



남자 대학생의 성 지식과 성 가치관이 생식건강 증진행위에 미치는 영향

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Impact of Sexual Knowledge and Sexual Values on Reproductive Health Promotion Behaviors among Male College Students

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Purpose: This study aimed to explore the impact of sexual knowledge and sexual values on reproductive health promotion behaviors (RHPBs) among male college students. **Methods:** We recruited 169 male students from online communities at two universities for a cross-sectional study. After obtaining consent, participants answered a self-administered online questionnaire. The measurements consist of sexual knowledge with 35 items, sexual values with 18 items, and males' RHPBs with 16 items, and general characteristics. A total of 166 responses were analyzed using SPSS 26.0 and SPSS Process Model 4. **Results:** The mean age of participants was 23.03±2.79 years (range, 18-30 years). The average score of sexual knowledge, converted to percentage, was 73.44±12.99. Other areas were above average, but pregnancy, sexually transmitted disease and AIDS scores were below average. The mean score for sexual values was 55.06±10.17. Scores in the behavioral domain were below average, although other domains were above the item average. The score for RHPBs was 55.54±6.42. While other areas were above the item mean, the scores for safe sex and sexual responsibility were lower than the mean. Sexual knowledge, sexual values, and RHPB were positively correlated, but regression analysis showed that only sexual values had a significant effect on RHPBs. As a result of exploring the mediating effect on RHPBs, an indirect effect of sexual knowledge through sexual values was revealed. **Conclusion:** As higher scores for sexual values and knowledge are significantly associated with better RHPBs, we should consider both factors when planning RHPB education for male college students.

Key Words: Health promotion, Knowledge, Male, Reproductive health, Students

Introduction

1. Background

College students belong to early adulthood after the second half of

adolescence; during this time, values related to sex are formed at the developmental stage, and they become mature enough to engage in sexual and sexual behaviors physically and mentally [1]. Acquiring accurate sexual knowledge at this time helps prevent sexual health problems,

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which can affect not only current college students' sexual health but also their sexual health and marital relationships later in adulthood [2]. In 2015, the Ministry of Education established compulsory school sex education plans based on laws and regulations and distributed them to elementary, middle, and high schools [3]. However, due to the entrance exam-oriented education culture of Korea, there is a lack of opportunities for college students to take appropriate classes on sex education [4].

Males have a variety of sexual and reproductive health needs, including contraception, HIV and other sexually transmitted infections (STIs), sexual dysfunction, infertility, male reproductive health cancers, and how to provide support during pregnancy and child-related care [5]. In this regard, during the college years when the scope of free interpersonal relationships and heterosexual interactions is widening, there is a high possibility that sexual behavior will be practiced according to one's sexual knowledge [6]. Sexual knowledge is also related to male students' living environment and military service, and those who lived independently and had experienced military service exhibited higher knowledge [7,8]. In addition, the sexual knowledge of college students has been found to be higher for those with sexual experience and lower for men than for women [9-11] and male students also had significantly lower scores for reproductive health promotion behaviors (RHPBs) than female students [12]. In this regard, college students often gain sexual knowledge through friends, seniors and juniors, the internet, or the mass media [13]. These sources may contain inaccurate or incorrect health information, which may lead to difficulties in acquiring correct sexual knowledge and forming appropriate sexual attitudes [14]. The misinformation disseminated through these techniques negatively impacted young adults can increase in unintended pregnancy, unsafe abortion that associated with higher maternal mortality [15]. Meanwhile, male college students showed more demonstrative sexual attitudes if they were male-chauvinistic [16]. Furthermore, a Portuguese study found that older male college students with active attitudes toward sexual behavior had more health risk factors than those who did not [17]. More demonstrative people had more sexual experiences, and male college students were more receptive than female college students [9,11,18]. However, male students had significantly lower scores for reproductive health promotion behaviors (RHPBs) than female students [12].

Within RHPBs, male students had higher scores in the healthcare domain, but the illegal and safe behavior domains had particularly low scores [9]. The age of the first sexual experience and one's academic major showed significant relationships with the health promotion behavior of male college students [12]. When examining the relationship between

each variable, positive correlations were found between sexual knowledge, sexual attitude, and RHPBs, such as using condoms, in male college students [6,12,19]. Therefore, we need to consider these characteristics of male college students when exploring the relationships among sexual knowledge, attitude, and RHPBs. Meanwhile, as the age of first sexual experience is becoming lower, increasingly many people experience sexual health problems [6]. To deal with those troubles, Reproductive and sex education in school improves awareness about safe sexual behaviors and risk reduction strategies, which has a great impact on the awareness and attitude of young people [20]. However, college students who have not received proper sex education in middle and high school become less cautious in establishing their sexual attitudes and taking sexual behaviors due to uncertain information or lack of knowledge about sex during the process of dating [6]. Also, the review of previous domestic studies in college students showed that male college students had lower levels of knowledge about reproductive health than female students, and that additional attention was suggested to male college students who had higher reproductive health risk factors for their accurate sexual knowledge and sexual attitudes [11]. However, males have been overlooked in discussions of reproductive health, especially when reproductive issues such as contraception and infertility have been perceived as female-related [5]. Hence, education on applying reproductive health for male college students is necessary. Therefore, the study aims to explore the influence of sexual knowledge and sexual values of male college students on reproductive health promotion behaviors. Therefore, this study aimed to explore the effects of sexual knowledge and sexual values in male college students on RHPBs. In addition, we would like to provide fundamental data for education and intervention programs for the reproductive health of male college students.

2. Purpose

The purpose of this study was to explore the impacts of sexual knowledge and sexual values on RHPBs among male students. The specific purposes of this study were as follows.

- 1) Identify the level of sexual knowledge, sexual values, and RHPBs of male college students
- 2) Examine the differences in sexual knowledge, sexual values, and RHPBs according to the general characteristics of male college students
- 3) Identify the relationship between male college students' sexual knowledge, sexual values, and RHPBs

- 4) Explore the factors affecting RHPBs among male college students
- 5) Examine the mediating effect of sexual values between male college students' sexual knowledge and RHPBs

Methods

1. Research design

This study used a cross-sectional and correlational survey design to explore the impacts of sexual knowledge and sexual values on RHPBs among male college students.

2. Study participants

The target population of this study was male college students. The selection criteria for selecting the study participants were unmarried male college students aged 18 to 30, including military applicants, who understood the purpose of this study and wanted to participate in it with consideration of the mandatory military service period for Korean men. Participants' academic majors belonged to seven categories — humanities, society, nature, education, engineering, medicine, and arts — according to the Korea Institute of Education and Statistics (KESs)'s "College Curriculum Status" [21]. However, we excluded married people due to the potential interference in sexual knowledge, sexual values, and RHPBs by their spouses. We recruited participants by convenience sampling via two colleges' online communities to more easily elicit responses about sensitive topics such as first sexual experience, age, and experiences of reproductive health problems.

The number of participants in this study was based on a calculation using the G*Power 3.1 program. The effect size for this study was set as $f^2=.13$ based on a previous study [22] showing 12% explanatory power in the RHPBs of college students with a significance level of 0.05, a power of 0.80, and nine predictors (age, major, military service, housing type, sexual experience, reproductive health problem experience, sexual knowledge sources, and sexual knowledge, and sexual values). The minimum sample size was 130. When considering a 20% omission rate in online adult survey [23], we recruited 169 participants and analyzed 166 responses, excluding three unfaithful responses.

3. Measurements

1) Sexual knowledge

Sexual knowledge was measured using the tool developed by Parcel,

Luttman, and Meyers (1979) [24] and modified by Jeon, Lee, and Rhee (2004) [25]. The tool consists of 35 questions with six areas: reproductive physiology, sexual psychology, pregnancy, contraception and abortion, STDs and AIDS, and sexual violence. Each correct answer receive 1 point, and wrong and unknown answers receive 0 points. The higher the total score (converted into a percentage), the higher the knowledge of sex. Cronbach's α for this tool was .85 in the previous study [25], and .75 in this study.

2) Sexual values

Sexual values were measured using the sex values tool for college students developed by Sung and Lee (2018) [26]. The tool has 18 questions, a 5-point scale with a score range of 0 to 4 points, including cognitive, emotional, and behavioral domains. The total score ranges from 0 to 72 points, and the higher the score, the more open-minded a respondent is in the cognitive area, the more optimistic in the emotional domain, and the more active in the behavioral domain [26]. Cronbach's α for this tool was .88 in the previous study [26] and 0.89 in this study.

3) Reproductive health promotion behaviors

RHPBs were measured using a tool for male students developed by Jo and Son (2014) [27]. The tool consists of 16 questions, a 4-point Likert scale with four areas for safe sex, sexual responsibility, genital health management, and STD prevention. The total score ranges from 16 to 64 points, and the higher the score, the higher the one's level of RHPBs. Cronbach's α for this scale was .89 in the original study [27] and .88 in this study.

4) General characteristics of the participants

The participants age, major, military service status, residential type, sexual experience, reproductive health problem experience, and sexual knowledge sources were collected via questionnaires.

4. Data collection

After obtaining IRB approval, the first author posted a recruitment notice on two colleges' online communities, where anonymity was guaranteed. The notice included the purpose and method of research, voluntary participation, freedom of dropout, benefits and risks of participation in the study, and methods of protecting personal information. Those who were interested in this study and suitable for the study could access it through the QR code linked in the criteria list and recruitment notice.

After reading all the descriptions, those who wanted to participate selected the participation agreement button and started the survey. The survey was conducted using google Forms. Filling out a structured study questionnaire took about 15 to 20 minutes. Mobile coffee coupons worth 5,000 Korean won (approximately 3.6 US dollars) were sent to participants as compensation. Data collection was done from August 29 to September 30, 2022. A total of 169 responses were collected and 166 of them were analyzed after excluding 3 insufficient responses.

5. Data analysis

This study was approved by the Institutional Review Board of Chungnam National University (202206-SB-084-01). Informed consent was obtained from the participants. The collected data were analyzed using IBM SPSS 26.0, and the statistical significance level of the study was set at $p < .05$.

- 1) A descriptive analysis was conducted of the participants' general characteristics, sexual knowledge, sexual values, and RHPBs.
- 2) The two-sample independent *t*-test and one-way ANOVA were used to determine differences in sexual knowledge, sexual values, and RHPB according to the participants' general characteristics. A post-hoc analysis was conducted using Bonferroni.
- 3) Pearson's correlation analysis was conducted to identify correlations among sexual knowledge, sexual values, and RHPBs.
- 4) Hierarchical multiple regression analysis was run to explore factors influencing RHPBs.
- 5) Mediation effect analysis was conducted using SPSS Process Macro model 4 to confirm the mediating effect of sexual values between sexual knowledge and RHPBs.

Results

1. Characteristics of participants

Of a total of 166 participants, the average age was 23.03 ± 2.79 years, and 60.8% had completed their military service. The participants' majors were distributed as follows: engineering (30.1%), social studies (16.9%), humanities (15.1%), nature (15.7%), medicine (12.0%), education (6.0%), arts and physical education (4.2%). In addition, the primary type of housing was rent (48.8%). For sex-related characteristics, 80.7% had sexual experience, and the age at the first sexual experience was 19.60 ± 2.51 years old. In addition, 18.7% had experienced reproductive health problems, such as sexually transmitted infections. The main source through which

participants obtained knowledge about sex or reproductive health was mass media, with 32.5% reporting internet surfing (Table 1).

2. Differences in sexual knowledge, sexual values, and RHPBs according to the characteristics of the participants

Sexual knowledge was positively related to age ($r = 2.31, p = .022$) and sexual knowledge differed by students' major ($F = 2.48, p = .025$). The Bonferroni post-hoc test showed that the sexual knowledge of students majoring in the medical field was significantly higher than that of those majoring in engineering ($p = .014$). Furthermore, students who had sexual experience showed higher scores for sexual values than those who did not ($t = 2.53, p = .012$) (Table 1).

3. Levels of sexual knowledge, sexual values, and RHPBs

The sexual knowledge score converted to a score out of 100 was 73.44 ± 12.99 , and the average correct rate was 73.4%. The areas of sexual knowledge with high scores were sexual psychology (86.74 ± 19.37), reproductive physiology (84.33 ± 16.38), sexual violence (83.73 ± 37.01), and contraception and abortion (80.48 ± 18.28), and the areas with low scores were pregnancy (65.06 ± 18.62) and STD and AIDS (62.89 ± 16.73). The score for sexual values was 55.06 ± 10.17 , ranging from 24 to 72. The item mean for sexual values was 3.05 ± 0.56 , and the cognitive domain had the highest score (3.19 ± 0.61), followed by the affective domain (3.14 ± 0.62), and the behavioral domain (2.94 ± 0.67). The RHPB score was 55.54 ± 6.42 , ranging from 32 to 64. The item mean of RHPBs was 3.47 ± 0.40 , and STD prevention had the highest score (3.59 ± 0.46), followed by genital health management (3.55 ± 0.48), safe sex (3.41 ± 0.49), and sexual responsibility (3.39 ± 0.52) (Table 2).

4. Relationships among participants' sexual knowledge, sexual values, and RHPBs

Sexual knowledge was positively related to sexual values ($r = .28, p < .001$) and RHPBs ($r = .20, p = .007$). Additionally, sexual values showed a positive relationship with the RHPB score ($r = .21, p < .006$) (Table 3).

5. Impacts of participants' sexual knowledge and sexual values on RHPBs

For regression analysis, age, major, and sexual experience were entered in the first step, sexual knowledge was added in the second step, and sexual values were added in the third step. The first-stage model was not shown to be significant; however, in the second-stage model where

Table 1. Differences in Study Variables According to Participants' Characteristics (N=166)

Variables	Categories		Sexual knowledge		Sexual value		RHPBs	
	Mean±SD	Range	r (p)	t/F (p)	r (p)	t/F (p)	r (p)	t/F (p)
Age (yr)	23.03±2.79	18-30						
Age of first sexual Intercourse (yr)	19.60±2.51	12-30	.15(.045)	-	.03(.661)	-	-.04(.587)	-
		n(%)	Mean±SD	t/F (p)	Mean±SD	t/F (p)	Mean±SD	t/F (p)
Military service status	Fulfilled	101 (60.8)	72.84±13.31	-0.74 (.460)	55.29±10.79	0.37 (.707)	55.71±6.68	0.42 (.671)
	Unfulfilled	65 (39.2)	74.37±12.52		54.70±9.20		55.27±6.04	
College majors	Engineering ^a	50 (30.1)	70.80±14.32	2.48 (.025) [†] a<b	54.02±9.66	1.99 (.069)	54.60±7.05	1.04 (.399)
	Social Science	28 (16.9)	72.34±10.97		57.35±9.61		55.01±4.89	
	Natural Science	26 (15.7)	74.72±12.03		55.84±9.64		57.50±5.13	
	Humanities	25 (15.1)	74.40±11.35		51.72±10.18		54.40±7.25	
	Medicine & Nursing Science ^b	20 (12.0)	82.42±8.90		56.50±10.03		56.85±6.42	
	Education	10 (6.0)	68.85±17.94		61.50±7.04		57.40±5.83	
	Arts & Physical Education	7 (4.2)	73.44±12.99		49.14±16.49		54.57±8.67	
Sexual experience	Yes	134 (80.7)	73.32±12.79	-0.23 (.815)	56.02±9.84	2.53 (.012)	55.42±6.01	-0.47 (.633)
	No	32 (19.3)	73.92±14.01		51.03±10.69		56.03±7.99	
Experience with Reproductive health problems	Yes	31 (18.7)	71.24±13.99	-1.04 (.298)	54.90±14.47	-0.74 (.941)	55.03±7.74	-0.48 (.626)
	No	135 (81.3)	73.94±13.75		55.10±8.97		55.65±6.10	
Sources of sexual knowledge	Mass media	54 (32.5)	74.33±13.36	1.50 (.216)	55.24±10.71	0.32 (.809)	55.53±6.99	1.16 (.345)
	Personal sources	32 (19.3)	70.96±13.26		55.70±8.07		54.70±4.38	
	School	10 (6.0)	75.23±9.29		54.72±8.51		57.55±5.64	
	Family	8 (4.8)	65.71±12.23		50.28±14.17		54.14±6.41	
Residential type	Own house	6 (3.6)	72.95±13.96	-0.35 (.725)	55.58±10.03	0.48 (.631)	55.65±7.28	0.16 (.869)
	Rent house	31 (18.7)	73.70±12.49		54.78±10.28		55.48±5.94	

SD: Standard deviation; RHPBs: Reproductive Health Promotion Behaviors; [†]Bonferroni post hoc test

Table 2. Levels of Sexual Knowledge, Sexual Value, and Reproductive Health Promotion Behaviors (N=166)

Variables (Number of items)	Range	Min-Max	Mean±SD (0-100)	Mean±SD
Sexual Knowledge	0-100	28.57-94.29	73.44±12.99	25.70±4.54
Sexual psychology (3)	0-100	12.50-100	86.74±19.37	2.60±0.58
Reproductive Physiology (8)	0-100	0-100	84.33±16.38	6.74±1.31
Sexual violence (1)	0-100	0-100	83.73±37.01	0.83±0.37
Contraception and abortion (5)	0-100	20-100	80.48±18.28	4.02±0.91
Pregnancy (8)	0-100	0-100	65.06±21.12	5.20±1.68
STD and AIDS (10)	0-100	10-100	62.89±16.73	6.28±1.67
Sexual Value	0-72	24-72	55.06±10.17	3.05±.56
Cognitive (5)	0-20	3-20	15.99±3.08	3.19±.61
Affective (4)	0-16	6-16	12.56±2.51	3.14±.62
Behavioral (9)	0-36	9-36	26.50±6.08	2.94±.67
Reproductive Health Promoting Behaviors	16-64	32-64	55.54±6.42	3.47±.40
STD prevention (3)	3-12	6-12	10.78±1.39	3.59±.46
Genital health management (3)	3-12	6-12	10.66±1.44	3.55±.48
Safe sex (6)	6-24	11-24	20.51±2.97	3.41±.49
Sexual responsibility (4)	4-16	7-16	13.58±2.09	3.39±.52

Min: Minimum; Max: Maximum; SD: Standard deviation; STD: Sexually Transmitted Disease; AIDS: Acquired Immune Deficiency Syndrome

Table 3. Relationships among Study Variables

(N=166)

Variables	Sexual knowledge	Sexual value	RHPBs
	r (p)	r (p)	r (p)
Sexual knowledge	1		
Sexual value	.28 (<.001)	1	
RHPBs	.20 (.007)	.21 (.006)	1

RHPBs: Reproductive Health Promotion Behaviors

sexual knowledge was added, sexual knowledge positively affected RHPBs ($\beta=.20, p=.012$). This model showed an explanatory power of 3.5% for RHPBs ($F=2.50, p=.045$). In the third-stage model that included sexual values, sexual values were found to positively affect RHPBs ($\beta=.34, p<.001$). Sexual knowledge, which was significant in the second-stage model, was also significant in the third-stage model. The explanatory power of sexual knowledge and sexual values on RHPBs was 13.5% ($F=6.13, p<.001$), the additional explanatory power of sexual values for RHPBs was 10.2%, and the amount of the R^2 change was significant ($p<.001$) (Table 4).

6. Mediation effect analysis of sexual values between sexual knowledge and RHPBs

The analysis results of examining the mediating effect of sexual values in the relationship between male university students' sexual knowledge and RHPBs, with RHPBs as the dependent variable and sexual knowledge as the independent variable, are as follows (Figure 1, Table 5). The 'a' is an unstandardized coefficient of the relationship when the outcome variable of the model is 'sexual value'. The 'b' is an unstandardized coefficient of the relationship when the outcome variable of the model is 'RHPBs'. The unstandardized coefficient 'c' represents the indirect effect of sexual values on the relationship between sexual knowledge and

RHPBs. The unstandardized coefficient 'a*b' represents the indirect effect of sexual values on the relationship between sexual knowledge and RHPBs. In addition, 'T' indicates the unstandardized coefficients of total effect for the relationship between sexual knowledge and RHPBs (Figure 1).

The analysis revealed that the relationship between sexual knowledge and sexual value(a) was significant when the outcome variable of the model was 'sexual value' ($B=.64, p<.001$). When the outcome variable of the model is 'RHPBs', only the relationship between sexual value and RHPBs(b) was significant ($B=.20, p<.001$). Thus, the direct effect(c) of sexual knowledge on RHPBs in male university students was not significant ($B=.15, p=.145$). However the indirect effect(a*b) of sexual knowledge on RHPBs mediated by sexual value was significant ($B=.13, 95\% CI=.02-.17$). Furthermore, sexual knowledge in male university students showed a significant total effect(T) on RHPBs ($B=.28, p=.008$). Therefore, the study confirmed that sexual knowledge indirectly affects RHPBs through the mediation of sexual values, confirming that sexual values have an indirect mediating effect between the two variables (Figure 1, Table 5).

Discussion

The study found that other areas of sexual knowledge among male

Table 4. Factors Influencing Reproductive Health Promotion Behaviors

(N=166)

Variables	Model 1			Model 2			Model 3		
	β	t	p	β	t	p	β	t	p
Age(yr)	-.05	-.71	.477	-.08	-1.07	.282	-.07	-.97	.330
College majors (1=medicine)	.13	1.69	.091	.10	1.32	.188	.09	1.31	.191
Sexual Experience (1=yes)	-.03	-.42	.675	-.02	-.33	.737	-.09	-1.27	.203
Sexual knowledge				.20	2.55	.012	.09	1.27	.203
Sexual value							.34	4.41	<.001
F (p)	1.12 (.340)			2.50 (.045)			6.13 (<.001)		
ΔF (p)	-			6.51 (.012)			19.49 (<.001)		
R^2	.020			.059			.161		
Adj R^2	.002			.035			.135		

RHPBs: Reproductive Health Promotion Behaviors

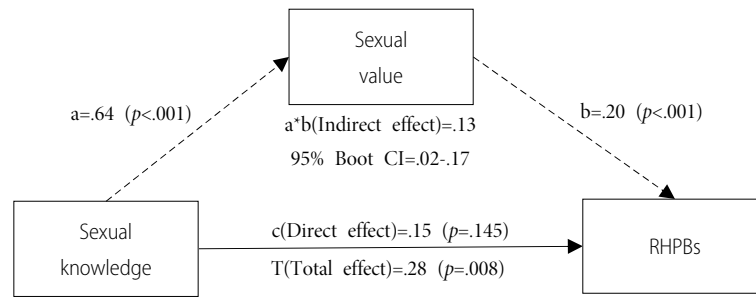


Figure 1. Mediating effect analysis of sexual values between sexual knowledge and RHPBs.

Table 5. Mediating Effect Analysis of Sexual Values between Sexual Knowledge and RHPBs (N=166)

Dependent variable	Independent variable	Mediating variable	Effect					95% Confidence Interval (CI)			
			Path	B	SE	β	t	p	LLCI	ULCI	
RHPBs	Sexual knowledge	Sexual value	T	Total effect (c+a*b)	.28	.10	.20	2.67	.008	.07	.50
			a	Sexual knowledge → Sexual value	.64	.16	.28	3.85	<.001	.31	.97
			b	Sexual knowledge → RHPBs	.15	.10	.11	1.46	.145	-.05	.36
				Sexual value → RHPBs	.20	.04	.32	4.25	<.001	.10	.29
			c	Direct effect (Sexual knowledge → RHPBs)	.15	.10	.11	1.46	.145	-.05	.36
			a*b	(Sexual knowledge → Sexual value) * (Sexual value → RHPBs)	.13	.05	.09	-	-	.02	.17

SE: standard error; LLCI: lower level of the 95% confidence interval; ULCI: upper level of the 95% confidence interval; RHPBs: Reproductive Health Productive Behaviors

college students were above the item mean but below the mean in the areas of pregnancy, STDs, and AIDS. Sexual knowledge also varied by college major among male college students, with medical majors scoring higher than engineering majors. Medical students had higher sexual knowledge than engineering students, which supports previous reports that male students in health-related majors have higher sexual knowledge scores than male students in non-health-related majors [28]. This discrepancy may be due to health-related students having greater exposure to sexual knowledge through their academic curriculum. This result has implications for finding the need to address the lack of sexual health knowledge among college students in more diverse majors through liberal arts courses rather than courses in specific majors.

Sexual values were higher among male students with sexual experience. This finding supports a line of previous research indicating that sexual attitudes influence sexual experience and that sexual attitudes become more evident with more sexual experience [11,18]. Another prior study reported that male students held more positive and active sexual values than female students [9]. However, in this study, male college students' scores in the behavioral domain were lower than the item mean, although

other domains of sexual values were higher than the item mean. Therefore, it could be that male college students hold more eager values about sex than female students but are less likely to express behavior about their sexual interests. This result is similar to a study comparing sexual consciousness and sexual behavior between Dutch and Korean adolescents, which found that Korean adolescents had positive perceptions of sex but inhibited the expression of sexual impulses [29], which may reflect Korean cultural specificity. Therefore, it is necessary to provide education that considers the Korean socio-cultural background so that male college students can cultivate values that allow them to express their sexual urges naturally and appropriately.

Although other areas of male students' RHPBs were higher than the average of all items, safe sex, and sexual responsibility were lower than the average of all items. A previous study [9] reported similar results, showing that male students' RHPBs were lower in sexual responsibility and safe sex compared to other domains. Therefore, it is necessary to emphasize education on safe sex and sexual responsibility, which are lower in male college students' RHPBs compared to other domains.

The results of the correlation analysis showed that male college stu-

dents' sexual knowledge, sexual values, and RHPBs were positively correlated. This result supports the previous study that confirmed a positive correlation between male college students' sexual knowledge and RHPBs [12] and a previous study that examined the influence of sexual attitudes and sexual behaviors on college students [11]. Age, college major, and sexual experience were not significant explanatory variables when exploring explanatory factors of reproductive health promotion behaviors. Sexual knowledge was a significant explanatory variable when entered alone. However, when considering sexual knowledge and sexual values at the same time, only the influence of sexual values was a significant explanatory variable. This result is because the correlation value of sexual values ($r=.34$) on RHPBs was greater than that of sexual knowledge ($r=.20$), which could be because the correlation between sexual values and RHPBs ($r=.34$) was higher than the correlation between sexual knowledge and RHPBs ($r=.20$), so the influence of sexual values was more significant when entered simultaneously. Therefore, it is necessary to focus on sexual values rather than sexual knowledge to promote the reproductive health promotion behaviors of male college students. As a basis for this result, when analyzing the mediating effect of sexual values in the relationship between sexual knowledge and RHPBs, when considering sexual knowledge and sexual values simultaneously, sexual values had a significant direct effect on reproductive health promotion behaviors. Meanwhile, sexual knowledge had a significant indirect effect on RHPBs by mediating sexual values. Therefore, the strategy to promote RHPBs of male college students should consider the direct and indirect effects of sexual values and sexual knowledge together. These results are consistent with the result of the literature analysis that sexual behaviors have a causal relationship with sexual knowledge and sexual attitudes [11]. In addition, when compared with the results of a previous study on female college students [30] that sexual knowledge about STDs and sexual physiology directly or indirectly affected RHPBs and sexual attitudes have a mediating effect, it suggests the possibility that the level of interaction between factors affecting reproductive health promotion behaviors may differ by gender.

The results of this study can be used as primary data for education to establish accurate sexual knowledge and correct sexual values in male college students. However, this study has several limitations. First, since the study collected sensitive information such as sexual experience through an online survey, the reliability of the responses may be limited due to social desirability bias. Second, since the study recruited a convenience sample from the online communities of two universities accessible to the researcher, the study may not fully reflect all the characteristics of male

college students. Therefore, further research is needed to identify factors affecting RHPBs other than those considered in this study through probability sampling and face-to-face interviews. Third, we suggest that follow-up studies, including both male and female college students, be conducted to more clearly identify the differences in factors influencing reproductive health promotion behaviors by gender.

Conclusions

This study aimed to explore the effects of male college students' sexual knowledge and sexual values on RHPBs. The results of the study confirmed that sexual values directly affected RHPBs, while sexual knowledge indirectly affected RHPBs through sexual values. Therefore, RHPBs of male college students should be promoted by considering both the direct and indirect effects of sexual values and sexual knowledge.

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