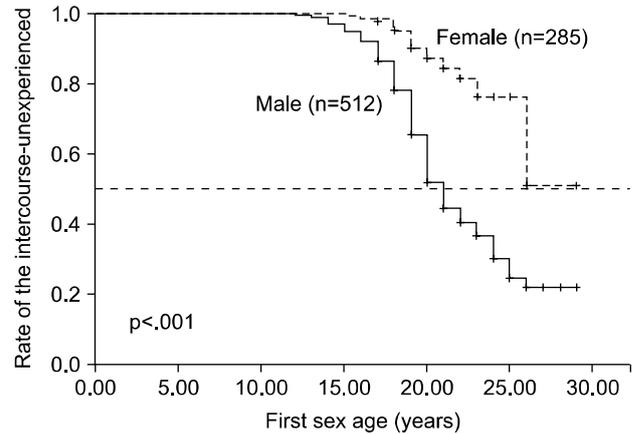


Fig. 1. Rate of the intercourse-unexperienced according to gender.

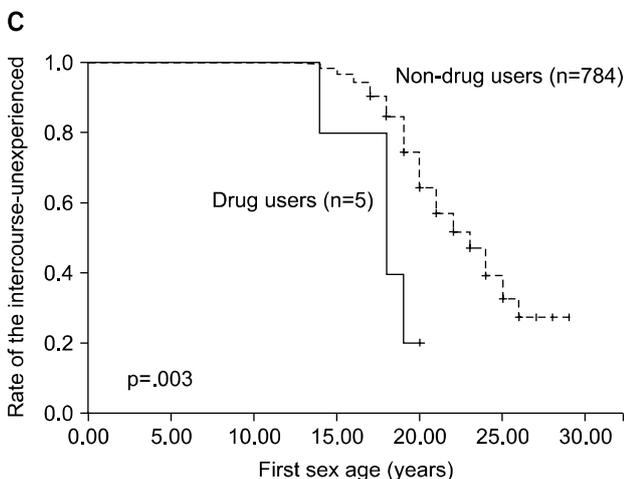
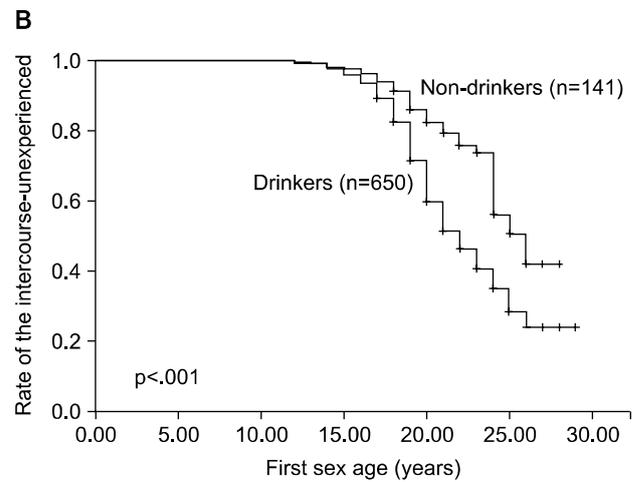
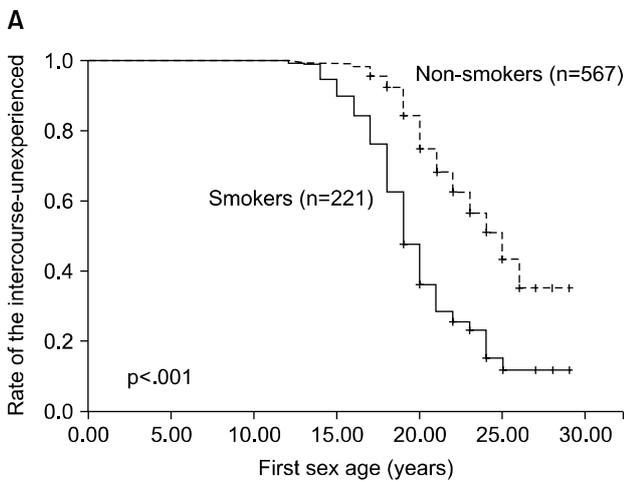


Fig. 2. Sexual intercourse free survival according to risk behaviors; (A) smoking, (B) alcohol drinking, and (C) drug use.

SE, .25) had an earlier timing of sexual debut than the nonsmoking group (median: 25.00; SE, .71) ($p < .001$). The alcohol drinking group (median: 22.00; SE, .41) had an earlier timing of sexual debut than the non-alcohol drinking group (median: 26.00; SE, 1.51) ($p < .001$). No difference was observed for the timing of sexual debut between the drug-using group (median: 18.00; SE, 2.19) and those who did not abuse drugs (median: 23.00; SE, .42) ($p = .057$).

5. Cox proportional hazards model for the timing of first sexual intercourse

The results of a Cox regression analysis using the variables detected from the Kaplan-Meier estimate are shown in Table 4.

As a result, males tended to have 2.518 times more sexual experience than females ($p < .001$). Although the rate of sexual intercourse increased 1.155 times for cases in which the parents had a neutral attitude towards sex, it was not statistically significant ($p = .262$). Those with parents who were open-minded about sex had 1.753 times more sex than those who had conservative parents ($p < .001$). The respondents who had experienced pornography had 1.809 times more sex than those who had not experienced pornography ($p = .005$). Smokers had 1.958 times more sex than non-smokers ($p < .001$); and drinkers had 1.787 times more sex than non-drinkers ($p = .003$).

Table 4. Cox proportional hazards model for timing of first sexual intercourse

	HR	(95% CI)
Age	1.017	(0.969, 1.067)
Male	2.518	(1.710, 3.707)
Sexual attitude of parents		
Neutrality	1.155	(0.898, 1.486)
Liberal	1.753	(1.283, 2.395)
Experience with pornography	1.809	(1.196, 2.735)
Smoker	1.958	(1.535, 2.498)
Alcohol drinker	1.787	(1.222, 2.615)

HR: hazard ratio, CI: confidence interval.

Discussion

This study was cross-sectional to predict the timing of first sexual intercourse among college students using a survival analysis and to investigate variables associated with the timing of first sexual intercourse.

The rate of sexual intercourse experienced by students in this study (41.4%) was higher than the 25.1% of the Aeri Son¹⁰ study targeting 4-year university students in the entire country but showed a similar rate (44%) with Kang⁸ who investigated 4-year university students in Seoul and Gyeonggi.

The median time for first sexual intercourse among college students was 21.00-years-old for males and not applicable for females. This means that 50% of males had their first sexual intercourse before the age of 21. Since preparatory research results do not exist in this country, it is difficult to compare exactly the median time of first sexual intercourse. The timing of first sexual intercourse is a very significant variable for reproductive health. However, there are a lack of studies estimating the timing of first sexual intercourse among college students and the timing of first sexual intercourse has been compared only as an average¹¹ or accumulated distribution rate.¹⁰ Although some studies such as Ahn et al,¹¹ stated that the timing of first sexual intercourse is not different between males and females, it was simply analyzed with an average. That study also suggested the average timing of first sexual intercourse in males and females, but there was no difference ($p = .980$).

The average age for a first marriage in Korea increases constantly, and the average age of first marriage in 2007 was 31.1-years for males and 28.1 for females which increased 0.2 years in males and 0.3 years in females from the previous year. However, the timing of first sexual intercourse tends to be earlier; therefore, a longer duration from the first sexual intercourse to marriage would influence reproductive health along with an increasing number of sexual partners,¹² unplanned pregnancy, and increasing STD morbidity rate.

Early first sexual intercourse is related to risky

behaviors. As Table 2 shows, the group who experienced sexual intercourse before the age of 16 (85.2%) had a 2~6 times greater smoking rate than the group who had sexual intercourse after 19 (38.5%) or those who had not experienced sex; the groups who experienced sexual intercourse had greater alcohol drinking rates (<16, 88.9%, ≥16 to <19, 90.8%, ≥19, 88.8%) than the group who had not experienced sex (77%) ($p < .001$). The reason why drug abuse experience was extremely low (5, 0.6%) is because the respondents had a comparatively higher educational background and higher socioeconomic level than most people. Although the difference between abusing drugs and the timing of first sexual intercourse was statistically significant ($p = .003$), the study should be enlarged to include others to investigate the correlation between drug abusing experience and the timing of first sexual intercourse. Sexual knowledge tended to be the highest for the group who had experienced their first sexual intercourse at ≥16 to <19-years-old, but it was not significant ($p = .063$). Because this was a retrospective survey, it was difficult to determine whether sexual intercourse was early because sexual knowledge was high or the current level of sexual knowledge was high because sexual intercourse had been experienced. Therefore, a prospective study measuring the level of sexual knowledge periodically since before the first sexual intercourse would be necessary to investigate the timing of first sexual intercourse as it relates to the level of sexual knowledge. The group who experienced sexual intercourse before the age of 16 showed the highest rate for sexual attitude with 70.18 (± 8.56), which appeared to be the most open-minded concerning sexual attitude than the remaining three groups ($p < .001$). Those who had experienced sexual intercourse before the age of 16 had the highest number of sexual partners, overwhelmingly (mean: 35.25; SD, 43.50). This result agrees with an overseas investigation which showed that the number of sexual partners is higher with earlier timing of sexual intercourse.

The main factors that affected early sexual intercourse were gender (males), parent's attitude towards sex (liberal), and pornography experience (experienced). The rate of sexual intercourse was higher in those who

did not practice religion than those who did in overseas countries; however, this study did not indicate a difference concerning religion, and had the same outcome as that of Kang (2007). Although low socioeconomic status is a factor related to early sexual intercourse, we could not confirm this, as the respondents were mostly middle class (87.5%). The group who smoke and drank alcohol had sex earlier than those who did not smoke or drink, which was similar to the result of Agenta (1996). Drug users tended to have the rate of sexual intercourse externally compared with those who do not abuse drugs, but this study did not show correlations of abusing drugs ($p = .659$) because of low numbers (0.6%).

The Cox proportional hazards model showed that males (hazard ratio [HR]: 2.518, 95% confidence interval [CI]: 1.710~3.707), parent's open-minded attitude towards sex (HR: 1.753, 95% CI: 1.283~2.395), the pornography experienced (HR: 1.809, 95% CI: 1.196~2.735), smokers (HR: 1.958, 95% CI: 1.535~2.498), and alcohol drinker (HR: 1.787, 95% CI: 1.222~2.615) were associated with earlier timing of first sexual intercourse. An overall reproductive health advancement program should be developed based on this results.

We used common male and female variables for Cox regression. The factors affecting the first sexual intercourse in males and females depended on their characteristics. Thus, further studies should be considered male and female characteristics.

1. Limitations

Some limitations should be considered when interpreting the results of this study. First, retrospective, self-reported data on topics such as age at first sex may be inaccurate or incomplete (Nocole, 2009). Second, this study did not distinguish coercive from consensual sex, as the question on sexual coercion was included but there were only a small number of respondents.

Conclusion

The results predicted the timing of first sexual inter-

course using a survival analysis and investigated variables associated with the timing of first sexual intercourse. Factors associated with earlier first sexual intercourse were males, and those with open parental sexual attitude, pornography experience, and health risky behaviors such as smoking, alcohol drinking, and STD morbidity rate. This study is considered a basic reference to enhance an arbitration program for reproductive health maintenance.

Both a prospective research study and a model separating males and females are necessary to explore a more accurate timing of first sexual intercourse and related factors.

REFERENCES

- 1) Seidman SN, Mosher WO, Aral SD. Predictors of high-risk behavior and drug involvement. *Journal of Marriage and the Family* 1994;52:783-98
- 2) Tenkorang EY, Maticka-Tyndale E. Factors influencing the timing of first sexual intercourse among young people in Nyanza, Kenya. *Int Fam Plan Perspect* 2008;34:177-88
- 3) Kim DS, Kim HS. Early initiation of alcohol drinking, cigarette smoking, and sexual intercourse linked to suicidal ideation and attempts: findings from the 2006 Korean Youth Risk Behavior Survey. *Yonsei Med J* 2010;51:18-26
- 4) Han KS, Ham MY. A study on knowledge, attitude and experience of college students toward sexual behavior. *Journal of Korean Academy Society Nursing Education* 2000;6:115-31
- 5) Lee JJ, Lee CW, Woo BW. Youth risk behavior survey of students at a university in Daegu metropolitan city. *Korean J Public Health* 2003;29:106-17
- 6) Woo NS, Ka YH. A study on the sexual knowledge, sexual attitudes, and sexual behavior of Korean and American college students. *Journal of Korean Academy Psychiatric* 2005;10:113-33
- 7) Yang SO, Jeong GH. Perceptual difference of sexual image and sexual role between male and female students in university, Korea. *Korean J Women Health Nurs* 2002;8:289-300
- 8) Kang HY. A study on the Characteristics of Sexual Knowledge, Attitudes, Behaviors and Variables Forecasting Sexual Intercourse of University Students. Unpublished master's thesis, Seoul: Sungkonghoe University; 2007
- 9) Jeon GS, Lee HY, Rhee SJ. Sexual knowledge, attitudes and behaviors of Korea college students and effects of sexual education on sexual knowledge and attitudes. *Korean Society for Health Education and Promotion* 2004;21:45-68
- 10) Sohn AR, Chun SS. Comparing sexual attitude, sexual initiation and sexual behavior by gender in Korean college students. *Health and Medical Sociology* 2005;18:73-100
- 11) Ahn S, Park I, Han JS, Kim TI, Kwak MS, Chung HS. Health behaviors, reproductive health history, and sexual behaviors of college students. *Korean J Women Health Nurs* 2008;14:205-12
- 12) Seidman SN, Mosher WD, Aral SO. Predictors of high-risk behavior in unmarried American women: adolescent environment as risk factor. *J Adolesc Health* 1994;15:126-32