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College Students' Knowledge, Attitudes, and Practices Regarding Reproductive Health: Implications to Science Education Curriculum

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ABSTRACT

Maintaining sound reproductive health is crucial for achieving and sustaining optimal overall well-being. Reproductive health encompasses various physical, emotional, and social factors that significantly impact an individual's quality of life. The present study used a descriptive-correlational research design to determine and explore the relationships between teacher education students' knowledge, attitudes, and practices (KAPs) on reproductive health in a state university in Zambales, Philippines. A total of 146 respondents completed the online survey questionnaires. Findings showed that teacher education students have a moderate level of knowledge on reproductive health, including the basic components of the reproductive system, the transmission of reproductive diseases, the influence of the environment on reproductive health, and birth control methods. Respondents have very favorable attitudes towards reproductive health in terms of reproductive health education and services. They often practice various activities related to reproductive wellness, reproductive hygiene, and reproductive health resources. When respondents were grouped based on age and year level, their practices showed significant differences. The study reveals a low positive correlation between respondents' knowledge and attitude towards reproductive health. Documenting teacher education students' KAP is a useful basis for science curriculum enhancement in education institutions to improve students' KAPs regarding reproductive health.

KEY WORDS: knowledge, attitudes, and practices; online-survey; Philippines; reproductive health; teacher education students

INTRODUCTION

Adolescence refers to the developmental stage between the ages of 13 and 20, which marks the transition from childhood to adulthood. This period is characterized by physical and emotional changes, including the onset of puberty, which signifies sexual maturation and the ability to make informed decisions. During adolescence, individuals begin to take on adult roles in society.

Teenagers face a significant risk of experiencing harmful health outcomes due to early and unsafe sexual activity. This can lead to reproductive health issues such as unwanted pregnancies, abortions, and sexually transmitted infections (STIs), largely due to a lack of knowledge about reproductive biology and preventative measures (Inthavong et al., 2020). However, discussing sexual and reproductive health can be a sensitive topic, and in many parts of the world, openly discussing sex is considered taboo. As a result, obtaining information and services related to sexual and reproductive health can be challenging, particularly in areas where contraception or abortion is prohibited due to religious or cultural beliefs.

Adolescents who lack knowledge about reproductive health may be at risk for poor health outcomes, particularly in cases of unplanned pregnancies (Pasay-an et al., 2020). It is crucial for adolescents to have a thorough understanding of safe sex practices, STIs, and how to prevent teenage pregnancies. Lack of sexual and reproductive health care can lead to the spread of sexually transmitted illnesses, including HIV. The Global Health Agenda (2020) emphasizes the importance of educating adolescents about sexual health, empowering them to make informed decisions, and encouraging them to practice safe sex to prevent STIs and unplanned pregnancy (Kyilleh, 2018). The World Health Organization (n.d.) defined reproductive health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and its functions and processes" (para. 1). Reproductive health implies that "people are able to have a satisfying and safe sex life and that they have the capability to reproduce and the freedom to decide if, when and how often to do so" (World Health Organization, n.d., para. 1). Reproductive health encompasses all aspects of sexuality and reproduction, including physical, emotional, mental, and social well-being, and goes beyond simply avoiding illness or dysfunction (Engel et al., 2019).

Globally, several studies have been conducted on reproductive health education. These studies examine various aspects, including the utilization of youth-friendly reproductive health services (Ninsiima et al., 2021), parent-adolescent

communication on adolescent reproductive health (Usonwu et al., 2021), and the effectiveness of school-based reproductive health education among adolescents (Alekhya et al., 2023). In addition, research has explored knowledge, attitudes, and practices (KAPs) related to reproductive health among different populations, such as adolescents (Adjie et al., 2022; Ha et al., 2024; Karim et al., 2021), female refugees (Tahir et al., 2022), early married women (Tripathi and Singh, 2021), women with unplanned pregnancies (Sheng et al., 2024), women of reproductive age (Lincoln et al., 2021), and college students (Zhao et al., 2023).

Despite being a crucial topic for Filipino youth, reproductive health remains a taboo subject in their culture (Zakaria et al., 2020), leading to controversy surrounding the issue (Asio, 2019). Similar to several other countries, there is a lack of recognition for comprehensive sex education (Chandra-Mouli et al., 2018). The KAP model, which posits that awareness and positive attitudes toward health-related topics influence behavioral practices, serves as a useful framework for understanding reproductive health behaviors among young individuals (Launiala, 2009). However, studies specifically examining KAPs on reproductive health among undergraduate students in the Philippines remain limited. Thus, this study aims to assess the reproductive health KAPs of teacher education students in a state university in Zambales, Philippines, serving as a basis for science curriculum enhancement.

METHODS

Research Model
The study utilized a descriptive-correlational research design. The researchers opted for the descriptive method to determine the estimated proportion of participants' perspectives and experiences within a specific population, specifically their level of KAPs regarding their reproductive health.

Research Group
The research study was conducted in a state university in Zambales, Philippines. The university is an ideal setting in conducting the research study since it offers teacher education programs. The study was conducted from December 2022 to May 2023. The respondents of the study were 146 teacher education students in a state university in Zambales, Philippines (Table 1). These include the 1st to 4th-year students from Bachelor of Secondary Education (BSED) and Bachelor of Elementary Education (BEED).

The respondents were conveniently chosen from PRMSU San Marcelino Campus. Due to internet connectivity issues and the busy schedules of other respondents, the researchers only obtained 146 responses out of the 287 target respondents with a sampling rate of 50.87%.

As shown, the majority of respondents were females in the age bracket of 21–23 years old. The program with the most respondents was BSED English, with BSED Science and

Table 1: General characteristics of the research group

Profile	n	%
Sex		
Male	36	24.66
Female	110	75.34
Age*		
18–20	62	42.47
21–23	80	54.79
24+	4	2.74
Program enrolled		
BEED	46	31.51
BSED English	52	35.62
BSED Science	34	23.29
BSED Social studies	14	9.59
Year level		
1st Year	12	8.22
2nd Year	19	13.01
3rd Year	56	38.36
4th Year	59	40.41

*Mean age: 20.85 (SD=1.70)

Social Studies programs following closely. Almost half of the participants were in their final year of college.

Instruments
The researchers developed the KAP regarding Reproductive Health survey questionnaire (KAPRH-SQ) to collect reliable and valid data on reproductive health KAP of college students. The survey was used to gather data from teacher education students for this study. The data were collected through an online survey with the use of Google forms for easy access. The survey questionnaire was subjected to construct and content validity. The validity of the items in each variable was examined by three research professionals. It was found out that the knowledge on Reproductive Health had good reliability with an overall reliability coefficient of 0.727. The attitude towards reproductive health had an overall reliability coefficient of 0.925 which is considered excellent. The standard Cronbach's Alpha measure of internal consistency is used to examine the survey questionnaire's reliability where 0.70 and above is considered as acceptable.

Some scholarly literature served as references in the development of the questionnaire measuring the respondents' knowledge of reproductive health, attitude toward reproductive health, and practices on reproductive health (e.g., Asio, 2019; Messerlian et al., 2018; Pasay-an et al., 2020; Inthavong et al., 2020; Mukherjee et al., 2019; Pasay-an et al., 2020; Silva et al., 2019; Yosef and Nigussie, 2020).

Data Collection
The researchers developed a survey questionnaire that was used to gather data and information from the respondents. The questionnaire underwent preliminary corrections and was later validated by three experts in research, reproductive health, and instrument development. The final version was then subjected

to a pilot test and tested for Cronbach's alpha reliability. The pilot test involved 160 students from various colleges on the San Marcelino Campus, but they did not participate in the actual survey. Following this, a letter was submitted to conduct the study. To comply with public health guidelines while conducting the study, the researchers distributed survey questionnaires online. The researchers shared Google form links through social media platforms, including individual Facebook messenger and group chats, for easy access. This approach allowed the researchers to avoid physical contact with respondents and follow health protocols. The form was available to participants from December 2022 to February 2023, giving them ample time to provide their responses.

Data Analysis

This study employed descriptive statistical tools, including weighted mean, frequency, and percent distribution, to summarize the data. For inferential analysis, Analysis of Variance (ANOVA) was used to determine significant differences in KAPs on reproductive health across different groups. In addition, Pearson's correlation coefficient (Pearson-r) was applied to assess the relationship between knowledge and attitudes. The strength of the correlation was interpreted based on standard guidelines: slight (0.00–0.21), low (0.21–0.40), moderate (0.41–0.60), high (0.61–0.80), and very high (0.81–1.00). The researchers utilized the Statistical Package for Social Sciences (SPSS) version 25 to facilitate data processing and analysis.

RESULTS

College Students' Knowledge of Reproductive Health

Table 2 shows the respondent's knowledge of reproductive health. As shown in the table, teacher education students had a moderate level of knowledge of reproductive health with an overall mean percent score (MPS) of 73.78%. This implies that the respondents have average knowledge of the different concepts related to reproductive health.

As presented in the table, the teacher education students showed a high level of knowledge about the reproductive system with an MPS of 77.23%. The statement "the primary reproductive organs, or gonads, consist of the ovaries and testes" received the highest MPS of 97.26%. Meanwhile, respondents only had a moderate level of knowledge of regular orgasm, as evidenced by the lowest mean score of 3.49 (SD = 0.64). This implies that the respondents are unaware that repeated orgasms or sexual pleasure do not expose the reproductive system to certain diseases.

Given the results, the respondents showed a moderate level of knowledge regarding reproductive health diseases with an MPS of 74.17%. The respondents are knowledgeable in the item, "HIV does not spread the virus through the coughing and sneezing of an infected person" which received the highest MPS of 98.63%. The respondents also had high knowledge (98.63%) that STDs are usually transmitted through person-to-person sexual contact. The respondents exhibited a high

level of understanding that STDs are typically transmitted through person-to-person sexual contact. On the other hand, teacher education students had low knowledge of the statement, "one will always know when they have a sexually transmitted disease because there will be symptoms" with only 34.25% correct response.

The results found that the respondents have a moderate level of knowledge in connection with the effects of the environment on reproductive health with an MPS of 67.81%. The respondents exhibited a high level of knowledge of how excessive alcohol consumption in men can cause difficulties sustaining an erection or penile enlargement, decreased ejaculation, and poor sperm quality, and how it can cause birth defects and developmental delays in women with a mean percentage score of 82.88%.

In contrast, teacher education students had low knowledge of the statement "women who reported using chemical hair-straightening products had a greater chance of developing cancer in the uterus than women who did not report using these products" with only 47.95% correct response.

As shown in the table, the teacher education students showed a high level of knowledge about different birth control methods with an MPS of 81.23%. The statement "substance use, including tobacco smoking, marijuana use, heavy drinking, and using illegal drugs, reduces fertility in both men and women" received the highest MPS of 84.93%. Meanwhile, respondents have a high level of knowledge that using a contraceptive pill does not provide protection against STIs, such as HIV but received the lowest MPS of 76.71.

College Students' Attitudes towards Reproductive Health

Table 3 shows the respondent's attitudes toward reproductive health. As shown in the table, teacher education students have a very favorable attitude toward reproductive health with an overall mean of 3.64 (SD = 0.40). The respondent's attitude toward reproductive health has two sub-variables, attitude in terms of reproductive health education and attitude in terms of reproductive health services.

Based on the survey responses, the teacher education students showed a very favorable attitude toward reproductive health in terms of reproductive health education with a mean of 3.65 (SD = 0.32). The statement, "the use of family planning methods is beneficial" received the highest mean of 3.89 (SD = 0.33) and was interpreted as very favorable. On the other hand, the respondents only have a favorable attitude about the impact of teenage pregnancy on the fetus's and the mother's health which obtained the lowest mean of 3.49 (SD = 0.64).

Given the survey results, the respondents showed a very favorable attitude toward the services in reproductive health with a mean of 3.63 (SD = 0.40). The respondents acquired the highest mean in the item "adolescents need to know about the health services for reproductive health" with a mean of 3.75 (SD = 0.44). However, the respondents are only in favor of adolescents having access to contraceptives such as condoms,

Table 2: Respondents' knowledge of reproductive health

Item	Mean percentage score	Verbal description
A. Reproductive System		
1. The primary function of the reproductive system is to ensure the survival of the species or organisms.	84.25	H
2. A woman's menstrual cycle, which is more than once within a month, is not a problem.*	64.38	M
3. Regular orgasms or sexual excitement can risk your reproductive system to different diseases.*	63.01	M
4. The primary reproductive organs, or gonads, consist of the ovaries and testes.	97.26	H
Weighted MPS	77.23	H
B. Reproductive Diseases		
1. Menstruation is a form of a disease. *	95.89	H
2. One will always know when they have a sexually transmitted disease because there will be symptoms.*	34.25	L
3. Women are more likely to get sexually transmitted diseases (STDs) than men.	58.22	M
4. HIV cannot be spread through breast milk.*	65.75	M
5. STDs cannot be spread through kissing.*	67.81	M
6. STDs are usually passed through person-to-person sexual contact.	98.63	H
7. HIV does not spread the virus through the coughing and sneezing of an infected person.	98.63	H
Weighted MPS	74.17	M
C. Environmental Effects on Reproductive Health		
1. Women with higher levels of chemicals in their urine increase levels of ovary cells necessary for reproduction and a higher rate for successful pregnancies and live births.*	56.16	M
2. Exposure to lead, which can be toxic to humans, is linked to reduced fertility in both men and women.	79.45	H
3. Long soaks in the bathtub or hot tub, long hours of sitting, and excessive cycling can cause the temperature in the scrotum to increase enough, which can impair sperm production.	60.27	M
4. Chemotherapy and x-ray therapy for cancer cannot be highly toxic to sperm and eggs and cannot cause permanent infertility.*	61.64	M
5. Overweight women with irregular periods are more likely to ovulate or release an egg each month than women with regular periods.*	70.55	M
6. Excessive alcohol in men may lead to difficulties maintaining an erection or penis enlargement, impaired ejaculation, and reduced sperm quality, and may lead to birth disabilities and developmental delay in women.	82.88	H
7. Women who smoke are thrice more likely to experience a delay in getting pregnant than non-smokers.	71.92	M
8. Obesity is linked to higher sperm count and quality in men. *	79.45	H
9. Women who reported using chemical hair-straightening products had a greater chance of developing cancer in the uterus than women who did not report using these products.	47.95	L
Weighted MPS	67.81	M
D. Birth Control Methods		
1. Male condoms offer the best protection against STDs that other forms of birth control do not.	79.45	H
2. Substance use, including tobacco smoking, marijuana use, heavy drinking, and using illegal drugs, reduces fertility in both men and women.	84.93	H
3. Using latex condoms, made from thick rubber, will help prevent the spread of STDs.	80.82	H
4. Taking a contraceptive pill protects against sexually transmitted infections (STIs), including HIV.*	76.71	H
5. Recreational drugs, such as marijuana and cocaine, may interfere with ovulation and the function of the fallopian tube.	84.25	H
Weighted MPS	81.23	H
Overall	73.78	M

MPS: Mean percent score, VD: Verbal description, H: High (76–100%), M: Moderate (51–75%), L: Low (26–50%), VL: Very low (0–25%). Marked with * are false statements

tablets, and Intrauterine devices with the lowest mean of 3.37 (SD = 0.74).

College Students' Practices in Reproductive Health

Table 4 shows the respondents' practices in reproductive health. As presented in the table, the overall mean of 3.05 (SD = 0.39) signifies that reproductive health practices are often practiced by teacher education students.

As shown in the table, the overall mean of 2.80 (SD = 0.55) indicates that teacher education students often practice their reproductive health. The statement, "I express my sexual pleasure according to my sexual identity" received the highest mean of 3.19 (SD = 0.74) and was interpreted as often practiced. On the other hand, respondents often practice getting enough sleep, at least 8 h a day which received the lowest mean, 2.56 (SD = 1.10).

Based on the survey results, the overall mean of 3.86 (SD = 0.28) indicates that teacher education students always practice their reproductive hygiene. The statement, "I change my underwear every day" received the highest mean of 4.00 (SD = 0.00) and was interpreted as always practiced. While

Table 3: Respondents' attitude towards reproductive health

Item	Mean	Standard deviation	Verbal description
A. Reproductive Health Education			
1. Education about puberty and associated changes is essential for male and female adolescents.	3.78	0.45	VF
2. Attention to personal hygiene during menstruation is essential to avoid infections and STDs.	3.72	0.53	VF
3. Pregnancy at a young age affects the fetus's and the mother's health.	3.49	0.64	F
4. The use of family planning methods is beneficial.	3.89	0.33	VF
5. STDs affect the fetus.	3.55	0.56	VF
6. Communication with families concerning sex and contraception can help maintain a healthy reproductive system.	3.53	0.62	VF
7. The use of condoms is an effective method of preventing STDs and pregnancy.	3.52	0.67	VF
8. Abstaining from sex is the best prevention of STDs.	3.51	0.64	VF
9. Understanding reproductive health (RH) issues prepare adolescents to become responsible members of society.	3.80	0.42	VF
10. It is always the responsibility of male and female adolescents to ensure that the birth control method is used before they engage in sexual activity.	3.72	0.49	VF
11. Alcohol drinking will have a harmful effect on my reproductive health.	3.61	0.53	VF
Weighted Mean	3.65	0.32	VF
B. Reproductive Health Services			
1. Adolescent girls need RH services.	3.66	0.53	VF
2. Adolescents need to know about the health services for RH.	3.75	0.44	VF
3. Information, education, and communication (IEC) materials, such as pamphlets and brochures, about reproductive health must be made available.	3.71	0.47	VF
4. Infographics about EH services must be disseminated among adolescents through social media.	3.60	0.58	VF
5. Contraceptives such as condoms, pills, and IUDs must be available to adolescents.	3.37	0.74	F
6. Adolescents need access to RH facilities for consultation and guidance.	3.70	0.48	VF
Weighted Mean	3.63	0.40	VF
Overall	3.64	0.33	VF

STD: Sexually transmitted diseases, IUDs: Intrauterine devices, SD: Standard deviation, VD: Verbal description, VF: Very favorable (3.50–4.00), F: Favorable (2.50–3.49), U: Unfavorable (1.50–2.49), VU: Very Unfavorable (1.00–1.49)

the statement, "I avoid several partners to avoid contracting STDs" received the lowest mean 3.66 (SD = 0.83) although it is always practiced. This implies that the respondents always avoid multiple partners to prevent STDs.

Based on the survey result, the overall mean score of 2.48 (SD = 0.70) indicates that teacher education students often practice using reproductive health resources. The statement, "I get information regarding my reproductive health (physical, and emotional development) through the internet or social media." received the highest mean of 3.24 (SD = 0.75) and was interpreted as often practiced. On the other hand, respondents sometimes practice visiting a gynecologist for reproductive health tests which received the lowest mean, 1.50 (0.82), and was interpreted as sometimes practice.

Differences in the Respondents' Reproductive Health KAPs by Profile

Based on the ANOVA, the computed p-value on the respondent's knowledge on each profile variable was higher than (>) 0.05 level of significance; thus, the null hypothesis is accepted. Hence, there was no statistically significant difference on the respondent's level of knowledge when grouped according to their profile variables. The computed p-value for the respondent's attitude on each profile variable was higher than (>) 0.05 level of significance; thus, the null

hypothesis is accepted. Hence, there was no statistically significant difference in the respondent's attitudes when grouped according to their profile variables. The computed p-value for age (0.005) is lower (<) than the 0.05 level of significance; thus, the null hypothesis is rejected. Hence, there were statistically significant differences at the 0.05 level of significance in the respondent's mean scores by age.

As shown, there was a significant difference in the practices of teacher education students when grouped according to their age [$F(2,143) = 5.429$, $p = 0.005$]. *Post hoc* comparisons using the Scheffe test indicated that the students aged 21–23 (M = 3.12, SD = 0.41) practice more regarding reproductive health compared to students aged 18–20 (M = 2.94; SD = 0.33). This finding suggests that older students may have greater exposure to reproductive health information, increased maturity, and a more developed sense of responsibility regarding health-related decisions. In addition, they may be more open to discussing and applying reproductive health practices due to accumulated knowledge, peer influences, or personal experiences. In contrast, younger students might still be in the early stages of forming their attitudes and behaviors regarding reproductive health, potentially due to cultural taboos or limited formal education on the topic.

The researchers also found that based on the ANOVA, the computed p-value for year level (0.048) is lower (<) than

Table 4: Respondents' practices related to reproductive health

Item	Mean	Standard deviation	Verbal description
A. Reproductive Wellness			
1. I follow a healthy diet.	2.89	0.67	O
2. I do not eat processed meats, fast foods, and microwave popcorn containing trans fats.	2.58	0.64	O
3. I eat a balanced diet that is high in fiber and low in fat.	2.78	0.63	O
4. I do not consume alcoholic drinks, as this can drive my desire to engage in sexual activity.	2.77	1.19	O
5. I do not use tobacco.	2.93	1.41	O
6. I do not use illegal drugs.	2.91	1.44	O
7. I do regular exercises.	2.79	0.76	O
8. I get enough sleep, at least 8 h a day.	2.61	0.81	O
9. I wear protective gear or a cup to keep my private area safe when doing physical activities (volleyball, basketball, baseball, etc.)	2.56	1.10	O
10. I express my sexual pleasure according to my sexual identity.	2.75	1.04	O
11. I access information that supports healthy sexual development.	3.19	0.74	O
Weighted Mean	2.80	0.55	O
B. Reproductive Hygiene			
1. I stay away from multiple partners to prevent getting STDs.	3.66	0.83	A
2. I take a shower or bath daily.	3.97	0.18	A
3. I clean my intimate area with natural ingredients from front to back.	3.90	0.38	A
4. During menstruation, I regularly change sanitary napkins, panty shields, or tampons (for women). I undergo circumcision (for men).	3.77	0.75	A
5. I change my underwear every day.	4.00	0.00	A
6. I practice no sex because it is the most effective birth control method and prevention of STDs.	3.84	0.53	A
Weighted Mean	3.86	0.28	A
C. Reproductive Health Resources			
1. I visit a gynecologist for reproductive health tests, for example, pelvic exams, STI screening, HIV Tests, and Hepatitis C screening).	1.50	0.82	S
2. I subject myself to counseling and advice to help me make decisions promoting my reproductive health.	2.19	1.04	S
3. I manage my stress with guided meditation.	2.71	0.95	O
4. I do self-exam to check for breast cancer (for women). I do self-exam of my testes (for men).	2.57	1.04	O
5. I discuss my reproductive health concerns with a parent or other trusted adult.	2.47	1.05	S
6. I ask questions from my parents and adults about healthy family planning.	2.53	1.10	O
7. I get information regarding my reproductive health (physical, and emotional development) through the internet or social media.	3.24	0.75	O
8. I consult my parents and peers on information regarding my physical, mental, and social well-being relating to my reproductive health.	2.83	1.00	O
9. I read the salient provisions of Republic Act 10354 or the Responsible Parenthood and Reproductive Health Act of 2012.	2.32	0.99	S
Weighted Mean	2.48	0.70	S
Overall	3.05	0.39	O

A- Always (3.50–4.00), O- Often (2.50–3.49), S- Sometimes (1.50–2.49), N- Never (1.00–1.49), STD: Sexually transmitted diseases

the 0.05 level of significance; thus, the null hypothesis is rejected. Hence, there was a statistically significant difference at the 0.05 level of significance in the respondents' mean scores by year level. *Post hoc* comparisons using the LSD test indicated that the students' practices on reproductive were significantly different between 4th-year level (M = 3.14, SD = 0.41) and 3rd-year level (M = 2.97, SD = 0.32), and between the 4th-year level (M=3.14, SD=0.41) and 2nd-year students (M = 2.93, SD = 0.45). This suggests that senior teacher education students engage more actively in reproductive health practices than those in lower year levels. The observed differences may be attributed to the cumulative effect of academic exposure, as higher-year students may have completed courses related to health education, human development, or related subjects that enhance their awareness and decision-making regarding reproductive health. In addition, senior students may have greater access to reproductive health resources and discussions through peer networks, faculty mentorship, or research experiences. The maturity and life experiences gained over time could also contribute to their increased engagement in reproductive health practices, as they may feel a greater sense of responsibility for their well-being. In contrast, lower-year students may still be in the early stages of forming their knowledge and attitudes, potentially facing hesitancy due to limited exposure or cultural barriers.

Relationship among the Respondents' KAPs regarding Reproductive Health

Table 5 shows the relationship among the respondents' KAPs related to reproductive health. As shown, there was a low positive correlation between teacher education student's knowledge and attitude related to reproductive health ($r = 0.228$; $p = 0.006$). This means that as the students become more knowledgeable about reproductive health, their attitudes become more favorable.

There was no significant relationship between respondents' knowledge and practices towards reproductive health ($r = 0.134$; $p = 0.107$). Similarly, there was no significant relationship between student's attitudes and practices related to reproductive health ($r = 0.151$; $p = 0.070$).

Respondent's Perspective on the Importance of Taking Good Care of Reproductive Health

Table 6 shows the themes generated from the respondent's perspectives on the importance of taking good care of reproductive health. Based on the text table, the majority ($n = 83$) say that taking good care of their reproductive health prevents them from getting diseases; 52 respondents mentioned that this leads them to become healthy, while 24 respondents suggest that it protects them as well as their family. Meanwhile, 12 respondents state that it will help them reproduce.

Theme 1. To be healthy. The majority of the respondents say that taking good care of reproductive health prevents them from getting diseases such as HIV, STDs, infections, and long-term health problems. Some claim that doing so will prevent them from experiencing negative health effects.

The following are the opinions of teacher education students regarding how maintaining good reproductive health can help prevent diseases.

"Is it important to take good care of your reproductive health because it is the best way to prevent yourself from having a disease such as HIV, STD, and more." (P11)
"It is very crucial to take good care of my reproductive health to avoid a different kind of disease. Also, to protect me from infections and long-term health problems." (P23)
"It is important to avoid having a negative effect on our health." (P37)

Theme 2. To be healthy. As stated by the respondents, it is crucial to maintain reproductive health because it is one of the most essential body parts and can release waste throughout the body. Maintaining a healthy reproductive system will ensure that our organs work effectively to support our bodies' demands, keep them in good shape, and actively carry out the right actions. Some of them expressed:

"It is important to maintain good reproductive health to keep our bodies healthy and fit." (P14)
"It is important to take good care of reproductive health because it is one of the most fundamental parts of our body that can release waste throughout the body and actively do things right" (P10)
"To have a long life ahead. And to make sure that our organs function properly to sustain the needs of our body." (P28)

Theme 3. To protect oneself and family. Based on the respondents, ensuring reproductive health is essential because it secures and protects the safety of the respondents, their children, and the people in their surroundings.

"Taking good care of my reproductive health leads to healthy choices that can protect not only my reproductive health but also the reproductive health of the people around me." (P88)
"To ensure the safety of my children." (P65)

Theme 4. To reproduce. Respondents made the point that maintaining good reproductive health is crucial, especially for women who will conceive and act as an incubator because their primary goal is to reproduce. A healthy reproductive system is necessary for future family planning because it will eventually lead to healthy offspring.

"It is very important to take good care of our reproductive health, specifically, women as they are the one who conceives. Our reproductive system is important because it is the reason why we, humans, can reproduce. Our dreams to build a family in the future requires a healthy reproductive system." (P94)
"Because taking good care of the reproductive system will ensure one day to have a healthy baby when already in the phase of building a family." (P81)

Table 5: Correlation among the knowledge, attitude, and practices towards reproductive health

Variables	Knowledge	Attitude	Practices
Knowledge	1		
Attitude	0.228** (0.006)	1	
Practices	0.134 (0.107)	0.151 (0.070)	1

**Correlation is significant at the 0.01 level (2-tailed)

Table 6: Respondents' perspectives on the importance of taking good care of reproductive health

Theme	Sample significant statement	Frequency
1. To prevent diseases	*"It is important to take steps to protect it from infections and injury and prevent problems-including some long-term health problems" (P01)*	83
2. To be healthy	*"Prioritizing my reproductive health will make me physically, mentally, socially, spiritually, and sexually healthy" (P66)*	52
3. To protect for oneself and family	*"Taking care of yourself and making healthy choices can help protect yourself and the people around you" (P109)*	24
4. To reproduce	*"Reproduction is a serious matter as it provides new life, so it is really so much important to take good care of my reproductive health" (P121)*	12

"As a woman who is an incubator of a baby in the future, protecting reproductive health means protecting a life of a representative of a new generation." (P50)

The researchers also subjected the qualitative data into a word cloud using the Orange Data Mining software to visualize better the textual data composed of provided by the 146 respondents (Figure 1). As shown, the top 10 relevant words include reproductive (f = 346), health (f = 345), care (f = 239), good (f = 198), healthy (f = 147), protect (f = 102), diseases (f = 89), prevent (f = 82), system (f = 80), and infectious (f = 74). These words show the perspectives of the respondents on the importance of taking good care of one's reproductive health to stay healthy, protect oneself from infectious diseases, and to take care of the body systems.

Figure 1: Word cloud of the respondents' qualitative responses

Proposed Curriculum Enhancement in Science Education

Table 7 shows the proposed topics relevant to reproductive health which could enhance the teacher education curriculum based on the salient findings of the study. The proposed curricular enhancement aims to integrate essential concepts of reproductive health in the elective courses as well as in the general and specialization courses in the teacher education curriculum.

The identified topics are based on the lowest means in the survey results in the KAPs of teacher education students on reproductive health. Further validation of the topics to be included by subject experts may be considered before its integration in the course syllabus.

The integration of comprehensive reproductive health topics into the science education curriculum can significantly enhance teacher education students' KAPs on reproductive health. Specifically, incorporating evidence-based modules on sexual and reproductive health rights, contraceptive methods, responsible sexual behavior, and disease prevention can provide students with a well-rounded understanding of the subject. In addition, embedding discussions on cultural sensitivities, gender inclusivity, and effective communication strategies can help future educators address reproductive health topics in a way that is both accurate and respectful of diverse perspectives.

Table 7: Proposed topics for science education curriculum enhancement

Course	Course type	Proposed topic for enhancement
Gender and society	Elective	Role of reproductive health education in the contemporary society, gender and STDs: Probing who's more vulnerable
Readings in Philippine history	General Education	History of the reproductive roles of Filipino women
Science, technology, and society	General Education	Understanding reproductive diseases in the present era
Purposive communication	General Education	Reading text on maintaining reproductive wellness
Mathematics in the modern world	General Education	Statistical data on sex-related diseases in the Philippines
Anatomy and physiology	Specialization	Regular orgasm and sexual excitement: What you should know? understanding women's menstrual cycle, understanding STDs: Are there signs and symptoms?
Understanding the self	General Education	The sexual self: Consequences of sexual choices, sexual self-concept in the use of contraceptives
The contemporary world	General Education	UN sustainable development goals on sexual and reproductive health
Organic chemistry	Specialization	Effects of organic compounds on reproductive processes, reproductive effects caused by chemical agents
Genetics	Specialization	Role of genetic tests in reproductive health, special topics on reproductive genetics
Modern physics	Specialization	Quantum physics and its role in abortion
Microbiology and parasitology	Specialization	Role of bacterial microbiota in reproductive health
		Role of microbial diversity in female reproductive health, bacterial infections of the reproductive system
Electricity and magnetism	Specialization	Effect of electromagnetic field exposure on the reproductive system
Waves and optics	Specialization	Understanding medical ultrasound, effects of radiofrequency electromagnetic radiation on the human reproductive system
Fluid mechanics	Specialization	Biofluid mechanics of reproduction. Amniotic fluid dynamics and maternal health and disease
Biochemistry	Specialization	Microplastics and reproductive health, environmental effects on reproductive health
Analytical chemistry	Specialization	Toxic chemicals and reproductive health
Thermodynamics	Specialization	Reproductive thermodynamics
Ethics	General education	Ethical aspects of reproductive health

Future educators will be better equipped to facilitate meaningful discussions, dispel myths, and advocate for responsible reproductive health practices among their students by strengthening the reproductive health component of teacher education programs. This initiative not only enhances their competencies but also aligns with the UN Sustainable Development Goal 3, which aims to ensure healthy lives and well-being for all, including reproductive well-being at all stages of life. Ultimately, equipping future teachers with comprehensive reproductive health knowledge empowers them to serve as catalysts for informed decision-making, building a more health-conscious and responsible generation.

DISCUSSION AND CONCLUSIONS

Teacher education students had a moderate level of knowledge on reproductive health. They are moderately knowledgeable about the basic components of the reproductive system, the transmission of reproductive diseases, and the effects of the environment on reproductive health, but highly knowledgeable when it comes to the different birth control methods. In terms of the knowledge of reproductive health in terms of the reproductive system, the result of this study disagrees with the previous study that people lack comprehensive knowledge of basic reproductive health information and certain reproductive health diseases with a low level of access to reproductive health information, especially for adolescents that are quite capable of understanding complex concepts. This means it is preferable to increase secondary school students' access to information about reproductive health services by using accessible reproductive health services and educated health workers (Aragie and Abate, 2021). For them to be able to make educated decisions, they must have knowledge of reproductive health. These young people' decisions may have a beneficial or harmful effect on their life, their families, and society as a whole (Kyilleh et al., 2018).

The study also suggests that the students are not very familiar with the fact that there will always be indications of a STD. Since people who are unaware of the symptoms may not identify their need for assistance and may not seek it, knowledge about STDs and their complications is crucial for effective prevention and treatment. Furthermore, in developing countries, awareness of STIs other than HIV/AIDS is low (Amu and Adegun, 2015). The present study's findings differ from those of Thanduxolo Fana's earlier research from 2021, which revealed that students continue to hold false beliefs and misinformation about how HIV and AIDS are transmitted.

The study also reveals that the respondents are aware of the risks of alcohol intake to reproductive health. According to the study by Alcohol Research and Health, drinking during this time may also have an impact on growth and bone health. In addition, mild-to-moderate alcohol usage has a number of detrimental effects on female reproductive function (Van Heertum and Rossi, 2017). The respondents are unaware of the risk of uterine cancer associated with the use of

hair-straightening products. In addition, according to a recent study by NIEHS researchers, women who used chemical hair straightening products had a greater chance of developing uterine cancer than women who did not disclose using these products (Mackar, 2022).

The findings of this study are consistent with those of earlier studies, which indicated that most students had a high level of knowledge about contraception (Elkalmi et al., 2015). However, the findings shown in the previous study by Aragie and Abate (2021) were disagreed with, showing that the level of knowledge of respondents on reproductive health issues in the study area was low. Meanwhile, most hormonal non-barrier contraceptives offer great protection against unintended pregnancies; they offer limited protection against STDs, which supported the respondents' claim that the contraceptive pill does not offer protection against STDs (Deese et al., 2018).

The level of attitude among teacher education students towards reproductive health was very favorable. They had a favorable attitude in terms of reproductive health education such us recognizing the beneficial effect of family planning and reproductive health services such as awareness of adolescents to healthcare options. The findings from this study agree with a previous study by Joseph et al. (2021) which says that reproductive health education classes are effective because learners are very favorable in discussing sensitive issues concerning reproductive health. Schools need to be better equipped with resources and various perceived barriers need to be overcome before Reproductive Health Education can be successfully implemented (Joseph et al., 2021). Schools need to be better equipped with resources and various perceived barriers need to be overcome before RHE can be successfully implemented. The best modality to encourage students to be educated about their reproductive health issues is by including it into the school curriculum (Nyarko, 2022).

Moreover, the findings from the present results support the idea that the best method to support students is to provide them with access to counseling sessions and protect their privacy when they confide in teachers (Nyarko, 2022). The use of reproductive health services is a crucial part in shielding adolescents from a variety of sexual and reproductive health issues (Tlaye et al., 2018). Adolescents with low service usage may be more susceptible to risks for their reproductive health, including HIV/AIDS, STDs, and unintended pregnancies (Aragie and Abate, 2021).

Teacher education students often practiced various methods of maintaining their reproductive health. The results findings agreed with the study of Lefevor et al. (2019) which they practice and express their sexual pleasure in a way that is best for them whether to a man or woman. On the other hand, research entitled "Sleep and Reproductive Health" reveals that infertility across all ages is affected by the quality, timing, and duration of sleep, and the present results of this study say that sleeping for 8 h is often practiced by teacher education students (Lateef and Akintubosun, 2020). According to Dr. Dinges, the

prevalence of many various illnesses starts to rise when sleep duration falls below 7 h, particularly when it begins to trend toward six and a half hours or less (Worley, 2018).

Furthermore, the findings of this study support the results from a prior study indicating that adolescents always practice appropriate menstrual hygiene, particularly when it comes to changing pads and underwear daily (Bhusal, 2020). On the other hand, it supports the findings of a study by Pinyopornpanish et al. (2017) that avoidance of many partners can help to improve reproductive health. However, using condoms is still seen as a key intervention that has been shown to lessen the harmful health effects of risky sexual behaviors, as well as a strategy to lessen and prevent unexpected consequences of sexual behavior, even though the use of condoms as a whole is still low (Pinyopornpanish et al., 2017).

Parents should foster an environment that will allow young girls to inquire about, express, and seek explanations on matters of sexual and reproductive health (Chepkoech et al., 2019). However, there's still a need to avail adequate and factual information about reproductive health information to enable people to make informed and responsible choices regarding their practices.

There was a significant difference between reproductive health practices when grouped according to age, and when grouped according to year level. The findings of this study agree with the study of Inthavong et al. (2020) that teenagers are more likely to be at risk of reproductive health diseases such as STIs and unintended pregnancies because they engage in risky sexual practices than those who are older. In addition, unwanted pregnancies among females between the ages of 15 and 19 are estimated to be 23 million in underdeveloped nations (Inthavong et al., 2020). There was a low positive correlation between respondents' knowledge and attitude toward reproductive health. However, there was no significant relationship between knowledge and practices and between respondents' attitudes and practices related to reproductive health. The study confirms several studies that the knowledge in reproductive health has a significant correlation with reproductive health attitude (Asio, 2019; Chi and Hawk, 2016).

Integrating the different topics into science education programs can enhance the knowledge of future teachers regarding reproductive health. They will gain a deeper understanding of the biological aspects of reproduction, contraception methods, STIs, and other relevant health issues. This knowledge will enable them to provide accurate and up-to-date information to their students, dispel myths and misconceptions, and address any queries or concerns that may arise. Second, incorporating reproductive health topics can shape the attitudes of teacher education students toward reproductive health. They will be exposed to discussions on gender equality, sexual and reproductive rights, and the importance of consent and healthy relationships. These discussions can foster a positive and respectful attitude toward sexuality and help break down the stigma and discrimination associated with reproductive health

issues. Future teachers can then promote an inclusive and non-judgmental environment in their classrooms, ensuring that all students feel comfortable seeking guidance and support related to reproductive health matters.

Finally, the inclusion of the proposed topics in the curriculum can influence the practices of teachers' education students regarding reproductive health. They will be equipped with skills and strategies to integrate age-appropriate and evidence-based reproductive health education into their teaching practices. This includes developing instructional materials, facilitating discussions, and creating a safe and supportive space for students to learn about reproductive health. Through incorporating these practices, future teachers can contribute to the overall well-being of their students, empowering them to make informed decisions, adopt healthy behaviors, and maintain their reproductive health throughout their lives.

Enhancing the KAPs of teacher education students on reproductive health can create a ripple effect that extends beyond the classroom. These teachers will go on to educate and empower generations of students, ensuring that the knowledge and understanding of reproductive health are widespread.

Teacher education students have good knowledge of reproductive systems and birth control, but moderate knowledge of reproductive diseases and environmental effects on reproductive health. They have a positive attitude towards reproductive health education and services and practice reproductive hygiene and wellness. Age and year of study affect knowledge levels, but not attitudes and practices. There is a slight association between knowledge and attitude towards reproductive health.

RECOMMENDATION

The BSED science faculty may lead in the development and dissemination of research- and science-based learning materials about reproductive health concepts. The College of Teacher Education may spearhead lecture series or webinars on reproductive health KAPs to increase the KAPs of the students and other stakeholders. The instructors may strengthen the teaching of reproductive health concepts as a topic in general education and specialized courses using varied instructional strategies to improve students' KAPs on reproductive health. Finally, policymakers and curriculum developers should prioritize the inclusion of reproductive health education within the teacher education curriculum by embedding it more explicitly in courses related to health sciences, education psychology, and values formation. Establishing institutional policies that promote reproductive health awareness and access to health services within universities can further support students in making informed decisions about their well-being.

In addition, this study acknowledges certain limitations, particularly the self-reported nature of the survey, which may introduce response bias. Future research may consider utilizing triangulation methods, such as focus group discussions or

interviews, to validate findings and gain deeper insights into students' actual practices. Moreover, expanding the sample to include teacher education students from multiple institutions would enhance the generalizability of the results.

RESEARCH ETHICS PROTOCOL

In demonstrating the research's reliability and trustworthiness, the researchers considered the students' responses. As this research focused on the students' reproductive health, the online survey questionnaire was voluntary, and they have the right to withdraw at any time. The information collected from the respondents will be strictly confidential. Informed consent was included in the survey form, which was signed by selecting the "yes" option. The names of the respondents will not be included in the questionnaires to protect the confidentiality of the participants. The research objectives and methodological conditions were explained to all respondents before the questionnaire was distributed. Face-to-face engagement was avoided to protect the student's health and safety. In addition, proper citation and referencing of material were used to ensure compliance with copyright rules.

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