

SCHOOL-BASED EXTRACURRICULAR ACTIVITIES IMPROVE REPRODUCTIVE HEALTH KNOWLEDGE FOR HIGH SCHOOL STUDENTS: A STUDY IN TRA VINH PROVINCE, VIETNAM

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ABSTRACT

BACKGROUND: Reproductive health (RH) knowledge of high school students in Vietnam is poor. This study aimed to assess the effectiveness of school-based extracurricular activities in improving the RH knowledge for students in Tra Vinh province.

METHODS: A pilot intervention study was conducted on the control group (70 students) who had no the extracurricular activities on RH, and the intervention group (71 students) who participated extracurricular activities on RH with two sessions (90 minutes/session). Two forms of questionnaires were used for assessing student's level of knowledge change about RH that were built by researchers of the Department of Human and Animal Physiology, Biology Faculty, Hanoi National University of Education and evaluated by the Centre for RH Education and Family Planning.

RESULTS: There was no statistically significant difference in the pre-intervention test scores between the two groups ($P = 0.319$) while the post-intervention scores of the intervention group and control group were 7.11 and 5.77, respectively ($P = 0.026$). After adjusting for age, gender, ethnicity, participation in extracurricular activities still had a statistically significant relationship with students' scores ($OR = 2.96$, $\beta = 1.09$, $P = 0.009$). After participating in extracurricular activities, RH knowledge of students in the intervention group was dramatically improved.

CONCLUSION: High school students in Tra Vinh lacked school-based extracurricular activities in RH, therefore, their RH knowledge was still limited. Extracurricular activities provided students with accurate information and knowledge of RH.

KEYWORDS: Extracurricular Activities, Reproductive Health Education, High school Students, Vietnam

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INTRODUCTION

Adolescence is one of the strongest physical and mental development phases of humanity. It is not only a period of growth and physical change but also a period of change in emotion, psychology, society, and spirit. However, adolescence is also a period of increasing concerns about reproductive health (RH) issues¹. According to statistics, there are 86% of 1.2 billion adolescents living in developing countries whose access to RH services remains inadequate and incomplete². Adolescents' limited knowledge of sexuality has led to a range of health-related problems such as unwanted pregnancies, an increased risk of transmitted diseases, an increased risk of the rate of unsafe abortion, as well as limiting educational and employment opportunities³. In India, according to a 2020 report, over one-quarter of young women were married in childhood and the overwhelming majority of abortions take place outside of legally sanctioned provider and facility structures⁴. In Ethiopia, a cross-sectional study of 508 school children revealed that 30.3% of respondents were involved in early sexual debut. The absence of resources for information on RH increases the risk of early sexual debut as well as other risky sexual behaviors in adolescents^{5, 6}.

In Vietnam, according to a report by the Ministry of Health, on average, each year there are about 300,000 to 400,000 abortions between the ages of 15 and 19⁷. According to the General Office for Population and Family Planning, although the abortion rate in Vietnam has decreased in the past 10 years, the abortion rate among adolescents and young adults has shown signs of increasing - accounting for more than 20% of abortion cases⁸. Thus, it can be seen that comprehensive sexuality education reaches few adolescents, and in general, RH promoting information needs were still poorly met.

Therefore, improving RH education and upgrading students' knowledge in this field is essential for promoting healthy attitudes, behaviors, and decision-making. There are some key ways to enhance RH

education and knowledge among students, such as comprehensive curriculum, qualified educators, evidence-based information, interactive teaching methods, skill-building activities, peer education and support, inclusion of diverse perspectives, collaboration with healthcare providers, and parental involvement.⁹ By implementing these strategies, educational institutions can enhance RH education, empower students with accurate knowledge, and promote healthy behaviors, ultimately contributing to the overall well-being and informed decision-making of young individuals. A meta-study has revealed compelling evidence supporting the implementation of comprehensive RH education programs in every school setting to ensure that all school-going adolescents are convinced of the importance of sexual and RH¹⁰. Especially for adolescents in ethnic minority areas, RH education aims to reduce the incidence of early marriage, reduce the rate of pregnancy in adolescence, meet the needs of contraception, and decrease the prevalence of HIV/AIDS and other sexually transmitted diseases. However, the majority of studies focused on urban areas, whereas research in rural and mountainous areas is limited. According to the results of a survey on the knowledge of RH of more than 450 students at Trang Dinh high school in Lang Son province, where most students are ethnic minorities and living in rural areas, students' awareness of RH remains limited. According to statistics, 12.9% of students are not aware of the consequences of premarital sex; 30.4% students do not know if curettage and abortion is contraceptive or not, and 20.8% of students do not know any contraceptive methods. Meanwhile, the percentage of students knowing more than the three types of bacterial infectious sexually remains low (32.9%) and most of them misconstrued the path of sexually transmitted infections¹¹. The literature on adolescent sexual behavior in Vietnam, conducted in six provinces among adolescents aged 15-22, revealed that the sexual behavior of unmarried adolescents in Vietnam jeopardizes their health and well-being¹².

Tra Vinh is a province in the Mekong Delta, which is a part of southern Vietnam, with a population of over 1.1 million. With about one-third of the population being ethnic minorities (mainly Khmer ethnic group), Tra Vinh's economy still faces many difficulties. In Tra Vinh, most people live in rural areas (82.8%), while only 17.2% of the population live in urban areas¹³. Besides, the current education in Tra Vinh is facing many difficulties. Students are lack opportunities to access reliable sources of information about RH¹⁴. Therefore, the knowledge of RH among students here still has many problems. This study aimed to assess the effectiveness of school-based extracurricular activities in improving the RH knowledge for students in Tra Vinh province, thereby helping students to protect themselves proactively..

METHODS

Research subjects

The research involved a sample of 141 high school students at the age of 16 years (11th grade) at two different high schools in Tra Vinh Province (Hoa Loi High School and Hoa Minh High School), excluding students with mental disorders and students who were not willing to participate and not willing to attend all extracurricular activities. Within the research sample, 22.5% of the high school students identify as Khmer ethnicity, reflecting the significant presence of the Khmer community in Tra Vinh Province. The remaining 76.9% of the participants belong to the Kinh ethnicity, which represents the majority population in the region.

Research design

A pilot intervention study was conducted on 141 students. Students were divided into two groups: the control group (70 students) and intervention group (71 students) that have the same number of students and the same results of learning Biology at school. The control group did not engage in any extracurricular activities, while the intervention group participated in two extracurricular activities. These extracurricular activities specifically focused on RH education and were conducted outside of

regular class hours. Following a period of one week after the completion of these activities, all students, regardless of group affiliation, underwent a written test to assess their knowledge of RH.

The formula for calculating the sample size was ¹⁵:

$$N = 2 \times \left| \frac{(Z\alpha + Z\beta) \times \sigma}{\Delta} \right|^2$$

$Z\alpha$ is the Z-score corresponding to the desired significance level (1.96 for a 95% confidence level); $Z\beta$ is the Z-score corresponding to the desired statistical power (e.g., 0.84 for 80% power); σ is the estimated standard deviation of the outcome variable ⁷; Δ is the desired effect size (the difference in means between the groups, 3.5). Substituting the above formula and adding 10% non-responders, the estimated sample size was 69 students for each group.

High schools were selected by simple random sampling method. Students were selected by cluster sampling method.

Ethics statement

Students were explained about the purpose of the study and that they could stop participating at any time. Students signed a written consent to participate in the study after receiving permission from the school administrator and their parents. To ensure confidentiality, participants were not required to provide personal information and any identifiable information was kept secure. The study was approved by the local ethics committee at the Centre for RH Education and Family Planning, Hanoi National University of Education.

Intervention contents

The educational content was built based on the research that investigates the students' wishes and consultation from parents and teachers. The research content was designed to cover students' knowledge gaps and the cultural sensitivity of parents and teachers. Research contents include the anatomy and physiology of reproductive system, hygiene, physical and psychological changes in puberty, contraceptives, the consequences of abortion, sexually transmitted infections, and HIV/

AIDS. All information used simple and delicate language.

Intervention process

The study was divided into three stages:

- **Stage 1: The pre-intervention stage:** A test was used for both control and intervention groups to assess students' knowledge level related to RH before participating in the extra-curricular activities.

- **Stage 2: The intervention stage:** The RH education program was organized including two extra-curricular sessions (90 minutes/session). This program was prepared by researchers with extensive experience in RH teaching. In the extra-curricular process, teachers used positive teaching methods, including visual teaching facilities to increase student's interaction and acquisition of knowledge. At the same time, the presenter and the audience interacted through group discussion, mind map design, problem solving, games, and Q&A. For the control group, students did not participate in extra-curricular activities and the lectures were conducted in the usual way used by the teachers.

- **Stage 3: The post-intervention stage:** Another test was given to the students of the control and intervention groups one week after finishing all learning contents in the RH education program.

Testing and evaluating intervention effectiveness

Two forms of test that were built by researchers of the Department of Human and Animal Physiology, Biology Faculty, Hanoi National University of Education and evaluated by the Centre for RH Education and Family Planning were used for assessing student's level of knowledge change about RH. The test consisted of 20 multiple choice questions (according to Bloom's taxonomy levels). All of the questions were related to the changes in puberty, menstruation, hygiene, time of ovulation and fertilization, contraception, consequences of abortion, sexually transmitted infections, and HIV/AIDS. Students were not allowed to use any references or to discuss with others during the test.

Statistical analysis

Data were managed using Epidata 3.1 software and analyzed by SPSS software version 16.0. For the

categorical variables presented as a percentage and used a Chi-square test to check the effectiveness of the intervention. For a continuous variable that follows the normal distribution represented by the mean and the standard deviation, we used the Student's T-test. Binary logistic regression analysis was used to examine the association between the participation in extracurricular activities with students' scores, and the results were given as odds ratios (OR) with 95% confidence intervals (CI). The difference was statistically significant when $P < 0.05$ on both sides.

RESULTS

Demographic characteristics and the reality of learning RH of the participants

There was no statistically significant difference between the control group and the intervention group in terms of mean age and ethnicity. Students were eager to participate in extracurricular activities about RH. The percentage of students who indicated interest and very interested in extracurricular courses accounts for 95.7% in control group and 94.3% in intervention group ($P = 0.761$). However, in reality, students in Tra Vinh have rarely had the opportunity to participate in extra-curricular activities in RH (Table 1). Respondents identified TV/radio/newspaper, school, peers as the main sources of information on RH. Meanwhile, most students rarely talk to their parents about RH and rarely search for relevant information on the internet (Table 1).

Table 1. Demographic characteristics and the reality of learning RH of the participants

Characteristic	Control group (n = 70)	Intervention group (n = 71)	P-value
Age (years) ^a	16.4 ± 3.1	16.3 ± 2.8	0.917
Gender (n, %)^b:			
+ Male	37 (52.9%)	35 (49.3%)	0.672
+ Female	33 (47.2%)	36 (50.7%)	
Ethnicity (n, %)^b:			
+ Khmer	15 (21.4%)	16 (22.5%)	0.874
+ Kinh	55 (78.6%)	55 (77.5%)	
Interest in extracurricular activities in RH (n, %)^b:			
+ Disinterest	0 (0%)	0 (0%)	
+ Uncertainty	3 (4.3%)	4 (5.6%)	0.761
+ Interest	15 (21.4%)	14 (19.7%)	
+ Very interest	52 (74.3%)	53 (74.6%)	
Participation in extracurricular activities in RH (n, %)^b:			
+ Never	61 (87.1%)	62 (87.3%)	0.799
+ Seldom	5 (7.1%)	6 (8.5%)	
+ Sometimes	4 (5.7%)	3 (4.2%)	
+ Regularly	0 (0%)	0 (0%)	
Sources of RH knowledge (n, %)^b:			
+ Parents	7 (10.0%)	6 (8.5%)	0.893
+ Peers	56 (80.0%)	52 (73.2%)	0.712
+ School	64 (91.4%)	61 (85.9%)	0.704
+ Internet	6 (8.6%)	6 (12.7%)	0.811
+ TV/newspaper/radio	62 (88.6%)	60 (84.5%)	0.852

RH: reproductive health

^aData are mean ± SD, P-values obtained by Students T-test.

^bData are n (%), P-values obtained by Chi-square test.

Cumulative frequency distribution of the test score before and after the intervention

The cumulative frequency of scores after the intervention provided a visual representation of how scores accumulate across a range of values (Figure 3B), while there was virtually no difference before the intervention (Figure 3A). The cumulative frequency curve for the control group did not show a noticeable shift towards higher scores, indicating that the control group's scores remained relatively unchanged. Meanwhile, the

cumulative frequency curve for the intervention group showed a relatively steep increase initially, indicating a higher concentration of lower scores. As the scores progress, the curve became less steep, suggesting a shift towards higher scores. This pattern suggests that the intervention might have positively impacted the scores of the group over time. Overall, these cumulative frequency distributions indicate that the intervention group has experienced a shift towards higher scores compared to the control group.

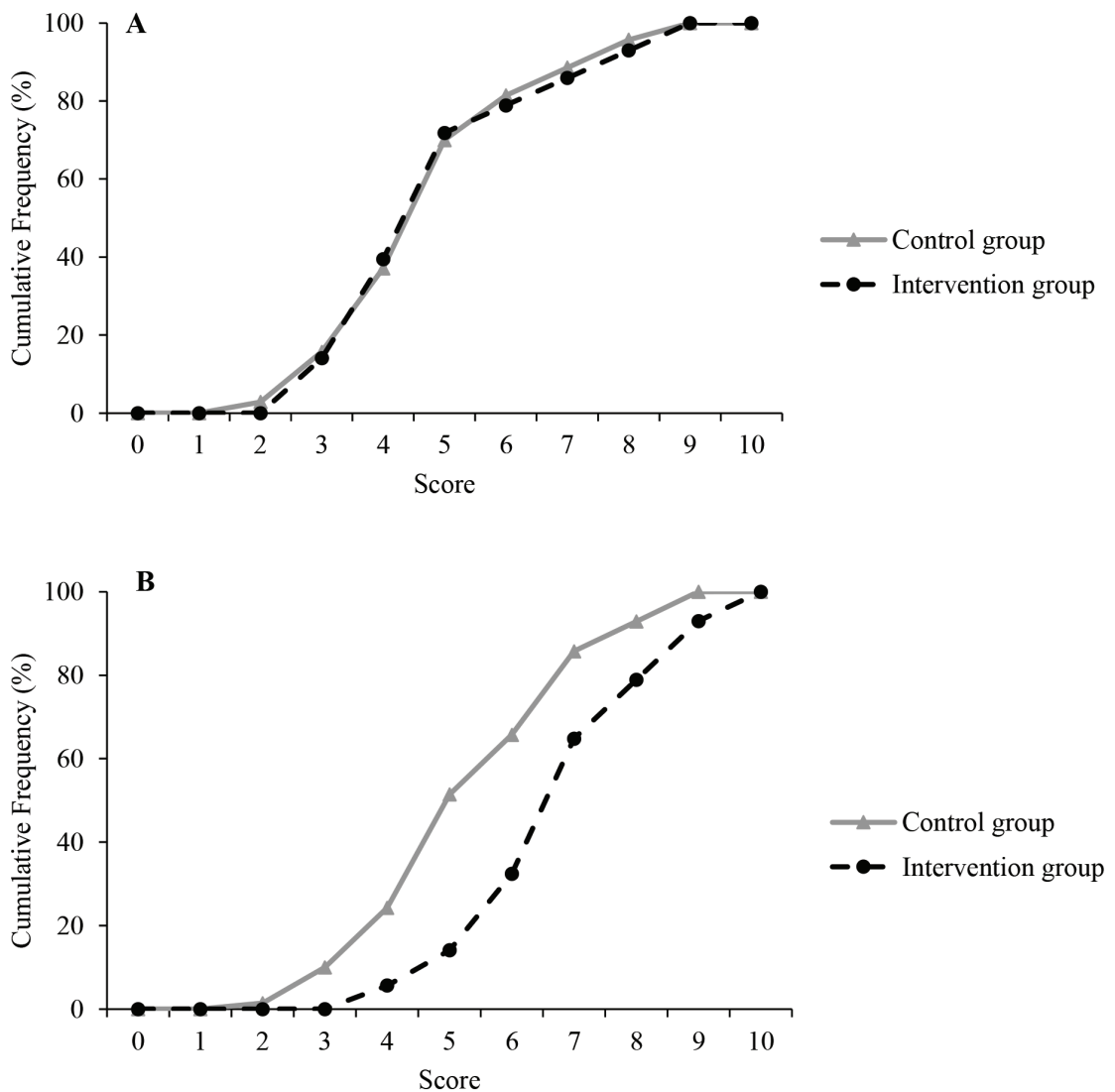


Figure 3. Cumulative frequency distribution of score before (A) and after (B) the intervention

The average scores before and after the intervention

In the pre-test, the average score of the study and control groups were nearly equal with the average score of 5.10 and 5.09, respectively ($P = 0.319$). After training, the average score of the intervention group was 7.11 while the score in the control group

was only 5.71 ($P = 0.026$). The average score of the control group before and after the intervention was almost unchanged ($P = 0.622$). Meanwhile, the average score of the intervention group increased nearly 1.4 times higher than the pre-test mean score ($P = 0.017$) (Figure 4).

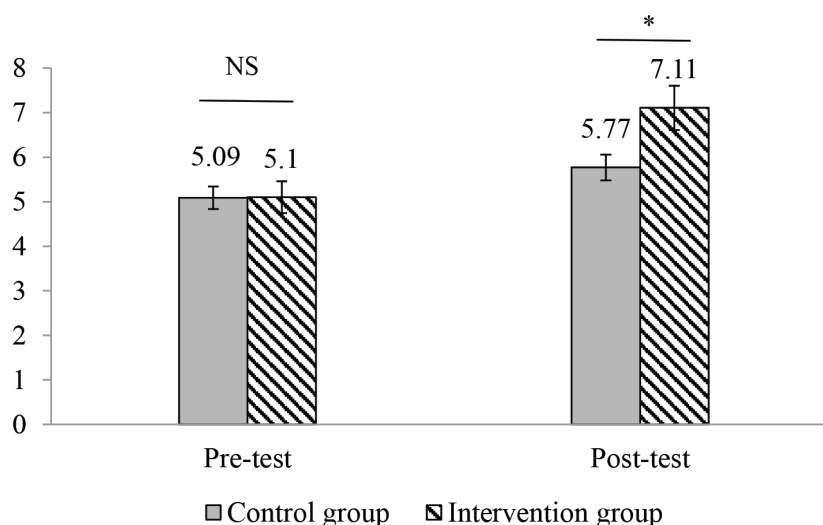


Figure 4. Average scores of reproductive health knowledge of control and intervention groups
P-values obtained by Student's T-test. * P < 0.05; NS: Non-Significant

Average number of correct answers after intervention

The results of the interventional study indicate that the intervention group demonstrated a statistically significant increase in the average number of correct answers compared to the control group.

This improvement was observed across various content areas, including menstruation, hygiene, physical and psychological changes in puberty, contraception, consequences of abortion, sexually transmitted infections, and HIV/AIDS (Table 2).

Table 2. Average number of correct answers after intervention

Contents	Number of questions	Control groups (n = 70)	Intervention groups (n = 71)	P-value
Menstruation	3	1.44 ± 0.79	1.99 ± 0.95	< 0.001
Hygiene	3	2.07 ± 0.93	2.51 ± 1.11	0.009
Time of ovulation and fertilization	3	1.83 ± 0.80	1.94 ± 0.75	0.111
Physical and psychological changes in puberty	3	2.13 ± 0.87	2.53 ± 0.88	0.006
Contraception	3	1.30 ± 0.84	1.95 ± 1.05	< 0.001
Consequences of abortion	2	1.06 ± 0.79	1.31 ± 0.69	0.035
Sexually transmitted infections and HIV/AIDS	3	1.76 ± 1.00	2.01 ± 1.01	0.015

Data are mean ± SD, P-values obtained by Students T-test.

Univariate and multivariate analysis of association of participation in extracurricular activities with students' score

To assess the association of participation in extracurricular activities with students' scores, logistic regression analysis was conducted. The results showed that participating in extracurricular

activities was associated with 2.9 times higher of getting good grades compared to students who did not participate in extracurricular activities, (95% CI: 1.30 - 6.53, P = 0.009). The logistic regression analysis did not find a statistically significant relationship between gender, ethnicity, and students' scores (Table 3).

Table 3. Univariate analysis of association of participation in extracurricular activities with students' score

Models	Score < 7(n = 105)	Score ≥ 8(n = 36)	OR (95% CI)	P-value
Participation in extracurricular activities				
No	59 (56.2%)	11 (30.6%)	1	0.009
Yes	46 (43.8%)	25 (69.4%)	2.92 (1.30 - 6.53)	
Gender				
Male	52 (49.5%)	20 (55.6%)	1	0.533
Female	53 (50.5%)	16 (44.4%)	0.79 (0.37 - 1.68)	
Ethnicity				
Kinh	84 (80.0%)	26 (72.2%)	1	0.333
Khmer	21 (20.0%)	10 (27.8%)	1.54 (0.64 - 3.68)	

P-values obtained by univariate logistic regression.

Bold values indicate a statistically significant.

95% CI: 95% Confidence interval, OR: odd ratio.

Table 4. Multivariate analysis of association of participation in extracurricular activities with students' score

Models	OR (95% CI)	P-value	β	S.E
Participation in extracurricular activities				
No	1	0.009	1.09	0.42
Yes	2.96 (1.32 - 6.68)			

P-values obtained by multivariate logistic regression and adjusted for age, gender, ethnicity.

Bold values indicate a statistically significant.

95% CI: 95% Confidence interval, OR: odd ratio.

The results in Table 4 showed that, after adjusting for age, gender, ethnicity, participation in extracurricular activities still had a statistically

significant relationship with students' scores (OR = 2.96, β = 1.09).

DISCUSSION

The research results indicating a positive change and statistically significant relationship between participation in extracurricular activities and knowledge of RH among students in Tra Vinh is indeed an important finding. It suggests that engaging in extracurricular activities has a beneficial impact on students' understanding and awareness of RH. It can be affirmed that school is the most favorable environment to educate RH for adolescents. A study of 80 adolescents in Ghana also found teachers were an important source of information on RH³. However, extracurricular activities in RH were rarely organized, so students'

knowledge in Tra Vinh about RH was limited. Consistent with our research results, a cross-sectional study conducted on 350 female students selected from governmental secondary schools in Riyadh showed that more than two-thirds (66.3%) of the participants had inaccurate knowledge regarding RH¹⁶. A study of 372 school girls in Markos town, Ethiopia, showed that girls could be victims of sexual violence. The study also confirmed that more interventions are needed to raise awareness in the school environment for girls to help reduce the phenomenon of sexual violence¹⁷.

Students in Tra Vinh Province did not have a chance to participate in educational extracurricular activities about adolescent RH. The reason for the lack of extracurricular activities about RH education may depend on the curriculum, as well as teachers' lack of time, skills and motivation to organize extracurricular activities in RH¹⁸. This can also be explained by the existence of cultural barriers to teaching RH topics in schools, especially in Eastern countries. Therefore, students' knowledge of RH was still vague, and misleading sometimes. The findings of the study, which indicate that the knowledge of participants regarding RH was poor in the pretest, shed light on an area of concern. This suggests a considerable knowledge gap in crucial aspects of RH among the adolescents in Tra Vinh. The extra-curricular activities help fill the gaps in the knowledge of adolescents about pubertal changes, reproductive anatomy and physiology, hygiene contraception, consequences of abortion, sexually transmitted infections, and HIV/AIDS. The findings demonstrate that the intervention, consisting of school-based extracurricular activities, resulted in a substantial improvement in the RH knowledge of students. This implies that such activities can be an effective approach to enhancing students' understanding of RH. Similar to our study results, the findings from the school-based health education study, involving 416 adolescent female students aged 11-16 years indicate positive outcomes following the educational intervention on menstrual hygiene¹⁹. Research on middle school students at Rivers State (Nigeria) also found significant improvement in students' knowledge. The intervention group had higher mean knowledge score than the control group (110.8 ± 16.0 vs. 92 ± 14.9 , $P < 0.05$). This study also recommended that educational program developers should introduce extra-curricular activities in schools to enhance RH knowledge for adolescents²⁰. Similarly, an intervention study on 309 adolescent girls aged 14-19 years old at 3 secondary schools in Saudi

Arabia showed that RH education positively changed adolescents' knowledge about puberty, menstruation, pregnancy, antenatal care and contraceptive intrauterine devices²¹.

The statistically significant difference in the average number of correct answers between the intervention and control groups implies that the intervention had a positive impact on knowledge acquisition. This outcome reinforces the importance of targeted RH interventions in improving RH knowledge among adolescents.

The school considered to be an ideal place for a multidisciplinary approach so the cooperation between schools, parents, health facilities, and local health institutes will bring effectiveness in raising awareness and helping prevent sex-related issues^{22, 23, 24}. There was evidence that school-based healthcare regarding RH was popular with adolescents and provides important mental and RH services^{25, 26}. A meta-analysis from 8 qualitative analyzes that evaluated school-based programs aimed at improving the sexual and RH of adolescents showed that there was little evidence that educational curriculum-based programs alone are effective in improving sexual and RH outcomes for adolescents. These studies have shown significant positive outcomes in various areas, including sexually transmitted infections, contraception, HIV/AIDS, menstruation, and hygiene¹⁰. These findings suggest that age and sex-appropriate health education programs have the potential to promote the development of healthy reproductive and sexual behavior patterns among adolescents by improving knowledge and fostering the right attitude²⁷. Similarly, the interventional study conducted on 200 randomly selected adolescents indicated that the majority of the students were unaware of reproductive organs, modes of transmission of HIV, and the prognosis of AIDS. The results show that the intervention improved the participants' knowledge and foster a more informed and positive attitude towards these topics²⁸. Thus, it can be

affirmed that school is a suitable environment for RH education and school-based activities would be a reliable source of RH information^{29, 30}.

However, it is important to consider several limitations of the study. First, the study design was a pilot intervention, which typically involves a smaller sample size and may not be representative of the entire population. Secondly, the study only focused on one province, Tra Vinh, which limits the generalizability of the findings to a broader population. To further validate the effectiveness of school-based extracurricular activities on RH knowledge, larger-scale studies involving diverse populations and a more comprehensive assessment of the intervention's components would be beneficial.

In conclusion, high school students in Tra Vinh lacked school-based extracurricular activities in RH, therefore, their RH knowledge was poor. Extracurricular activities provided students accurate information and knowledge of RH that would eventually build a positive view which would be the basis for their decision-making about their health. By participating in extracurricular activities in RH, the knowledge of students was significantly improved. Organizing extracurricular activities in RH needs to be extended to many schools in Tra Vinh province, especially for Khmer ethnic students in economically disadvantaged areas. Such interventions are essential for empowering adolescents to make informed decisions about their sexual and RH, protecting themselves and promoting overall well-being.

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