ผลของโปรแกรมการป้องกันการตั้งครรภ์โดยใช้โรงเรียนเป็นฐานต่อความรอบรู้ด้านสุขภาพทางเพศ พฤติกรรมการป้องกันการตั้งครรภ์ และพฤติกรรมเสี่ยงทางเพศ ในวัยรุ่นหญิงและเพื่อนชาย: การวิจัยนำร่อง

Effects of A School-Based Pregnancy Prevention Program on Sexual Health Literacy, Pregnancy Prevention Behavior and Sexual Risk Behavior among Female Teenagers and Their Boyfriends: A Pilot Study

นิพนธ์ต้นฉบับ **Original Article**

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาผลของโปรแกรมการป้องกันการตั้งครรภ์โดยใช้โรงเรียนเป็นฐานในการส่งเสริมความรอบรู้ด้านสุขภาพทางเพศ ส่งเสริมพฤติกรรมการป้องกันการตั้งครรภ์ และลดพฤติกรรมเสี่ยงทางเพศของวัยรุ่นหญิงและเพื่อนชาย และความเป็นไปได้ของโปรแกรม **วิธีการศึกษา:** การวิจัยนำร่องแบบทดลองกลุ่มเดียว วัดผลก่อนและหลังการทดลองและติดตามผล คัดเลือกกลุ่มตัวอย่างตามความสมัครใจ กลุ่มตัวอย่างเป็นวัยรุ่นหญิงอายุ 13 - 15 ปีและเพื่อนชาย จำนวน 7 คู่ รวบรวมข้อมูล 6 สัปดาห์ โดยทำกิจกรรมที่โรงเรียน 4 ครั้ง ใช้เวลา 120 นาทีต่อครั้ง (สัปดาห์ที่ 1 - 4) และทำกิจกรรมผ่านแอพพลิเคชั่นไลน์ 2 ครั้ง ใช้เวลา 60 นาทีต่อครั้ง (สัปดาห์ที่ 5 - 6) รวบรวมข้อมูลที่ก่อนเริ่มทดลองโปรแกรม เสร็จสิ้นโปรแกรม (สัปดาห์ที่ 6) และติดตามผล (สัปดาห์ที่ 10) โดยใช้แบบสอบถามความรอบรู้ด้านสุขภาพทางเพศ แบบสอบถามพฤติกรรมการป้องกันการตั้งครรภ์ และแบบสอบถามพฤติกรรมเสี่ยงทางเพศ วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาและการทดสอบฟรีดแมนสำหรับการประเมินซ้ำและทดสอบความแตกต่างรายคู่ด้วยดันน์-บอนเฟอโรนี **ผลการศึกษา:** พบว่าหลังการทดลอง คะแนนความรอบรู้ด้านสุขภาพทางเพศและคะแนนพฤติกรรมการป้องกันการตั้งครรภ์ทั้งระยะหลังการทดลองและระยะติดตามผลสูงกว่าก่อนการทดลอง (P-value < 0.05) คะแนนพฤติกรรมเสี่ยงทางเพศทั้งในระยะหลังการทดลองและระยะติดตามผลต่ำกว่าระยะก่อนการทดลอง (P-value < 0.05) **สรุป:** มีความเป็นไปได้ที่จะนำโปรแกรมการป้องกันการตั้งครรภ์โดยใช้โรงเรียนเป็นฐานไปทดสอบในการศึกษาหลัก ซึ่งอาจช่วยส่งเสริมความรอบรู้ด้านสุขภาพทางเพศ ส่งเสริมพฤติกรรมการป้องกันการตั้งครรภ์ และลดพฤติกรรมเสี่ยงทางเพศของวัยรุ่นหญิงและเพื่อนชายได้

คำสำคัญ: วัยรุ่นหญิง, เพื่อนชาย, พฤติกรรมการป้องกันการตั้งครรภ์, การป้องกันการตั้งครรภ์โดยใช้โรงเรียนเป็นฐาน, ความรอบรู้ด้านสุขภาพทางเพศ, พฤติกรรมเสี่ยงทางเพศ

Abstract

Objective: To examine the effects of a school-based pregnancy prevention program (SPPP) on sexual health literacy, pregnancy prevention behavior and sexual risk behavior among female teenagers and their boyfriends, and the program's feasibility. **Method**: A pilot study of one-group experimental design with pre-test, post-test and follow-up measurements had 7 voluntary dyads of female teenagers aged between 13 - 15 years old and their boyfriends. Data were collected for 6 weeks. Four 120-minute weekly session (weeks 1 - 4) were implemented at school, and two 60-minute sessions were implemented via the LINE™ application (weeks 5 and 6). Data were collected before and after (week 6) the program and at follow-up (week 10) using the Sexual Health Literacy Questionnaire, the Pregnancy Prevention Behavior Questionnaire and the Sexual Risk Behavior Questionnaire. Data were analyzed by using descriptive statistics and Friedman for repeated measures with Dunn-Bonferroni post hoc test. **Results:** The scores of sexual health literacy and pregnancy prevention behavior in both post-test and follow-up were better than that at baseline (P-value < 0.05), and the scores of sexual risk behavior in both post-test and follow-up were lower than that at baseline (P-value < 0.05). **Conclusion:** SPPP could be further tested in the main study with a larger sample size. The program could improve sexual health literacy, pregnancy prevention behavior, and sexual risk behavior in female teenagers and their boyfriends.

Keywords: female teenager, boyfriend, pregnancy prevention behavior, school-based pregnancy prevention program, sexual health literacy, sexual risk behavior

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Introduction

Teenage pregnancy is a global health issue. The prevalence of teenage pregnancy in girls aged 15 to 19 years was approximately between 16 and 2.5 millions for younger girls in developing countries.[1] In Thailand, the birth rate among teenagers aged 10 - 14 years old was 1.1 per 1,000 women, and among those aged 15 - 19 years old was 31.3 per 1,000 women.[2] Although some teenagers have knowledge about contraceptive methods, they may not be able to apply the knowledge to the pregnancy prevention. They may not seek the required contraceptive information and services because

of embarrassment and social stigma.[3] In addition, a study in Lao PDR reported that school teenagers had inadequate sexual and reproductive health literacy[4] and a study in Thailand reported that Thai female teenagers had a low level of sexual health literacy and a fair level of pregnancy prevention behavior.[5]

Teenage pregnancy and births have consequences not only at the individual level but also at the societal level with its economic burden on the society. The negative physical outcomes from a teenage pregnancy were maternal anemia, eclampsia, puerperal endometritis, and Caesarean section.[6] Teenage pregnancy may lead to health complications in an infant and these include low birth weight, severe neonatal conditions, and stillbirth.[7] Teenage pregnancy remains the major reason students leave school which lead them to be unemployed and receive low income.[8] Some teen mothers often are lone parents who find themselves in family conflict and often leave their families to take care of their baby. In addition, children from teen mothers may have poor health outcomes, delayed physical development, and psychological problems which can result in poor socio-economic circumstances in their future.[2]

Teenager is a period of physical and sex hormone changes which lead them to be in interested cross-sex. The transition to sexual and reproductive maturity brings with it a number of risks such as sexual risk behavior and pregnancy.[9] Sexual risk behaviors in teenagers lead to negative sexual outcomes such as pregnancy.[10] On the other hand, sexual health literacy enables teenagers to understand, interpret, evaluate, and apply sexual health information. It is not only the capacity to understand sexual health information, but also the act on the information available which could directly influence pregnancy preventing behavior.[5] Pregnancy prevention behavior is also a key individual factor related to preventing pregnancy. Teenagers who have high pregnancy prevention behaviors would be able to protect themselves from pregnancy. Therefore, promoting sexual health literacy and pregnancy prevention behavior as well as reducing sexual risk behaviors will affect the likelihood to prevent teenage pregnancy.

There are several pregnancy prevention programs which are delivered in diverse settings such as community- and school-based interventions. The school-based intervention is usually a sex education program which is delivered in a school setting. Most of the program activities take place during the regular school day and include alternative times such as having sessions on weekends or after school hours.[11] Previous studies showed that the school-based pregnancy prevention programs have taken different forms and durations. Most studies have combined interventions for implementation such as formal instruction plus behavior-skills practice, role-play, group discussion, brainstorming, demonstration, case scenarios, and computer-based activities programs. The implementation phases range from 3 weeks to 24 weeks, 30 to 120 minutes weekly, and up to 32 hours over a year.[12-14] For example, in the study by LaChausse, the positive prevention plus adolescent pregnancy prevention program was scheduled with 11 3-weekly, 45-minute sessions.[15] The interventions of the program were role-plays and interactive activities. The results showed that the intervention increased decision-making to delay sexual activity and to use condoms.[15] In a quasi-experimental research using the IMB skill model to guide the interventions which included formal instruction, group discussions, and role-plays, the interventions had an effect on pregnancy prevention behaviors.[16]

In Thailand, there have been many teenage pregnancy prevention programs aiming at promoting knowledge and attitude as well as changing sexual behaviors.[16-18] However, most of the research were conducted for female teenagers or students with various risk of pregnancy; there have been no studies conducted for the at-risk groups such as female teenagers who have boyfriends. In regard to a dyadic program, there have been a few studies that have focused on parent-adolescent dyads[19,20] but no studies have been conducted in female teenagers and their boyfriends. In fact, boyfriends may also influence decision-making about abstinence to delay the first sexual intercourse encounter or to consider contraceptive use. As a result, to prevent pregnancy in teenagers, female teenagers and their boyfriends should be encouraged in the intervention together. They would communicate and make a commitment and set a goal of being in an exclusive loving relationship together which may be effective in preventing pregnancy in teenagers.

The conceptual framework for this study was based on the Information-Motivation-Behavior (IMB) Skill Model by Fisher and colleagues.[21] The IMB model focuses on three fundamental determinants for changing health behaviors consisting of health information, health motivation, and health behavioral skills. The IMB model assumes that an individual

must be well-informed and motivated, and possesses the self-efficacy behavioral skills to reduce risk behaviors and improve sexual health promotion behavior. According to the IMB model, pregnancy prevention behavior is influenced by the provision of information about sexual risk, teenage pregnancy, and prevention, the motivation to consistently perform pregnancy prevention behaviors, and the behavioral skills to initiate and maintain pregnancy prevention behavior. The effects of information, motivation, and skill practice are improving sexual health literacy and pregnancy prevention, and reducing sexual risk behavior. The IMB model has been tested for good fit in many studies of sexual risk prevention and also pregnancy prevention.[13,22]

This pilot study was conducted to determine the feasibility of a school-based pregnancy prevention program for female teenagers and their boyfriends, based on the IMB Model. The research focused on promoting sexual health literacy, improving pregnancy prevention behaviors, and reducing sexual risk behaviors in female teenagers and their boyfriends which were measured at pre-test, post-test, and follow-up. The purpose of this pilot study was to examine the outcomes and the feasibility of this program. For the feasibility, we aimed to explore information about the completion of the program at a school and the use of the LINE™ application, as well as program acceptance to improve the program for the main study.

Methods

This pilot study was a one-group experimental design with pre-test, post-test and follow-up measures to determine the preliminary outcomes, i.e., sexual health literacy, pregnancy prevention behavior and sexual risk behavior, and feasibility of a school-based pregnancy prevention program in female teenagers and their boyfriends.

Data were collected from February to April 2021 in the setting of one public secondary school in Muang district of Mahasarakham province. Such district was selected as the study site because of the high prevalence of teenage pregnancy.[23] Most people in Mueang district had an urban lifestyle. Most parents students in this selected school worked out of their households. As a secondary school, this co-education school provided education from grade 7th to 12th.

The target population of this pilot study were female teenagers who were studying in a secondary school and their boyfriends. Boyfriends were a male individual who had a close relationship with the female student teenager, and the relationship was acknowledged by the female teenager's parents.

Participants who met the eligibility criteria were recruited by their willingness to voluntarily participate in the program. To be eligible, they had to be female teenager aged 13 - 15 years old, had never been pregnant, were not currently pregnant, and had permission from their parents to participate. For the boyfriend of the female teenager, they had to reside in Mahasarakham province, and were permitted by their parents to participate, if younger than 18 years old. Both female teenagers and their boyfriends had to have smart phones, could be contacted via LINE™ application, and were able to communicate in Thai language. However, participants (both female teenagers and their boyfriends) were excluded if either the female teenagers or their boyfriends or both were unable to complete all sessions or withdrew from the study.

Upon permission by the school administrator, the researcher contacted the school advisor for assistance in inviting prospective participants. Female teenagers who agreed to participate in the study were asked to invite their boyfriends for participation. After the female teenagers and their boyfriends agreed to participate in the study and signed a consent form, all 6 sessions of the implementation were conducted. According to the sample size for this pilot study, recommendations varied. Some researchers recommended 10% of the sample size of the main study while some recommended 12 to 35 cases per arm.[24,25] Bell and colleagues suggested at least 10 cases per arm for a power of 80%.[26] In this pilot study, a 25% of the sample size of the main study was used.[26] With a required 28 dyads in the main study, 7 dyads of female teenagers and their boyfriends were needed.

Research instruments

Research instruments consisted of a set of questionnaires for outcome evaluations and the school-based pregnancy prevention program (SPPP). Demographic characteristics of the participants were collected using a questionnaire developed by the researcher. Collected characteristics included age, gender, education level, grade point average, living arrangement, relationships within the family, absence from school, running away from home, staying with their boyfriends/girlfriends, and sources of information about

teenage pregnancy prevention. Sexual health literacy was evaluated using the **Sexual Health Literacy Questionnaire** (SHLQ). SHLQ was developed by the Committee of Health Education Division, Department of Health Service Support, Ministry of Public Health of Thailand.[27] It is a self-report scale containing 38 items measuring six components of sexual health literacy namely 1) knowledge and understanding of sexual health (8 items), 2) communication skills of sexual health (5 items), 3) sexual health and service information (6 items), 4) decision-making skills (5 items), 5) media literacy (5 items), and 6) self-management skills (9 items). For component 1 (8 items of knowledge and understanding of sexual health), with a 4-choice answer for each item, a score of one point was given for a correct choice, and zero points for the 3 remaining incorrect choices resulting in a possible total score of 0 to 8 points. For components 2 to 5, response for each item is a 5-point Likert type ranging from 1-never to 5-always. The last component, i.e., component 6, contains a rating scale ranging from 1-least accurate behavior to 4-most accurate behavior. Scores are reversed for negative items. All components' scores are summed to create a total score ranging from 30 – 149 points. Higher scores indicate greater sexual health literacy. The items were, for example, "when you were looking for information about sex and pregnancy prevention, you instantly select health resources" (positive item) and "you often have trouble finding sexual health information from various sources, whether you ask someone, read printed media, or search the Internet" (negative item). A previous study reported that internal consistency reliability of individual components of SHLQ was acceptable to high with Cronbach's alpha coefficients of 0.85 - 0.93.[4] In this pilot study, the Coefficient was 0.91.

Pregnancy prevention behavior was measured using the **Pregnancy Prevention Behavior Questionnaire** (PPBQ) which was developed by the Committee of Health Education Division, Department of Health Service Support, Ministry of Public Health of Thailand.[27] PPBQ is a self-report scale containing 15 items with a 5-point Likert scale ranging from 1-never to 5-always. Scores of negative items are reversed. Items are, for example, "I had ways to avoid the risk of sexual intercourse or pregnancy prevention that works for everyone" (positive item) and "I stayed with boyfriend/girlfriend in a romantic atmosphere" (negative item). The total score ranges from 15 to 75 points with higher scores indicating greater pregnancy prevention behavior. A previous study reported that PPBQ had an acceptable internal consistency reliability (Cronbach's alpha coefficient of 0.88).[4] In this pilot study, the coefficient was 0.80.

Sexual risk behavior was measured using the **Sexual Risk Behavior Questionnaire** (SRBQ) developed by Powwattana.[28] SRBQ is a self-report scale consisting of 18 closed-ended items with a 4-point Likert scale of 1-never to 4-always. The total score ranges from 18 to 72 points with higher scores indicating greater sexual risk behavior. Items were, for example, "you kissed your boyfriend/girlfriend" (sexual activity) and "you drank alcohol when you went to the party" (risk behavior). A previous study reported that SRBQ had acceptable internal consistency reliability with Cronbach's alpha coefficients of 0.63 - 0.87.[29] In this study, a high reliability was found with a Cronbach's alpha coefficient of 0.93.

The intervention called the **school-based pregnancy prevention program** (SPPP) was developed by the researcher as guided by the Information-Motivation-Behavior (IMB) Skill Model and related literatures (Table 1). The contents and procedure of the program were validated by 3 experts, specifically each one of pediatrics and family nursing, maternal–child and midwifery nursing, and public health nursing. The program consisted of three components, specifically (1) the provision of health information about sexual risk, teen pregnancy and prevention through games and interactive instruction, (2) the provision of health motivations to improve positive attitudes to prevent pregnancy through group discussions and video clips, and (3) the provision of health behavior skills training to improve sexual health literacy and the act of pregnancy prevention behaviors through role-plays, interactive instructions, demonstrations of contraceptive use and the practice of condom use, critique on sexual health media and search for online sexual health services, the use of scenarios and an e-book, and the use of LINE™ application. With its 6 sessions, 4 weekly sessions of 120 minutes each were implemented at school (weeks 1 - 4), and 2 weekly sessions of 60 minutes each were delivered via LINE™ application (weeks 5 - 6). These six weekly sessions were conducted on every Saturday by the researcher (A Thongkorn) who was a trained teenage pregnancy prevention counsellor. Details the program are shown in Table 1.

Table 1 School-based pregnancy prevention program.

Week	Objectives	Activities
1st	Session I: Developing knowledge and understanding about sexual risk behaviors, teenage pregnancy, and prevention	- The PI introduced information about sexual risk by using a game. - Presented information about teenage pregnancy and prevention through interactive instruction with a Powerpoint™ and lecture. - Set up the application LINE group and invited all participants to become members of the group and sent an e-book about teenage pregnancy prevention to all participants via the application LINE.
2nd	Session II: Improving positive attitudes and motivation on pregnancy prevention	- Presented a VDO clip for 10 minutes about a situation related to teenage pregnancy. - Divided the participants into small groups, 4-5 peoples per group, each group received a flipchart, discussed how to reduce sexual risk and prevent pregnancy and wrote down their ideas on the flipchart. - Each group presented the opinions of the group by using the flipchart. - Summarized the important points.
3rd	Session III: Developing pregnancy prevention skills	- Divided the participants into small groups, 4-5 peoples per group. - Provided four situations of risky sexual behavior that causes teenage pregnancy and word-cards for practicing pregnancy prevention behavior by role-play for 30 minutes (i.e., refusal and negotiation skills). - Each group performed their role-play about 5-10 minutes per group and other people commented and the PI summarized the main points. - Explained and demonstrated contraceptive use and participants were separated into two groups (male and female) and each group practiced condom use.
4th	Session IV: Improving skills to access sexual health media and sexual health service and setting a pledge of love	- Presented a video clip about media literacy for 5.13 minutes and gave information about media literacy by using a Powerpoint™ slide. - Provided a worksheet to all participants and they practiced critiquing sexual health media with the worksheet. - Presented information about sexual health services though a Powerpoint™ as well as lecture and participants practiced searching sexual health services online via their smartphone. - Pairs of a female teenager and her boyfriend set a goal of being in an exclusive loving relationship and wrote it on a worksheet and submitted it to the PI. - The PI read the participants' worksheet (but did not share the names of the participants).
5th	Session V: Improving decision-making skills in regards to pregnancy prevention	- Provided a scenario about a situation related to teenage pregnancy and a question and examples of how to resolve the problems of this scenario to all participants via the application LINE. - The participants answered the question by selecting from the examples from the PI via the application LINE. - Provided a conclusion and praised the participants.
6th	Session VI: Improving decision-making skills in regards to pregnancy prevention	- Sent only a scenario about the act of sexual risk behavior leading to teenage pregnancy to all participants via the LINE™ application. - Sent three questions to all participants and asked them to answer the questions about a scenario via the LINE™ application. - Provided a conclusion to all participants and thanked them.

Before participating the interventions, participants spent 15 – 20 minutes to complete 4 self-report questionnaires at pre-test/baseline (week 0, T1). This questionnaire consisted of demographic questionnaire, the SHLQ, the PPBQ, and the SRBQ. After completing all 6 sessions of the interventions, participants completed the SHLQ, the PPBQ, and the SRBQ again at week 6 (post-test, T2) and week 10 (follow-up, T3). The questionnaires were compiled by a researcher assistant.

Ethical considerations

This pilot study was approved by the Institutional Review Board (IRB) for Graduate Study, Burapha University (number: G-HS 077/2563, date: 08-01-2564). The participants and their parents were informed of the objective, method, benefits, potential risks of this study and the rights to discontinue participation in the study. After a female teenager and her boyfriend agreed to participate in the study, informed consent forms were signed. For participants younger than 18 years old, their consent form was also signed by their parents. All the data were stored in a secured place and reported as a summary. All data information of the participants will be deleted within one year after the study publication.

Data analysis

Descriptive statistics were used to describe the characteristics of the participants. The Friedman's test for repeated measures was conducted to compare the mean scores of sexual health literacy, pregnancy prevention behavior, and sexual risk behavior between the three-time evaluations at pre-test/baseline (week 0, T1), post-test (week 6, T2), and follow up (week 10, T3). The Dunn-Bonferroni post hoc test was applied for pairwise comparisons for the differences in treatment between paired time periods. The significance level was set at 0.05. All statistical analyses were conducted using SPSS version 26.0.

Results

The study results revealed two main findings in the outcomes of the school-based pregnancy prevention program and the feasibility of program implementation. All female participants and their boyfriends were teenagers (100%) and students (100%). Female teenagers' ages ranged from 13 - 15 years (mean = 14 $\pm$ 0.90) which were similar to their boyfriends (a range of 13 - 16 and a mean of 14 $\pm$ 1.11 years). The majority were studying in grade 9 (50.0 %). Their grade point averages (GPA) ranged from 1.20 to 3.82 (mean = 2.50 $\pm$ 0.75). The majority stayed with their parents (71.4%), had up and down relationship among family members (64.3%), were sometimes absent from school (71.4%), ran away from home sometimes (42.9%), and received information about teenage pregnancy prevention via the Internet (50.0%). While most of them did not stay with their boyfriend/girlfriend (92.9%), only one couple stayed together (7.1%).

At post-test (T2), the scores of sexual health literacy were improved (i.e., increased) from baseline (T1), and slightly decreased at follow-up (T3). Such overall changes were statistically significant (P-value < 0.05 for both) (Table 2). In addition, post hoc comparisons revealed that scores at T2 and T3 were significantly higher that that at T1, but no significant

difference was found between T2 and T3. Like sexual health literacy, overall scores of pregnancy prevention at the three measurements were significantly different (*P*-value < 0.05). However, post hoc comparisons showed that only score at T2 was higher than that at T1 with statistical significance but those between T3 and T1, and T2 and T3 were with no statistical significance.

Sexual risk behavior score, as a negative indicator variable, was also improved (i.e., decreased) from baseline, and slightly increased at follow-up with statistical significance (*P*-value < 0.05). Post hoc comparisons showed that significant differences were found between scores at T1 and T2, and T1 and T3, but not between T2 and T3. This pilot study showed that the SPPP could promote sexual health literacy and pregnancy prevention behavior and reduce sexual risk behavior in female teenagers and their boyfriends at the 10th week follow-up.

Table 2 Scores of sexual health literacy, pregnancy prevention behavior and sexual risk behavior at three valuations (N = 14).

Variable	Time points#	Mean (SD)	χ^{2}*	df	*P*-value
Sexual health literacy	T1	82.21 (18.27)^{a,b}	10.45	2	0.005
	T2	105.29 (18.28)^{a}			
	T3	104.36 (12.73)^{b}			
Pregnancy prevention behavior	T1	53.79 (9.37)^{c}	10.15	2	0.006
	T2	67.21 (5.98)^{c}			
	T3	60.79 (5.86)^{d}			
Sexual risk behavior	T1	37.00 (6.97)^{e,f}	10.65	2	0.005
	T2	28.36 (7.71)^{e}			
	T3	28.36 (5.98)^{f}			

T1 = pre-test, T2 = post-test, and T3 = follow-up

* Friedman's test for repeated measures across 3 time points.

^{a,b,c,d,e,f} The same superscript letters indicated the two values were significantly different while the different superscript letters indicated the two values were not significantly different.

Study feasibility

The feasibility of the SPPP was evaluated during the program implementation. All of the participants completed the 6-week sessions within the scheduled date and three-time evaluations. None of the female teenagers and their boyfriends withdrew from the study; hence a 100% retention rate. Firstly, for the program interventions, most participants preferred interactive learning such as games, group discussions, role-plays, and skills practice when these activities were completed. Participants enjoyed playing a game and also cooperated in group discussions. They could share their knowledge about teenage pregnancy prevention with group discussions. Also, participants intended to practice role-playing. However, role-playing activities took much more time to complete than other interventions and some groups needed more advice. In the future, the researcher should take more time for role-play interventions with specific attention on certain groups with additional needs.

In addition, participants responded that contraceptive practice was very important for them. For example, one participant said "I've never seen the contraceptive instruments before. The program could help me gain a deeper understanding of contraceptive methods." This means that the program interventions were viewed as beneficial. However, we found that participants did not prefer lectures, as they viewed them as uninteresting and boring. Hence, to organize the program in the main study, the researcher should focus more on skill practice than lectures.

Secondly, LINE™ application was used to promote decision-making skills of pregnancy prevention in two 60-minute sessions. In these two sessions, all participants answered the questions. They could contact the researcher whenever they needed via the LINE™ application. For example, some participants sent messages individually to ask the researcher about contraceptive use which they needed more information. The researcher answered them via the LINE™ application. The researcher could make an appointment for each intervention through group feature of LINE™ application. E-book could also be sent through LINE™.

Regarding time for each session, 60 minutes were not adequate for implementation. Some participants responded immediately during the session, but some participants did later. Hence, in the main study, the researcher should extend the time for implementation in LINE™ application to 90 - 120 minutes per session.

Thirdly, the program was found to be well accepted by the participants because of well-prepared interventions and the assured confidentiality. All six sessions of this program had been well prepared to handle the implementation by the researcher. With the acceptance on the researcher, the participants were enthusiastic to participate in many interventions. Moreover, confidentiality was important for all participants. The researcher kept secrets that participants shared. Having confidentiality allowed the participants to trust the researcher at the level that they felt comfortable to share personal information throughout the program. The interventions were held on the weekend and in a private room, the participants were more likely to feel safe and relaxed. As

a result, they were willing to interact with the other participants and adhere to the program. In summary, the success of the program was based on well-prepared interventions and assured confidentiality.

Discussions and Conclusion

The findings of this pilot study support the effectiveness and feasibility of the school-based pregnancy prevention program (SPPP). Female teenagers and their boyfriends who completed the SPPP had improved sexual health literacy, pregnancy prevention behavior and reduced sexual risk behavior. Our findings were consistent with previous study applying sexual risk reduction intervention and pregnancy prevention program which found that teenagers increased knowledge of pregnancy prevention, improve pregnancy prevention behaviors, and reduce sexual risk behavior.[13,16]

Based on the IMB model, the information process focuses on developing knowledge and understanding about sexual risk be00haviors, teenage pregnancy, and prevention. The researcher provided health information about sexual risk by using a game that raised participants' awareness about sexual risk behaviors leading to teen pregnancy. The researcher also showed a Powerpoint™ presentation about teen pregnancy prevention information to improve knowledge and understanding of teenage pregnancy and prevention. These interventions led the participants to increase sexual health knowledge about sexual risk, teenage pregnancy, and prevention.

The motivation process focused on improving positive attitudes and motivation on pregnancy prevention. A video clip and group discussions were used to motivate participants to adopt a positive attitude toward pregnancy prevention. The researcher presented participants a video clip about a situation related to teenage pregnancy. The participants were then divided into small groups and encouraged to discuss how to reduce sexual risk and prevent pregnancy. The effect of this process led participants to increase perceived individual and social support and behavioral positive attitudes toward pregnancy prevention.

The behavioral skill process focused on developing pregnancy prevention skills through role-play, demonstrating contraceptive methods and condom use practice, and critiquing sexual health media and searching sexual health services online. Four situations of role-playing were used to develop pregnancy prevention communication skills (refusal and negotiation skills) such as in situations about "they drank alcohol with friends at a pub and a friend put date-rape drugs in their drink." Participants practiced pregnancy prevention communication skills though role-playing. As participants went into a role play, they began to experience each other's characters and gained awareness about sexual risk behaviors, and improved communication skills of sexual health.[30] They also demonstrated contraceptive use and condom use practice to better understand and feel confident to select the contraceptive method. Finally, the practice of critiquing sexual health media and searching sexual health services were used to promote sexual health media literacy for participants. The researcher presented the participants a video clip and Powerpoint™ slides about media literacy. These activities led participants to develop pregnancy prevention skills, understand that media could influence teen's decision-making on sex, improve sexual health media literacy, and increase their experiences of searching sexual health services.[31]

The scenarios and the LINE™ application were used to promote decision-making skills of pregnancy prevention. The researcher presented the scenario of a situation related to teenage pregnancy and a question to all participants via the LINE™ application. The participants answered the questions and the researcher provided conclusions to all participants. These sessions allowed the participants to improve decision-making skills of pregnancy prevention. As one of the common methods, the researcher used LINE™ to make appointments with all participants and to promote consultation.[32]

Finally, the preliminary results of this pilot study showed that the interventions of the school-based pregnancy prevention program could promote sexual health literacy and pregnancy prevention behavior, and reduce sexual risk behavior in female teenagers and their boyfriends. However, the improvements of the scores from post-test (T2) to follow-up (T3) of sexual health literacy, pregnancy prevention, and sexual risk behavior were not statistically significant. Immediate benefit of the program could be offered; however, a long-term effect might not be sustainable. Therefore, in the main study, the researcher should use booster interventions, such as text message campaigns, to achieve sustainable behavior outcomes.

The strength of this pilot study was the involvement of boyfriends in the intervention, and the focus on skill-building. Study limitations included a small sample size which could

limit statistical power and generalizability, and the use of self-report questionnaires which could be susceptible for cognitive and social biases.

In conclusion, the preliminary results from this pilot study demonstrated that the school-based pregnancy prevention program could be an effective approach to improve sexual health literacy, pregnancy prevention behavior and sexual risk behavior in female teenagers and their boyfriends. This pilot study proved that the program was feasible. Further clinical trials with achievable sample sizes could help to improve the confidence of the pgrogram.

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References

1. World Health Organization. Adolescent pregnancy. (Accessed on Jan. 4, 2018, at http://www.who.int/news-room/fact-sheets/detail/ adolescent-pregnancy)
2. Bureau of Reproductive Health. Statistics on adolescent births, Thailand 2015. (Accessed on Jan. 4, 2018, at http://rh.anamai.moph.go.th/Downloads/Documents/statistics_adolescent15.pdf) (in Thai)
3. Chandra-Mouli V, Camacho AV, Michaud P-A. WHO guidelines on preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries. *J Adolesc Health* 2013;52(5):517-522.
4. Vongxay V, Albers F, Thongmixay S, et al. Sexual and reproductive health literacy of school adolescents in Lao PDR. *Plos One* 2019; 14(1):1-14.
5. Intarakamhang U, Khumthong T. Measurement development assessment of health literacy and unwanted pregnancy prevention behavior for Thai female adolescents. *J Pub Health Nurs* 2017;31(3):1-18.
6. Ganchimeg T, Ota E, Morisaki N, et al. Pregnancy and childbirth outcomes among adolescent mothers: A world health organization multicounty study. *Br J Obstetr Gynecol* 2014; 121(1):40-48.
7. Kaplanoglu M, Bulbul M, Kanca C, Kaplanoglu D, Tabak MS, Ata B. Gynecologic age is an important risk factor for obstetric and perinatal outcomes in adolescent pregnancies. *Women Birth* 2015;28:e119-e123.
8. Thaopan WW, Sota C. Teenage pregnancy and social dilemma in a province of northeastern Thailand. *J Pub Health Develop* 2017;15(2),43-54.
9. Gottschalk LB, Ortayli N. Interventions to improve adolescents' contraceptive behaviors in low-and middle-income countries: A review of the evidence base. *Contraceptive* 2014;90:211-225.
10. Thongnopakun S, Pumpaibool T, Somrongthong R. The association of sociodemographic characteristics and sexual risk behaviors with health literacy toward behaviors for preventing unintended pregnancy among university students. *J Multidiscipl Health Care* 2018;11:149-156.
11. Fonner VA, Armstrong KS, Kennedy CE, O'Reilly KR, Sweat MD. School based sex education and HIV prevention in low and middle-income countries: A systematic review and meta-analysis. *Plos One* 2014;9(3):1-18.
12. Abe Y, Barker LT, Chan V, Eucogco J. Culturally responsive adolescent pregnancy and sexually transmitted infection prevention program for middle school students in Hawai. *Am J Pub Health* 2016;106(1):s110-s116.
13. Morrison-Beedy D, Jones SH, Xia Y, Tu X, Crean HF, Carey MP. Reducing sexual risk behavior in adolescent girls: Results from a randomized controlled trial. *J Adolesc Health* 2013;52(3):314-321.
14. Villarruel AM, Zhou Y, Gallegos EC, Roins DL. Examining long-term effect of Cuídate-a sexual risk reduction program in mexican youth. *Rev Panam Salud Publica* 2010;27(5):345-352.
15. Lachausse RG. A clustered randomized controlled trial of the positive prevention plus adolescent pregnancy prevention program. *Am J Pub Health* 2016;106(1):91-97.
16. Kingmala C, Rawiworrakul T, Powwattana A. Effect of pregnancy prevention program for female adolescents. *J Boromrajonani Coll Nurs Bangkok* 2015;31(3):25-33. (in Thai)
17. Srimuang S, Powwattana A, Lagampan S. The effects of health literacy promotion program on teenage pregnancy prevention among early adolescent girls in school under Bangkok Metropolitan Administration. *J Health Nurs Res* 2019;35(3):74-85. (in Thai)
18. Chaiyachat P, Saranrittichai K. The effects of health literacy and social support development program on pregnancy prevention behaviors for early adolescent. *J Nurs Health Care* 2019;37(4):42-51. (in Thai)
19. Hattakitpanichakul K, Phuphaibul R, Phumonsakul S, Viwatwongkasem C. Effectiveness of the dual approach program to promote sexual abstinence in Thai early female adolescents and improve parent-daughter sexual communication. *J Health Res* 2019;33(4):280-292.
20. Akkase A, Soofon P, Songsri C. The development sexual communication guidelines of adolescents pregnant and families. *J Health Environ Educ* 2020;5(3):148-160.
21. Fisher JD, Fisher WA. Changing AIDS-risk behavior. *Psychol Bull* 1992; 111(3):455-474.
22. Suwarni L, Selviana, Ruhama U, Arfan I. The application of the IMB model as primary prevention on adolescent's premarital sextual intention. *Inter J Pub Health Sci* 2017;6(1):59-64.
23. Ministry of Public Health. Situation of adolescent pregnancy in Mahasarakham province 2015. (Accessed on Feb. 10, 2018, at http://hdc-mkho.moph.go.th) (in Thai)
24. Cocks K, Torgerson DJ. Sample size calculations for pilot randomized trials: a confidence interval approach. *J Clin Epidemiol* 2013;66(2):197–201.
25. Whitehead A, Julious S, Cooper C, Campbell MJ. Estimating the sample size for a pilot randomised trial to minimise the overall trial sample size for the external pilot and main trial for a continuous outcome variable. *Stat Methods Med Res* 2016;25(3):1057–1073.
26. Bell ML, Whitechead AL, Julious SA. Guidance for using pilot studies to inform to design of intervention trials with continuous outcomes. *Clin Epidemiol* 2018;10(1):153-157.
27. Health Education Division, Department of Health Service Support. Health literacy scale for unwanted pregnancy prevention of Thai female

adolescents. Nonthaburi. Ministry of Public Health, 2016: pp.1-66. (in Thai)

28. Powwattana A. Self-discrepancies, negative emotions, cognitive strategies, and sexual behavior among young adult Thai women. Doctoral dissertation (Nursing). Madision, WI. The University of Wisconsin-Madison, 2002.
29. Chaikoolvatana C, Powwattana A, Lagampan S, Jirapongsuwan A, Bennet T. Development of a school-based pregnancy prevention model for early adolescent female Thais. *Pacific Rim Inter J Nurs Res* 2013; 17(2):131-147. (in Thai)
30. Taylor M, Dlamini N, Khanyile Z, Mpanza L. Exploring the use of role play in a school-based programme to reduce teenage pregnancy. *South Afr J Educ* 2012;32(4):441-448.
31. Pinkleton BE, Austin EW. Assessing effects of a media literacy-based intervention on US adolescent' responses to and interpretations of sexual media messages. *J Child Media* 2013;7(4):463-479.
32. Chutrtong J, Chutrtong W. Science students' acceptance to use LINE application in laboratory subject. *Inter J Info Educ Technol* 2020;10(3): 227-231.