Effectiveness of Parent Participation in a Technology-Based Adolescent Sexuality Education Program: A Randomized Control Trial

Monrudee Chokprajakchad, Rutja Phuphaibul, Renee Evangeline Sieving, Srisamorn Phumonsakul

Abstract: Adolescent sexual risk behavior is considered a severe problem worldwide. A technology-based program is a practical tool for increasing parents' sexual communication when it has been implemented to reduce sexual risk behaviors. This randomized control trial investigated the effects of parent participation in a technology-based adolescent sexuality education program on outcomes of parental sexual communication behavior and adolescent sexual abstinence intention. Eighty seventh-grade students and their parents in a secondary school in Bangkok, Thailand were recruited and randomly assigned to either the experimental (n= 41) or the comparison group (n=39). The experimental group received the Parent Participation in a Technology-Based Adolescent Sexuality Education Program, whereas in the comparison group only adolescent received a Technology-Based Adolescent Sexuality Education Program. Data were collected by Adolescent Sexual Risk Behavior questionnaires and Parent Sexual Communication Behavior questionnaires. Generalized Estimating Equations were used to evaluate differences in parent and adolescent outcomes by intervention condition.

Results showed that attitudes, norms, intention, and sexual communication behavior of parents in the experimental group were higher than the comparison group. Adolescents' norms about sexual abstinence in the experimental group were higher than the comparison group. Additionally, adolescents' reports of communicating with their parents about sexual health topics in the experimental group also were higher than the comparison group. Nurses should work with parents to improve parents' sexual communication and also promote adolescents' sexuality education.

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Monrudee Chokprajakchad, *RN, PhD (Candidate), Faculty of Medicine Ramathibodi Hospital and Faculty of Nursing, Mahidol University, Thailand. E-mail: monrudee.cho@mahidol.ac.th*

Correspondence to: Rutja Phuphaibul*, DNS , FAAN, Professor, Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Thailand. E-mail: ruja.phu@mahidol.ac.th*

Renee E. Sieving, *PhD, RN, FAAN, FSAHM, Professor, School of Nursing, University of Minnesota, USA. E-mail: sievi001@umn.edu*

Srisamorn Phumonsakul, *D.N.S., RN, Associate Professor, Ramathibodi School of Nursing, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Thailand. E-mail: Srisamorn.phu@mahidol.ac.th*

Introduction

Early initiation of sexual intercourse is an important modifiable risk factor for teenage pregnancy.[1-3] Globally, 16 million adolescent girls aged between 15-19 give birth every year, with 1 million of these

group being 15 years old or younger.[4] Though teenage pregnancy is a large-scale global problem, it is especially prevalent in Thailand.[5] The birth rate among female adolescents aged between 10 and 14 years is estimated to be 1.4 per 1,000 women, approximately 2,746 babies.[6] Not only teenage pregnancy, but unprotected sexual intercourse has also been associated with sexually transmitted infections, including HIV among adolescents.[2] In Thailand, 4,100 of new cases of HIV infection were aged under 15 years old.[6]

Countries are concerned to ensure that adolescents have access to high-quality sexual health promotion and prevention services.[7,8] Many studies are promoting sexual prevention programs to achieve decreases in adolescent pregnancy and other sexually transmitted infections.[9] Delaying sexual initiation among early adolescents is a reasonable goal[7] and it is the best way to prevent pregnancy and STD/HIV among adolescents.[2]

Appropriate sex education is a tool for helping young teens.[2] Even though informing adolescent, particularly early adolescents through sex education is good,[10] adding parent participation seems to be better.[11] Parent-adolescent communication decreases adolescent risky sexual behavior and helps adolescents avoid sexual risk-taking, and helps reduce HIV risks.[12] Many studies have shown that training parents in sexual communication can produce positive changes in parents' attitude toward sexual communication and increases parents' sexual communication satisfaction.[13,14] Moreover, when parents have knowledge and understanding about sex in adolescents, they can give advice and talk to their children.[15] This is a crucial pathway towards successful and sustained ability to promote sexual prevention in adolescents.

Comparisons of the effectiveness of these types of sexuality education programs are scarce in Thailand.[7] Therefore, this study was designed to compare the effects of parent participation in a technology-based adolescent sexuality education program (PPTASE) and only adolescent in a technology-based adolescent sexuality education program on sexual communication behavior of parents (TASE), and sexual abstinence intention of early adolescents in a secondary school in Bangkok, Thailand.

Literature Review and Conceptual Framework

Communication technology is rapidly expanding globally. Smartphone and new technologies are becoming broadly available, connecting people to the internet with lower-cost, highly engaging, and access to sexual health programs.[16,17] Adolescents and parents commonly use technology to obtain information and skills related to their health.[8] The challenge remains how to cultivate the right mentality in young children for long-term learning and sustainability. Various strategies being used to reduce risk behaviors, especially technology-based interventions such as websites[7] and computer games,[18] because of easy facilitation and convenience. However, technology has not achieved the desired outcome when used with the teen alone, so parents' participation in need.[19]

The strongest risks and protective factors are adolescents' own sexual beliefs, values, attitudes, efficacy, and intentions.[20-23] Moreover, parents' sexual communication is an important resource for their children's sexual education and plays a significant role in shaping their adolescent child's sexual attitudes,[14] norms, behaviors[24,25] and is important influence on the timing of adolescents' first sexual intercourse.[26,27]

This study used the Theory of Planned Behavior (TPB) as its conceptual framework. TPB has been successful in predicting and explaining health behaviors. The theory posits that the primary variable for predicting human behavior is the intention. The intentions of humans are guided by the following three kinds of perceptions: 1) attitude toward behaviors; 2) perceived norms; and 3) perceived ability for behavior control.[28,29]

This study integrated effective approaches through technology activities to increase positive modification of adolescents' attitudes. The computer game media and group activities promoted adolescents in learning

and believing that avoiding premature sexual intercourse is reasonable, appropriate, and preferable.[9] Perceived norms about refusing to engage in early sexual intercourse can be corrected in the computer game media Kid Think.[19] As for reinforcing perceived behavior control on sexual abstinence, the students learn through playing in the computer game media about how to avoid or refuse risk behaviors potentially leading to premature sexual intercourse. However, Kid Think was tested with seventh-grade students.[9] The finding revealed that the game did not change norms about abstaining from sexual intercourse. Therefore, this study added group discussions and parent participation to influence adolescents' perceived norms about sexual abstinence.

Also, the study established parents' positive attitudes, perceived norms about parents' sexual communication through group activities, and the LINE application on the smartphone. It allows parents to exchange opinions on appropriate sexual communication deemed socially acceptable. Moreover, parents can review their knowledge and confidence in talking to their children at all times through the "Talk to Teen" sexual education application. The hypotheses were: 1) Parents in the experimental group would have more positive perceptions regarding sexual communication with their children (attitudes, subjective norms, and perceived behavioral control) greater intention, and more communication with their adolescent children about sexual topics than parents in the control group. 2) Adolescents in the experimental group would have greater sexual abstinence perceptions (attitude, subjective norms, and perceived behavioral control) and intention to be sexually abstinent than adolescents in the control group.

Methods

Design: A Randomized Controlled Trial (RCT)

Sample and setting: The setting was a public school in Bangkok under the Office of The Basic Education Commission, Thailand. The sample was Grade 7 students, aged between 10-13 years and their parents (father or mother). Inclusion criteria of adolescent were: the ability to use a basic computer or laptop and cohabitation with father, mother, or both. Inclusion criteria of parents were: father or mother of the student participating in this study; the parent was living in the same home with primary responsibility for the care of their adolescent child; possession of a smartphone and ability to use LINE application and Web application. Exclusion criteria were students with attention deficit hyperactivity disorder (ADHD) or other learning disorder (LD), and for parents, those currently participate in another parent skills development program or parenting skills and sexual education program.

The sample size was estimated using power analysis with a power of .80 and a significance level of .05. The average effect size (0.4) was calculated from a previous study.[15] The sample size required was 32 per group. For the dropout rate, an attrition rate of 20% was determined. The total number of participants was 38 per group. From a list of 15 mixed gender schools in metropolitan Bangkok that were similar in terms of school size, had a number of students more than 1,000 and standardized curriculum in sexual health education. The primary investigator (PI) randomly selected one school after meeting the inclusion criteria. Three classrooms were randomly selected from eight classrooms by drawing lots. A total of 80 students were randomly assigned to the comparison group (TASE program; n=39) vs. experimental group (PPTASE program; n=41) by distributing a sealed and opaque envelope containing a label indicating the assigned group and an information sheet to each subject. The PI prepared the envelopes while the teacher distributed the group assignment. The allocation of the study groups was concealed to the teachers **(Figure 1).**

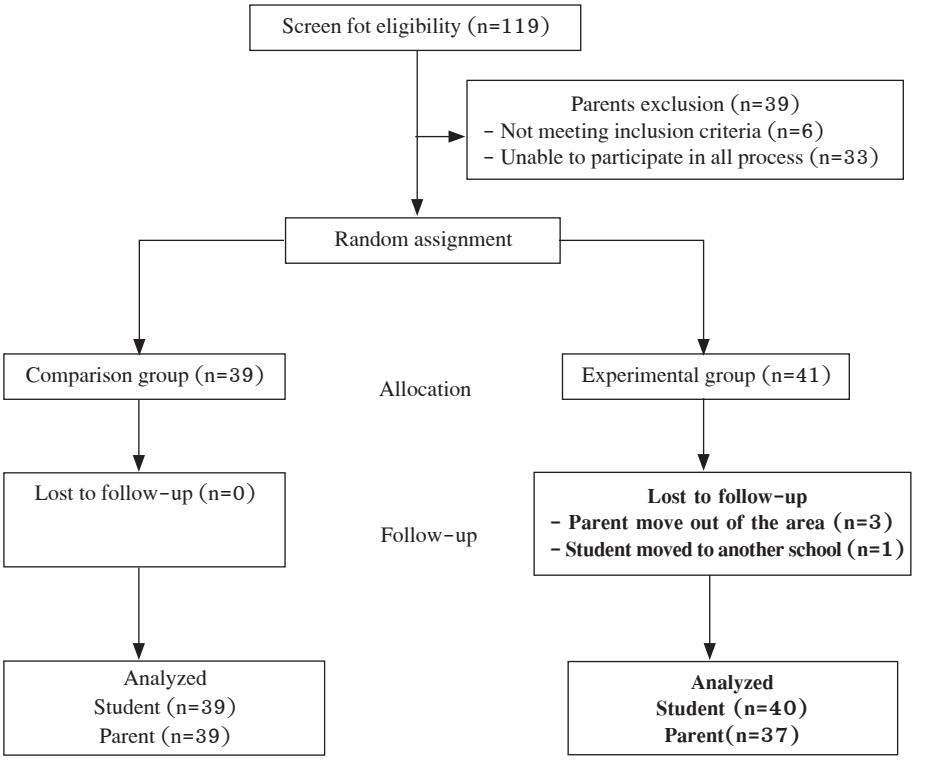

Figure 1. Flow of Study Participants

Ethical Considerations: The study was approved by the Ethics Committee on Human Rights Related to Research Involving Human Subjects, Faculty of Medicine, Ramathibodi Hospital, Mahidol University (ID 02-61-63) prior to data collection. All students and their parents who met the inclusion criteria were provided with detailed information regarding the research objectives, intervention, and preservation of confidentiality and anonymity. Next, consents and agreements were obtained from parents and their children, with permission from school authorities. The participants' rights were protected throughout the study. Also, the participant could withdraw at any time without repercussion.

Instruments: Two instruments were used for data collection – Adolescents' Sexual Risk Behavior and Parent Sexual Communication Behavior. The instruments in this study were examined for content validity by five experts: three pediatric and adolescent nurse instructors, one child and family development instructor, and one adolescent psychiatry instructor.

Adolescent Sexual Risk Behavior questionnaire consisted of three sections and is self-administered. It is described below.

Demographics and general characteristics of adolescence were developed by PI and included: gender, age, education, family living situation, perceived quality of the parent-teen relationship, Student living arrangements attitudes about marriage, frequency of internet use, sources of information about sexuality and currently having a boyfriend or girlfriend. For parents, this included: gender, age, education, marital status, parents' perceived quality of the parent-teen relationship, opinion about the

ideal age for marriage, the frequency of internet use and parents' sources of information about sexuality.

Sexual Risk Behavior was developed by Taikhanong[30] based on the TPB.[31] The PI got permission from the developer to use it in this study. There are 39 items with four subscales: Attitudes toward Sexual Abstinence (12 items), Norms about Sexual Abstinence (14 items), Perceived Behavior Control about Sexual Abstinence (12 items), and Sexual Abstinence Intention (1 items). Examples of items are: "Having sex in school-age is challenging and exciting," "If I have sex in the current school year, how would your father think about this?" Responses are given on 5-point Likert scales from 0 (strongly agree) to 4 (strongly disagree). Higher scores indicate higher positive attitudes, subjective norms, positive perceived control, and sexual abstinence intention. The content validity index (CVI) of this questionnaire was .91. Cronbach's alpha coefficients of the original questionnaires were .80, .91, .83, and .84, respectively. Cronbach's alpha coefficients for this measure in this study were .80, .89, .94, and .87, respectively

Sexual Communication with Parent – was developed by the PI based on literature reviews. There are 12 items. The rating was dichotomous (0=No; 1=Yes). Higher scores indicate higher communication. Example of item is: "Parents talk with you about physical and sexual development". The CVI of this questionnaire was .89. Cronbach's alpha coefficients in this study were .87

Parent Sexual Communication Behavior questionnaire was developed by the PI based on the TPB.[31] It consists of three sections described below and is self-administered. It described below.

Demographics and general characteristics of parents included; gender, age, education, marital status, parents' perceived quality of the parent-teen relationship, opinion about the ideal age for marriage, the frequency of internet use, parents' sources of information about sexuality and does your child have a boyfriend/girlfriend?

Sexual Communication Behavior developed by PI based on the TPB.[30] There are 41 items with three subscales: Attitudes toward Sexual Communication (20 items), Norms about Sexual Communication (10 items), and Perceived Behavior Control about Sexual (10 items). Examples of items are: "People around me think that I should talk about sex with my children". "You are confident to explain about the genital cleanliness for your child". A response is given on a 5-point Likert scales from 0 (strongly agree) to 4 (strongly disagree). Higher scores indicate higher positive attitudes, subjective norms, positive perceived control about sexual communication, and sexual communication intention. The CVI of this questionnaire was .90. Cronbach's alpha coefficients of this measure in this study were .81, .74, and .89, respectively. Sexual Communication Intention (1 item) was an individual determination to actively sexual communication. The scores range from 0 (strongly disagree) to 4 (strongly agree); higher scores indicate higher positive intention.

Sexual Communication with Teen was developed by the PI based on literature reviews. There are 12 items. The rating is dichotomous (0=No; 1=Yes). Higher scores indicate higher communication. Example of item is "You talk about physical and sexual development with your child" The CVI of this questionnaire was .89. Cronbach's alpha coefficients in this study were .72

Intervention Programs: The PPTASE program consisted of 2 programs – Adolescent Sexual Health Education Program and Parent Sexual Communication Program. Four experts viewed the content validity of the program: two pediatric and adolescent nurse instructors, one child and family development instructor, and one adolescent psychiatry instructor. It was pilot tested for understanding and program practicality with two families who met the inclusion criteria. However, they did not participate in the main study for detailed information about each of these programs (see content and methods for each session in **Table 1**).

Table 1 Content and methods for the PPTASE program

Participant	Time Schedule	Lessons
Student	Week 1/ 1 hr.	Sexual behavior and enable students to adapt their knowledge to use in changing student behaviors to prevent sexual risk problems
Parent	Week 1/ 3hrs.	1) The adolescent development, nature of teens and when children ask about sex feature how to answer 2) Infographic 1 shows statistic and negative outcomes of premature sexual intercourse
Student	Week 2/ 1.30 mins	1) In the scenario at home, the substance involved communication between parents and children to adjust attitudes about sexual communication. 2) In the scenario at school; the content on the students was shared and learning together in the classroom to recognize the social norms about having a boyfriend/ girlfriend as a young adolescent. 3) The behaviors based on having friends of the opposite sex, sexual refusal skills.
Parent	Week 2/ Any time*	Infographic 2 illustrates the advantages if parents talk about sex with their teen children, compared to the negative effect if the parent avoids talking to their teen children about sexuality.
Student	Week 3	-
Parent	Week 3/ Any time*	Infographic 3 provides parents with information on how to prepare for a conversation about sexuality with their children. It conveys that talking with children about sexuality is the right thing for parents to do, and not difficult to start.
Student	Week 4/ 1.30 mins	1) In the scenario at a friend's home, focused on practicing refusal skills decision-making skills and upholding personal values. 2) In the scenario in public, communication skills and making decisions in harmful situations. 3) The scenario at an internet café and the training children recognized the importance of the social norms of the internet and chatting and learning refusal skills.
Parent	Week 4/ 3 hrs.	1) Preparation for discussing sex and starting to talk 2) Infographic 4 provides parents with information on what sexual topics are relevant to talk about with their adolescent children.
Student	Week 8/ 1 hr.	Summarize the lessons learned through the media computer game and parents sexual communication
Parent	Week 8/ Any time*	Sexual communication with their child. Parents join student class and write love stories and things that will be conveyed to children.

* The parents learned sexual communication through Talk to Teen web application via smartphone whenever they wanted to learn.

Adolescent Sexual Health Education Program

The adolescent sexual health education program, delivered over eight weeks, included the following two components:

Computer Media Game Kid Think. Phuphaibul, and colleagues[19] developed a computer media game (Kid Think) based on the TPB.[31] The researcher got permission from the developer. Kid Think (2D

computer media game) is a self-administered computer media game for preventing sexual risk behavior among early adolescents. Students played the Kid Think game for a 60-minute session in Weeks 2 and 4.

Classroom Discussions Students had interactive 30-60 minute classroom discussions about sex education and the prevention of sexual risk behaviors weekly during Weeks 1, 2, 4, and 8. The PI and classroom teachers facilitated all sessions

Parent Sexual Communication Program: The parent sexual communication program, delivered over eight weeks, included three components:

*Interactive Group Discussion*s - Two 3-hour in-person sessions for parents (Weeks 1 and 4). The parents were invited to join the adolescents' classroom discussion in week 8.

Line Application - Weekly information graphic (infographic), semi-structured discussion and group problem solving were done using Line (group) application on a smartphone (Weeks 1, 2, 3, 4; throughout the intervention period). Study data were collected on the number of parents who read the weekly infographic and the number of parents who engaged in weekly Line app discussions.

"Talk to Teen" Sexual Education Application - provided information with colorful cartoons, pictures, and exciting video clips. Parents installed this application after the first interactive group discussion (Week 1). Study data were collected on parents' use of various sources of information on the Talk to Teen app.

Data Collection: After the participants were randomly assigned to either the experimental or comparison group, they were asked to complete the demographic data questionnaires. Students completed Adolescent Sexual Risk Behavior, while parents completed Parent Sexual Communication Behavior as baseline data. Adolescents completed the Adolescent Sexual Risk Behavior questionnaires again immediately after the 8-week adolescent program (post-test). The parent, participants completed the Parent Sexual Communication Behavior questionnaires at immediately after the 4-week parent program (posttest 1), and one month after the 4-week parent program (posttest 2).

Data Analysis

Statistical analyses employed SPSS version 18.0 statistical package for Windows (Bangkok, Thailand) and STATA. Descriptive statistics, including percentages, means, and standard deviations, were used to describe participants' characteristics. Independent t-tests were used to evaluate differences in mean scores between the experimental group and comparison group at baseline. Generalized Estimating Equations (GEE) models were used to examine relationships between study treatment conditions in repeated measures of parents' sexual communication perceptions (attitudes, subjective norms, perceived behavioral control, and intention) and parents' sexual communication behavior at baseline, post-intervention (Week 4) and at one-month follow-up (Week 8). Also, GEE models were used to examine relationships between study treatment conditions and repeated measures of adolescents' sexual abstinence perceptions (attitudes, subjective norms, and perceived behavioral control) and adolescents' sexual abstinence intention at baseline and the one-month follow-up (Week 8). Statistical significance was defined as $p < .05$. GEE was used because it is a fixable assumption and produces a summary estimate of group effect across time, taking into account correlations among individual longitudinal variables.[32]

Results

The demographic characteristics of the seventh-grade students were similar in terms of ages (11-13 years old) and were identical in GPA, family status, and cohabiting parents or others. The

majority of students were female. For family marital status and perceived quality of a family relationship, more than half of students in two groups had a parent living together and good relationships with them. Additionally, we found that both groups had similar opinions about the ideal age for marriage, frequency of internet use, sources of information about sexuality, and currently a boyfriend or girlfriend.

The parents in two groups were similar in sex, age, education, marital status, perceived quality of a family relationship, parent opinion about the ideal age for marriage, a frequency of internet use, and sources of information about sexuality. The majority of the participants were mothers. Additionally, we found that both groups had similar opinions about the ideal age for marriage, frequency of internet use or chat, and sources of information about sexuality. There were no statistically significant differences between the two groups of students and parents on any of these baseline descriptors.

Assumptions testing: no dependent variables in parents and students violated an assumption of a normal distribution, indicating that normality could be assumed. At baseline assessment, there were no statistically significant differences in attitudes, subjective norms, perceived behavioral control, and sexual abstinence intention scores between students in the comparison and experimental group. Similarly, there were no baseline differences between groups of students in sexual communication with parents. Among parents, there were no statistically significant differences in parents' attitudes, norms, perceived behavior control, and parent's sexual communication intention between parents in the comparison and experimental group. Similarly, sexual communication behaviors showed no statistically significant differences between parent groups. Baseline group means, t-tests, and associated p-values are shown in **Table 2.**

Table 2: Baseline comparisons of study variables between the control group and the experimental group

Variable	Control group group (n=39)	Experimental group (n=41)	*t*	*df*	*p-value*
	Mean (SD)	Mean (SD)			
Student					
Attitudes toward sexual abstinence	88.82 (4.12)	88.85 (3.26)	.53	78	.882
Norms about sexual abstinence	104.62 (6.11)	106.30(8.15)	.27	78	.737
Perceived behavior control about sexual abstinence	81.59(12.65)	80.80(11.38)	.29	78	.806
Sexual abstinent intention	3.56 (.72)	3.48 (.75)	.32	78	.642
Sexual communication with parent	7.28 (3.69)	7.53 (3.29)	.05	78	.895
Parents					
Attitudes toward sexual communication	81.62(30.62)	85.56(28.29)	.82	78	.477
Norms about sexual communication	41.15(15.63)	38.49(14.41)	.01	78	.808
Perceived behavior control about sexual communication	50.31(14.64)	46.38(16.13)	.19	78	.507
Sexual communication intention	2.79 (1.13)	2.84 (.73)	4.46	78	.946
Sexual communication behavior	9.69 (4.00)	8.35 (3.69)	.07	78	.256

Regarding **Table 3** parents in the experimental group reported statistically significant increases over time in their attitudes, subjective norms, and intentions to communicate with their adolescent children about sexual health topics when compared to parents in the comparison group. However, parents in the experimental group reported no greater change over time in perceived behavior control of sexual communication with their children than did parents in the comparison group. Parents in the experimental group reported statistically significant increases over time in their levels of communication with their adolescent children about sexual behavior when compared to parents in the comparison group.

Table 4, Students in the experimental group reported significantly greater changes over time in norms about sexual abstinence than students in the comparison group. Moreover, the experimental group reported significantly greater increases over time in sexual communication with parents than students in the comparison group. However, students in the comparison group and the experimental group had similar changes between baseline and in attitudes, perceived behavior control, and sexual abstinence intention ($p > .05$).

Table 3 Comparisons the effect of parents sexual communication program over time on parents sexual communication perception and sexual communication intention by The Generalized Estimating Equations (GEE)

Variables score	Group	Baseline ($n_a = 39, n_b = 41$)	Post-test I (Week 4) ($n_a = 39, N_b = 37$)	Follow up (Week 8) ($n_a = 39, N_b = 37$)	β	95%CI	*p-value*
		Mean (SD)	Mean (SD)	Mean (SD)			
Attitudes toward sexual communication	Comparison	81.6(30.6)	79.1(29.1)	80.8(27.7)	20.29	8.22, 32.35	.001
	Experimental	85.7(28.2)	87.9(25.6)	102.5(27.2)			
Norms about sexual communication	Comparison	41.2(15.6)	41.2(16.3)	38.7(18.1)	50.66	40.78, 60.54	<.001
	Experimental	38.5(14.4)	42.7(13.3)	89.4(25.3)			
Perceive behavior control about sexual communication	Comparison	50.3(14.6)	49.9(14.7)	49.9(13.2)	.89	5.24, 7.02	.777
	Experimental	46.4(16.1)	48.1(12.7)	50.8(14.2)			
Sexual communication intention	Comparison	2.8 (1.1)	2.9 (1.1)	2.9 (1.1)	.48	.11, .85	.012
	Experimental	2.8 (.7)	3.3 (.6)	3.3 (.5)			
Sexual communication behavior	Comparison	9.7 (4.0)	9.1 (3.5)	9.0 (3.4)	2.37	.79, 3.94	.003
	Experimental	8.4 (3.7)	9.4 (2.7)	10.0 (2.4)			

a=the comparison group b=the experimental group

Table 4 Comparisons of the effects of the PPTASE program on adolescents' sexual abstinence perceptions and intention by The Generalized Estimating Equations (GEE)

Variables score	Group	Baseline ($n_a = 39, n_b = 41$)	Follow-up (Week 8) ($n_a = 39, n_b = 40$)	β	95%CI	*p-value*
		Mean (SD)	*Mean (SD)*			
Attitudes toward sexual abstinence	Comparison	88.8 (4.1)	92.2 (2.7)	.20	-1.45, 1.85	.809
	Experimental	88.9 (3.3)	92.1 (2.6)			
Norms about sexual abstinence	Comparison	104.6 (6.1)	97.4 (7.8)	12.93	10.09, 15.77	<.001
	Experimental	106.3 (8.2)	110.4 (4.8)			
Perceived behavior control	Comparison	81.6 (12.7)	82.4 (10.5)	3.48	-.53, 7.50	.089
	Experimental	80.8 (11.4)	85.9 (7.5)			
Sexual abstinence intention	Comparison	3.6 (.7)	3.9 (.5)	-.08	-.39, .24	.639
	Experimental	3.5 (.8)	3.9 (.2)			
Sexual communication with parents	Comparison	7.3 (3.7)	7.5 (3.3)	3.68	-1.32, 1.74	.001
	Experimental	7.5 (3.3)	11.0 (1.7)			

a=the comparison group b=the experimental group

Discussion

The PPTASE program was successful in promoting the parents' sexual communication behaviors and adolescents' norms and communication behaviors with the parent. The parent-based expansion of the TPB to include parenting influences explicitly indicated a conceptual framework for family-based design to increase sexual communication between parent and their adolescent child and also promote adolescent' norms and sexual communication. This is consistent with previous studies showing that communicating between parent and adolescent can help the adolescent to improve the sexual abstinence perceptions positively and bodes well for the future of adolescent sexual health.[15,33,34]

Parents in the PPTASE program showed sustained improvement in attitude toward sexual communication immediately post-intervention and at 1-month follow-up. The parent program activities promoted positive attitudes and encouraged parent-adolescent sexual communication via a presentation of video clips. The topic including consequences of adolescents initiating sexual intercourse, discussion of potential positive results of talking with children about sex, simulation video clips with role modeling parents about teens' sexual risk situations, and the sexual communication experiences. Also, parents shared opinions and barriers about talking with their adolescent children about sex in group discussions. These activities may have contributed to parents' understanding of common sexual situations for adolescents and changed their attitudes about the perceived advantages of communicating with their children about sex.[15]

The parents in the PPTASE program showed sustained improvement in perceived norms and behavior about sexual communication with their adolescent children at post-intervention and 1-month follow-up. Through the Line application, parents in the experimental group learned other parents' thoughts, shared their opinions via group discussion, and supported each other. People can comply because they want to be like a social group.[35] Therefore, the result in social power about norms of sexual communication with their child was higher than baseline. Interestingly, parents reported engaging spouses and other family members in discussions initiated on the Line app. Moreover, parents and their spouses shared different opinions regarding sexuality with each other. The finding might be explained in that key support for parents, such as their spouses, have the effect of reinforcing perceived norms and behaviors.[14] Moreover, the program promoted sexual communication by providing practice in sexual communication through group discussions as well as knowledge through smartphone info-graphics. The findings are consistent with a previous study. They found that a parental skill development intervention about HIV prevention in adolescents was statistically significant in term of improving communication skills of parents.[33]

However, the PPTASE program did not influence parents' perceived behavior control about sexual communication with their children. The reasons may be due to the fact that the topic of sexuality remains sensitive. Thai parents may feel embarrassed to discuss sexual health matters with their adolescent children.[14] Therefore, parents may need more time and activities to reinforce that they have control over when they talk with their children about sexual topics.[12-13] This finding is congruent with a previous study.[15] Additionally, this study includes girls and boys, mothers, and fathers. Parents of the opposite sex to their children may perceive particularly low levels of control in talking with their adolescent child about sexual health topics.[10]

In terms of adolescent outcomes, adolescents in The PPTASE program reported a greater increase over time in norms regarding abstinence and greater increases over time in their sexual communication with parents. The findings are consistent with the

literature across populations.[23] Moreover, this finding demonstrates the added benefit of including parents in sexual health programs for teens. Beyond a curriculum, conversations with parents can shape teens' normative beliefs about sexual behavior. Parents are one of the most important sources of influence on shaping adolescent sexual behaviors.[17, 34] Therefore, parents influence adolescents' perceived norms for sexual behavior among young people.[36] Parent program activities, including interactive group discussions and app-based activities - encouraged parents to talk about sex with their children. These activities, in turn, may have strengthened adolescents' perceived norms about sexual abstinence.

The PPTASE program did not influence adolescents' attitude, perceived behavior control, and intention in between group. The reasons may be due to the adolescents in both groups receiving the same program. Besides, this study was a short-term program. Changing attitude, perceived behavior control, and intention should be followed in a long term period.[23, 35] However, adolescents in the PPTASE program reported significantly higher increases over time in all variables compared between baseline and posttest (week 8). This study demonstrated that the effect of parents' participation positively resulted only in perceived norms in adolescents. However, many studies showed that adolescents who have a positive perception of parents about sex issues are more intended to avoid sexual risk behavior.[15, 34] Importantly, both groups were associated with increases in adolescents' attitudes, perceived behavior control regarding sexual risk behavior, and intention about sexual abstinence. This finding illustrates the benefits of an Adolescent Sexual Health Education Program consisting of computer gaming, group discussions, and role-playing to practice negotiation skills. The above results indicate that the adolescent program had utility in increasing attitudes, perceived norms, and perceived behavior control-related delaying early sexual intercourse. Moreover, most students in both groups reported strong intentions to be sexually abstinent, which is normative among early Thai adolescents. Most Thai adolescents of this age are not sexually active.[4, 6]

Limitations and Recommendations for Future Research

First, the settings of the study were limited to selection from only one public school under the Office of The Basic Education Commission in Bangkok Metropolitan. Thus, the generalizability of the findings was limited. Second, in the duration of implementation of the adolescent sexual health education program combined with parent sexual communication program was restricted to eight weeks. This period might not have been sufficient to change sexual abstinence behavior. Thus, the positive results in this initial study suggest that further replication studies are warranted. Lastly, this study did not have a control group that received only usual care. Therefore, it may not found the obvious effectiveness of the intervention between two groups. Future research with usual care is suggested.

Conclusions

The study findings indicate that parents participating in adolescent technology-based sexuality education program for early adolescents strengthens adolescents' norms supporting sexual abstinence. Adding sexual communication program for parents that includes face-to-face and mobile app components enhances parent-teen sexual communication. The establishment of more open sexual communication between parents and their child may have positive sexual health outcomes into later adolescence. For future research, culture sensitive and gender specific intervention are recommended. Nurses should persuade and help empower parents' abilities, as these people

influence behavioral, normative, and control beliefs of adolescents regarding sexual abstinence intention. Additionally, this study was a short-term study. Long-term follow-up until adolescents entering middle and late adolescents is extremely important in monitoring the adolescents' sexual behavior.

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ประสิทธิผลของการมีส่วนร่วมของผู้ปกครองในโปรแกรมการใช้สื่อเทคโนโลยีสอนเพศศึกษาในวัยรุ่น: การทดลองแบบสุ่ม

มนฤดี โชคประจักษ์ชัด รุจา ภู่ไพบูลย์ Renee Evangeline Sieving ศรีสมร ภูมนสกุล*

บทคัดย่อ: พฤติกรรมเสี่ยงทางเพศในวัยรุ่นเป็นปัญหาที่รุนแรงทั่วโลก สื่อเทคโนโลยีเป็นเครื่องมือที่ช่วยเพิ่มการพูดคุยเรื่องเพศของพ่อแม่ ซึ่งจะมีผลในการลดความเสี่ยงทางเพศ การศึกษาทดลองนี้มีวัตถุประสงค์เพื่อเปรียบเทียบผลของการมีส่วนร่วมของผู้ปกครองในโปรแกรมการศึกษาเรื่องเพศในวัยรุ่นโดยใช้สื่อเทคโนโลยีต่อพฤติกรรม การสื่อสารเรื่องเพศของผู้ปกครองและความตั้งใจละเว้นเพศการมีเพศสัมพันธ์ในนักเรียนชั้นมัธยมศึกษาปีที่ 1 และผู้ปกครองจำนวน 80 คู่ ได้รับการสุ่มเข้ากลุ่มทดลอง (41 คู่) และกลุ่มเปรียบเทียบ (39 คู่) กลุ่มทดลองได้รับโปรแกรมการมีส่วนร่วมของผู้ปกครองในโปรแกรมการใช้สื่อเทคโนโลยีสอนเพศศึกษาในวัยรุ่น กลุ่มทดลองเฉพาะวัยรุ่นเท่านั้นที่ได้รับโปรแกรมการใช้สื่อเทคโนโลยีสอนเพศศึกษาในวัยรุ่น เก็บรวบรวมข้อมูลโดยใช้แบบสอบถามพฤติกรรมความเสี่ยงในวัยรุ่นและแบบสอบถามพฤติกรรมการพูดคุยเรื่องเพศของพ่อแม่ วิเคราะห์ประสิทธิผลของโปรแกรมโดยใช้ Generalized Estimating Equations

ผลการศึกษาพบว่าคะแนน ทัศนคติ บรรทัดฐานทางสังคม ความตั้งใจและพฤติกรรมการสื่อสารทางเพศของผู้ปกครองในกลุ่มทดลองสูงกว่ากลุ่มเปรียบเทียบ สำหรับนักเรียนคะแนนการรับรู้บรรทัดฐานทางสังคมในกลุ่มทดลองสูงกว่ากลุ่มเปรียบเทียบ นอกจากนี้วัยรุ่นในกลุ่มทดลองรายงานว่ามีการพูดคุยกับพ่อแม่เรื่องเพศมากกว่ากลุ่มเปรียบเทียบ ผลการศึกษานี้มีข้อเสนอแนะว่าพยาบาลควรทำงานร่วมกับพ่อแม่เพื่อสนับสนุนการสื่อสารเรื่องเพศในพ่อแม่และยังช่วยส่งเสริมการสอนเพศศึกษาในวัยรุ่นอีกด้วย

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คำสำคัญ: วัยรุ่นตอนต้น การมีส่วนร่วมของพ่อแม่ การละเว้นพฤติกรรมทางเพศ การสื่อสารเรื่องเพศ สื่อเทคโนโลยี

มนฤดี โชคประจักษ์ชัด *นักศึกษาหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาการพยาบาล (หลักสูตรนานาชาติและหลักสูตรร่วมกับมหาวิทยาลัยในต่างประเทศ) โครงการร่วมคณะแพทยศาสตร์โรงพยาบาลรามาธิบดี และ คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล E-mail: monrudee.cho@mahidol.ac.th*

ติดต่อที่: รุจา ภู่ไพบูลย์ *ศาสตราจารย์ โรงเรียนพยาบาลรามาธิบดี คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล E-mail: ruja.phu@mahidol.ac.th*

Renee E. Sieving*, PhD, RN, FAAN, FSAHM, Professor, School of Nursing, University of Minnesota, USA. E-mail: sievi001@umn.edu*

ศรีสมร ภูมนสกุล *รองศาสตราจารย์ โรงเรียนพยาบาลรามาธิบดี คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล E-mail: Srisamorn.phu@mahidol.ac.th*