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Vietnamese undergraduate students' perspectives on sexual knowledge, attitudes, and risky sexual behavior

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ABSTRACT

Human sexual behavior research is a multidisciplinary endeavor that seeks to comprehend one of the most vital and complex aspects of our behavioral science. This study aimed to investigate Vietnamese university students' perception of sexual knowledge as well as the relationship between gender, academic year, and sexual orientation. The questionnaire was sent to 666 Vietnamese undergraduate students in four universities which 418 respondents were considered valid for research purposes. The study results showed that there was a significant difference among the four study groups of different (1) academic year; (2) sexual orientations; (3) gender and academic year level; (4) academic year and sexual orientation; (5) gender, academic year, and sexual orientation level when considered jointly on the variables of the three aspects of the Sex knowledge and Attitude Questionnaire II. However, there was no reciprocal relationship between (6) gender; (7) gender, and sexual orientation level. The findings of this study will have implications for school policies that attempt to promote and maintain a positive school climate in an effort to address the issue of sexuality education, including sexual knowledge.

1. Introduction

Sexual knowledge (SK) is an essential component of daily life. It covers sex, sexuality, sexual orientation, pregnancy, contraception, and sexually transmitted diseases (STDs) (Lyu et al., 2020; McKelveym et al., 1999). Sex was used to refer to sex chromosomes and sexual anatomy in a purely biological context. Sex refers mainly to social or cultural features, even though the distinction between the two words is not always observed. Sexuality is characterized as the ability to derive pleasure from various types of sexual activity and behaviors, especially sexual intercourse (Dutt and Manjula, 2017; McMann and Trout, 2021). The long-term sexual attraction of a person to a man, a woman, or both partners. There have been numerous studies investigating sexual knowledge of university students, such as factors influencing knowledge as media, education, religion, and so on, or the level of knowledge of them (Baumeister, 2000; Mukherjee et al., 2019; McMann and Trout, 2021; Richman et al., 2014; Sümer, 2015; Zhang et al., 2010). However, little is known about university students' sexual health literacy in Vietnam and even less about their understanding of sexual health among Vietnamese undergraduates.

Many studies showed that university students had their shadow understanding of sexual knowledge. Many medical students had inaccurate factual information about major problems in sexual health, particularly condom failure, abortions, and disease, as found in a study at Bristol University Chlamydia Common (Fayers et al., 2003). In China, Zang et al. (2010), research showed the lack of knowledge of sexual and reproductive health among female Chinese university students. Only 8.8 percent (out of 100) had more than 60 points, with less than half answered properly by over 70. Grades are increasing as expected with age and grade. The results also show that the earlier it happened, the higher their knowledge and this could be linked to their interest and their understanding of previous sexual behavior (Baumeister, 2000; Zhang et al., 2010) and the degree of knowledge is different between urban and rural areas (Lou et al., 2012;

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McMann and Trout, 2021). In a study with 752 medical undergraduate students in different universities in India, by Kumar et al. (2020), the results showed that the participants are deficits in sexual knowledge and conservative attitude in certain areas. Females, higher education level, and urban area participants have higher sexual knowledge and liberal attitude. Liberal attitude towards sex develops as sexual knowledge increases. In 2017, a study conducted at the Thai Nguyen University of Pharmacy in Vietnam showed that 23.7% of students did not properly understand safe sex; 1.3% do not know a particular type of contraceptive method; more than 42% do not know the signs or symptoms of STDs and 16% don't understand where to treat the disease and how they relate the received knowledge information from schools; sexual knowledge has to do with premarital attitudes.

In a number of studies, the increasing sexual knowledge is observed as the academic year (education) of participants. Scores of fourth-grade students have been found to be more important than first-grade students (Sohbet and Geçici, 2014). Students who are older become increasingly aware of sexuality and have shown significant results between the first and fourth grades in the study by Avci et al. (2016). These findings corresponded to Sidi et al. (2013). These results can be explained as students gaining more knowledge and clinical information in the increasing academic year. Synovitz et al. (2002) found that sexuality and contraception knowledge increased with a year in college. The overall knowledge was the lowest for students who did not receive sex education previously or who had received it at primary and higher education at the college level.

Sex-related knowledge in males, higher grades (older students) universities in the province of Zhejiang, was significantly higher in this study by Lyu et al. (2020). 3649 (61.2 %) considered that a female could become pregnant when she first got sex and 48.8 percent understood the "safe period" In terms of pregnancy (with 33.4% unsure). About one-third of students correctly identified all types of HIV transmission, and a half (50.9%) knew there were easy checks for HIV diagnosis; 4978 (83.5 %) students knew condoms defend against STIs, and 5238 (87.8%) assumed condoms should be used more than once. However, 2400 students (40.3 percent) believed it was detrimental to their health (with 26.2 percent unsure). On average 22.6% of respondents replied "not sure" on all things.

College students' sexual awareness and attitudes are not a new subject. However, few studies have been conducted with college students in Vietnam on this subject. To fill this gap, we investigated Vietnamese university students' perception of sexual knowledge as well as the relationship between gender, academic year, and sexual orientation. We expected a correlation between gender and sexual orientation, gender and academic year, and sexual orientation and academic year.

2. Methodology

2.1. Research hypotheses

A 2×4x5 factorial design was used. The independent variables were three aspects of the student: gender (male, female), academic year (freshman, sophomore, junior, and senior), and sexual orientation (heterosexuality, homosexuality, bisexuality, pansexuality, asexuality). Three dependent variables were measured: Biological Aspect (BA), Psychological Aspect (PA), and Social Aspect (SA). The following null hypotheses were tested:

Ho_1 (main effect): There is no significant difference among the two study groups of a different gender when they are compared simultaneously on the Biological Aspect (BA), Psychological Aspect (PA), and Social Aspect (SA).
Ho_2 (main effect): There is no significant difference among the four study groups of the different academic years when they are compared simultaneously on the Biological Aspect (BA), Psychological Aspect (PA), and Social Aspect (SA).
Ho_3 (main effect): There is no significant difference among the five study groups of different sexual orientations when they are compared simultaneously on the Biological Aspect (BA), Psychological Aspect (PA), and Social Aspect (SA).
Ho_4 (interaction effect): There is no significant interaction between gender and academic year level when students are compared simultaneously on the Biological Aspect (BA), Psychological Aspect (PA), and Social Aspect (SA).
Ho_5 (interaction effect): There is no significant interaction between gender and sexual orientation level when students are compared simultaneously on the Biological Aspect (BA), Psychological Aspect (PA), and Social Aspect (SA).
Ho_6 (interaction effect): There is no significant interaction between academic year and sexual orientation level when students are compared simultaneously on the Biological Aspect (BA), Psychological Aspect (PA), and Social Aspect (SA).
Ho_7 (interaction effect): There is no significant interaction between gender, academic year, and sexual orientation level when students are compared simultaneously on the Biological Aspect (BA), Psychological Aspect (PA), and Social Aspect (SA).

2.2. Participants

Four hundred and three undergraduate students participated in this prospective study from February 2021 to April 2021. The survey instrument was distributed through an online survey application. The distribution of the data was done through Google Form, an application developed by Google Inc. 666 Vietnamese students of four universities located in Vietnam, of which 666 questionnaires were returned, with a return rate of 100 percent, which had exceeded the 30 percent response rate

most researchers require for analysis (Dillman, 2000). 418 Vietnamese students, including 272 heterosexuality (92 freshmen, 124 sophomores, 36 juniors, and 20 seniors), 13 homosexuality (6 freshmen, 4 sophomores, 1 junior, and 2 seniors), 42 bisexuality (20 freshmen, 11 sophomores, 7 juniors, and 4 seniors), 25 pansexuality (10 freshmen, 9 sophomores, 4 juniors, and 2 seniors), and 66 asexuality (27 freshmen, 27 sophomores, 7 juniors, and 5 seniors) from universities of Vietnam, were participants of our study. Table 1 shows **the** number of participants in the sexual orientation by groups of the academic year.

Table 1: Number of participants in the sexual orientation by groups of the academic year

Sexual orientation group	Academic year group				Total
	Freshman	Sophomore	Junior	Senior	
Heterosexuality	92	124	36	20	272
Homosexuality	6	4	1	2	13
Bisexuality	20	11	7	4	42
Pansexuality	10	9	4	2	25
Asexuality	27	27	7	5	66

Participants were selected randomly from students at universities. After they were provided a description of this research's purpose, all participants received informed consent. The study protocol was approved by the Educational Psychology Research Group, Ho Chi Minh City University of Education, Vietnam (No. 3019/QD-DHSP). Fig. 1 shows the number of Participants in the Sexual orientation by Group of Academic year.

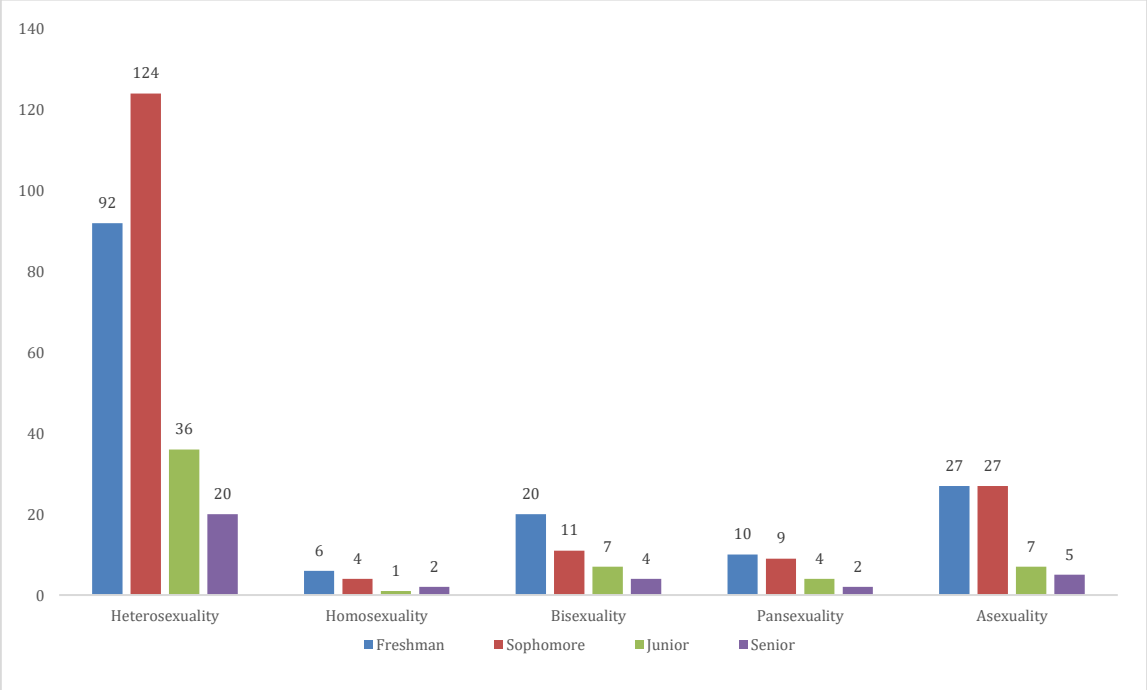

Fig. 1: Number of participants in the sexual orientation by groups of the academic year

2.3. Measurement

Participants were asked to complete the following questionnaire: The Vietnamese versions of the Sex knowledge and Attitude Questionnaire II (SKAQ II) for undergraduate students based on the original (Kumar et al., 2020), a 71-item questionnaire measure of sexual knowledge and attitude. The SKAQ II consists of three subscales: Biological Aspect (BA), Psychological Aspect (PA), and Social Aspect (SA). The 35 items of SKAQ were translated into Vietnamese by two bilingual researchers who were both familiar with the construct being assessed. For one of them, the first language was Vietnamese; for the other, the first language was English. Forward and backward translation procedures were executed following the guidelines. The same sequence of items was maintained in the Vietnamese translation of the index. All participants were instructed to read the questionnaire questions carefully and choose the responses that best described themselves. The SKAQ consists of 35 questions administered to the entire at once. The coding procedure was based on a seven-point Likert system, as follows: 1=Very bad, 2=Bad, 3=Fairly bad, 4=The same as before, 5=Fairly good, 6=Good, and 7=Very good. According to Nunan et al. (2020), the seven-point Likert scale's interval width should be computed to set up the group boundary value for result discussions. Cronbach's alpha for this scale was 0.92 in the current study. A value that is high but still usually considered sufficient for a questionnaire (Bowling, 2014; Leech et al., 2005; Taber, 2018).

2.4. Procedure

In the beginning, participants are required to complete the General Information form, including gender, academic year, and sexual orientation. Subsequently, the instructions of SKAQ II were introduced to students to understand the questionnaire. Students were informed that other peers would not know their responses, and the questionnaire did not have the wrong answer. They were asked to answer and complete each question based on their own experience.

3. Results

3.1. Descriptive analysis

According to the norms from the SKAQ (Kumar et al., 2020), the participants scored in the average range on the sexual knowledge scale. The mean score for the BA subscale was 69.49 (SD=18.13). The mean score on the PA subscale was 25.51 (SD=7.71). The mean score for the SA subscale was 36.31 (SD=11.74). Table 2 presents descriptive statistics of dependent variables, including BA, PA, and SA results by sexual orientation and academic year level groups.

3.2. Inferential analysis

The null hypotheses were tested with a three-way MANOVA procedure performed by SPSS. In order to run MANOVA, we conducted a preliminary assumption check for normality, homogeneity of variance-covariance matrices. If the sizes of groups are approximately equal or the size of the largest group is less than about 1.5 times the size of the smallest group, MANOVA is robust to violations of the homogeneity of variance/covariance matrices (Leech et al., 2005). The largest group in this research (n=124) was about 124 times larger than the smallest group (n=1), the multivariate homogeneity of variance-covariance matrices tested with Box's M test revealed that the M value of 164.517 was significant (p=0.007). Therefore, the assumption of homogeneity of covariance matrices was not satisfied. For this reason, a more robust statistic, Pillai's Trace value, was used for reporting the result.

Table 2: Summary of the mean (M) and standard deviation (SD) of sexual knowledge questionnaire

Sexual orientation	Academic year Group				Combined
	Freshman	Sophomore	Junior	Senior	
Heterosexuality (N)	92	124	36	20	272
BA					
M	3.89	3.75	3.85	4.22	3.85
SD	1.06	0.93	1.00	1.09	1.01
PA					
M	4.27	.70	.60	.65	
SD	1.23	.23	.27	.25	
SA					
M	.34	.43	.38	.39	
SD	.21	.22	.20	.21	
Homosexuality (N)	6	4	1	2	13
UF					
M	.48	.46	.41	.45	
SD	.22	.18	.18	.20	
FS					
M	.79	.72	.68	.72	
SD	.20	.23	.23	.23	
TR					
M	.42	.48	.52	.48	
SD	.21	.21	.21	.21	

On the basis of the significant effects from the result of MANOVA, a separate two-way univariate analysis of variance (ANOVA) for each of the dependent variables was conducted without undue inflation of the experiment-wise Type I error (Grimm and Yarnold, 1995). Within the MANOVA and ANOVA, the assumption that the variances of each variable are equal across the groups is checked by Levene's Test of Equality of Error Variances. If Levene's test produces a significant result, this means that the assumption has been violated. In this research, the value of Levene's test came out to be significant for all the variables with the exception of SA [$F_{(30, 372)}$=1.07, p>0.05]. So, the assumption that the variances of each variable are equal across the groups was not met for the other variables (BA [$F_{(30, 372)}$=1.613, p<0.05], PA [$F_{(30, 372)}$=2.181, p<0.05]). Therefore, when the follow-up ANOVAs were conducted, results for Biological Aspect (BA), Psychological Aspect (PA) were interpreted with caution. Table 3 shows the effects of gender, academic year, sexual orientation on students' sexual knowledge.

There was not a significant difference between males and females when considered jointly on the variables Biological Aspect, Psychological Aspect, and Social Aspect. Pillai's Trace value=0.015; $F_{(3, 370)}$=1.818, p=0.14, partial η^2=0.015. Therefore, the results suggested that the first hypothesis (Ho_1) was not rejected.

Table 3: Effects of gender, academic year, sexual orientation on students' sexual knowledge

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial η2
Corrected Model	BA	40.801a	30	1.360	1.382	.091	.100
	PA	69.971b	30	2.332	1.409	.079	.102
	SA	65.951c	30	2.198	2.087	.001	.144
Intercept	BA	915.242	1	915.242	929.790	.000	.714
	PA	1039.112	1	1039.112	627.536	.000	.628
	SA	745.021	1	745.021	707.331	.000	.655
Gender	BA	2.231	1	2.231	2.266	.133	.006
	PA	.071	1	.071	.043	.836	.000
	SA	2.008	1	2.008	1.907	.168	.005
Academic year	BA	3.551	3	1.184	1.202	.309	.010
	PA	8.883	3	2.961	1.788	.149	.014
	SA	11.089	3	3.696	3.509	.015	.028
Sexual orientation	BA	9.345	4	2.336	2.373	.052	.025
	PA	20.401	4	5.100	3.080	.016	.032
	SA	11.070	4	2.767	2.627	.034	.027
Gender * Academic year	BA	1.900	3	.633	.643	.588	.005
	PA	9.049	3	3.016	1.822	.143	.014
	SA	7.933	3	2.644	2.510	.058	.020
Gender * Sexual orientation	BA	3.872	4	.968	.983	.416	.010
	PA	17.706	4	4.426	2.673	.032	.028
	SA	2.522	4	.631	.599	.664	.006
Academic year * Sexual orientation	BA	22.752	11	2.068	2.101	.020	.058
	PA	36.336	11	3.303	1.995	.028	.056
	SA	29.958	11	2.723	2.586	.004	.071
Gender* Academic year * Sexual orientation	BA	11.599	4	2.900	2.946	.020	.031
	PA	21.033	4	5.258	3.176	.014	.033
	SA	13.850	4	3.462	3.287	.011	.034
Error	BA	366.180	372	.984			
	PA	615.980	372	1.656			
	SA	391.822	372	1.053			
Total	BA	6381.775	403				
	PA	8073.917	403				
	SA	4849.504	403				
Corrected Total	BA	406.981	402				
	PA	685.951	402				
	SA	457.774	402				

a: R Squared= .100 (Adjusted R Squared= .028); b: R Squared= .102 (Adjusted R Squared= .030); c: R Squared= .144 (Adjusted R Squared= .075)

There was a significant difference between freshman, sophomore, junior, and senior when considered jointly on the variables Biological Aspect, Psychological Aspect, and Social Aspect. Pillai's Trace value=0.060; $F_{(9, 1116)}$=2.513, p=0.008, partial η^2=0.020. Hence, the results suggested that the second hypothesis (Ho_2) was rejected. A separate ANOVA was conducted for each dependent variable, with each ANOVA evaluated at an alpha level of 0.017 (i.e., 0.05/3). There was a significant difference between freshman, sophomore, junior, and senior only on Social Aspect, $F_{(3, 372)}$=3.509, p=0.015, partial η^2=0.028, with senior (M=3.83, SD=1.22) scoring higher than freshman (M=3.35, SD=1.07), sophomore (M=3.15, SD=1.01), and junior (M=3.30, SD=1.03) and there was a non-significant difference between freshman, sophomore, junior, and senior on Biological Aspect, $F_{(3,372)}$=1.202, p=0.309, partial η^2=0.01. There was a non-significant difference between freshman, sophomore, junior, and senior on Psychological Aspect, $F_{(3, 372)}$=1.788, p=0.149, partial η^2=0.014.

There was a significant difference between heterosexuality, homosexuality, bisexuality, pansexuality, and asexuality when considered jointly on the variables Biological Aspect, Psychological Aspect, and Social Aspect. Pillai's Trace value=0.077, $F_{(12, 1116)}$=2.436, p=0.004, partial η^2=0.026. Consequently, the results suggested that the third hypothesis (Ho_3) was rejected. A separate ANOVA was conducted for each dependent variable, with each ANOVA evaluated at an alpha level of 0.017 (i.e., 0.05/3). There was a significant difference between heterosexuality, homosexuality, bisexuality, pansexuality, asexuality on Psychological Aspect, $F_{(4, 372)}$=3.08, p=0.016, partial η^2=0.032, with asexuality (M=4.51, SD=1.43) scoring higher than heterosexuality (M=4.27, SD=1.23), homosexuality (M=4.43, SD=1.49), bisexuality (M=4.25, SD=1.37) and pansexuality (M=3.85, SD=1.43) and there was a non-significant difference between heterosexuality, homosexuality, bisexuality, pansexuality, asexuality on Biological aspect, $F_{(4, 372)}$=2.373, p=0.052, partial η^2=0.025. There was not a significant difference between heterosexuality, homosexuality, bisexuality, pansexuality, asexuality on the Social aspect, $F_{(4, 372)}$=2.627, p=0.034, partial η^2=0.027.

The results revealed that there was a significant multivariate effect for interaction between gender and academic year when considered jointly on the variables Biological Aspect, Psychological Aspect, and Social Aspect. Pillai's Trace value=0.047, $F_{(9, 1116)}$=1.957, p=0.041, partial η^2=0.016. Thus, the results suggested that the fourth hypothesis (Ho_4) was rejected. Follow-up univariate analysis found that males had higher Biological Aspect and Psychological Aspect than females in freshman, sophomore, and senior, but not in junior. Females had higher Social Aspects than males in sophomore.

The results revealed that there was not a significant multivariate effect for interaction between gender and sexual orientation level when considered jointly on the variables Biological Aspect, Psychological Aspect, and Social Aspect. Pillai's Trace value=0.051, $F_{(12, 1116)}$=1.595, p=0.087, partial η^2=0.017. Accordingly, the results suggested that the fifth hypothesis (Ho_5) was not rejected.

The results revealed that there was a significant multivariate effect for interaction between academic year and sexual orientation level when considered jointly on the variables Biological Aspect, Psychological Aspect, and Social Aspect. Pillai's Trace value=0.143, $F_{(33,1116)}$=1.687, p=0.009, partial η^2=0.048. Therefore, the results suggested that the sixth hypothesis (Ho_6) was rejected. A separate ANOVA was conducted for each dependent variable, with each ANOVA evaluated at an alpha level of 0.017 (i.e., 0.05/3). There was a significant difference between academic year and sexual orientation when considered jointly on the variables Social aspect, $F_{(11, 372)}$=2.586, p=0.004, partial η^2=0.071 but no significant on Biological aspect, $F_{(11, 372)}$=2.101, p=0.02, partial η^2=0.058 and on Psychological aspect, $F_{(11, 372)}$=1.995, p=0.028, partial η^2=0.056. Follow-up univariate analysis found that seniors had higher Social aspect scores than freshman, sophomore, and senior in asexuality, but not in pansexuality.

Our findings showed that there was a significant multivariate effect for interaction between gender, academic year, and sexual orientation level when considered jointly on the variables [Biological Aspect, Psychological Aspect, and Social Aspect], Pillai's Trace value=0.089, $F_{(12, 11162)}$=2.185, p=0.011, partial η^2=0.029. So, the results suggested that the third hypothesis (Ho_7) was rejected. A separate ANOVA was conducted for each dependent variable, with each ANOVA evaluated at an alpha level of 0.017 (i.e., 0.05/3). There was a significant difference gender, academic year, and sexual orientation level when considered jointly on the variables Social aspect, $F_{(4, 372)}$=3.287, p=0.011, partial η^2=0.034 and on Psychological aspect, $F_{(4, 372)}$=3.176, p=0.014, partial η^2=0.033 but no significant on Biological aspect, $F_{(4, 372)}$=2.946, p=0.02, partial η^2=0.031.

4. Discussion

The present study investigated under graduated students' sexual knowledge in Vietnam. The study results indicated significant effects of sexual orientation, academic years; the interaction between gender and academic years; the interaction between sexual orientation and academic years, and the interaction gender, sexual orientation, and academic years of undergraduate students when they are compared simultaneously on the Biological aspect, Psychological aspect, and Social aspect. However, this research showed that there were no significant effects of gender; the interaction between gender and sexual orientation when they are compared simultaneously on SKAQ-II subscales.

There was no significant difference in sexual knowledge between males and females, and the findings are consistent with previous findings. These findings were consistent with those of Kacha and Lakdawala (2019), who discovered no significant difference in overall knowledge between males and females. According to Baumeister (2000), men have more sexual knowledge than women.

In many studies, the increasing sexual knowledge is observed as the academic year (education) of participants. Sohbet and Geçici (2014) found that the 4th grade was higher than the first graduation. With their aging, the sexual knowledge gains of students are increasing. Avci et al. (2016) showed that the first- and fourth-grade ranges are significant and the findings of Sidi et al. (2013) were consistent with Kumar et al. (2020). These results can be explained as students gaining more knowledge and clinical information in the increasing academic year. Synovitz et al. (2002) found that sexuality and contraception knowledge increased with a year in college. Overall knowledge was lowest in students who did not receive any preceding sexual education or received it in primary school and higher in school graduates.

The interaction between gender and academic years has been found in our research. Freshman, sophomore, and older men had a higher sexual knowledge than women, but not junior men. This is supported by the study by Lyu et al. (2020) as the sexual knowledge scores in males and higher grades (older students) universities in Zhejiang province were significantly higher in their study.

The sample, literature, and self-reported measurements were the main research limitations. Even if it was large, the samples for this current study came from only four specific universities in Vietnam, which may not be sufficient to represent the entire higher education institutions in Vietnam and socio-cultural influences from different parts of Vietnam as well. Furthermore, this study only used questionnaires for itself, which could bias the findings, and it was a cross-sectional study, which does not allow us to conclude causal relationships between research variables. These limitations should be addressed in future studies, and sexual knowledge for college students should be investigated further.

5. Conclusion

Our research found that there was a relationship between gender, academic year, and sexual orientation. However, there was no significant difference in sexual knowledge between males and females. One significant finding was that the sex-related knowledge increased with college years accumulated by those students. Further research was needed which used more diverse and larger samples in order to determine the extent to which the current results may be generalizable to other

populations. The findings of this study might have important implications for psychology professionals who teach human sexuality. With today's comprehensive-sex education, knowing students' sexual attitudes deserved close attention.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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