Effectiveness of Computer-Based Sexual Communication Program for Mothers and Pre-Adolescent Daughters: A Quasi-Experimental Study

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Abstract: Adolescent sexual risk behaviors are a problem that may have long-term health outcomes. Many strategies and interventions are needed around the world to reduce these risks. This quasi-experimental study examined the effects of the computer-based Mother-daughter Sexual Communication-Thailand Program developed to increase positive attitudes, subjective norms, perceived behavioral control, and intention focused on mothers' sexual communication behaviors and daughters' sexual abstinence intention in an attempt to reduce adolescent risk behavior. The participants were mothers and their pre-adolescent daughters in elementary schools in Bangkok, Thailand. The intervention group (n=37) received one session weekly for five consecutive weeks of the program, whereas the control group (n=40) did not receive the intervention. Eight instruments were used to collect data from the mothers and pre-adolescent daughters before the intervention and at Week 5 immediately after the intervention and at one month after the completion of the intervention. Data were analyzed by Generalized Estimating Equations.

The results indicated that the mothers in the intervention group had statistically significant higher positive attitudes, perceived behavioral control, and intention at one month after the intervention in addition to better sexual communication behaviors immediately after the intervention than those in the control group. However, the mothers' subjective norms and the daughters' sexual abstinence intentions were not significantly different between the two groups. This program will be undergoing further testing and possible modification for adolescents' health promotion.

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Introduction

Sexual risk behavior among adolescents is a significant public health problem worldwide as the prevalence of HIV/AIDS and other sexually transmitted

diseases and teenage pregnancy has been increasing. For example, between 2017 and 2018, sexually transmitted diseases reported among adolescents aged 15 to 24 years increased from 161.2 to 189.5 per 100,000 people in Thailand.[1] This age group shows the highest rates of sexually transmitted infections. Only a few adolescents use condoms during sexual activity due to a lack of knowledge regarding the transmission and prevention of HIV/AIDS.[2]

Learning about sexuality from parents will help adolescents acquire knowledge, change attitudes toward sexual practice, foster correct sex-related values,[3] change adolescents' perceived norms and boost adolescents' self-efficacy.[4] Parent-adolescent sexual communication is associated with delayed sexual initiation, less risky sexual behaviors, safer sex behavior, changes in sexual intentions, increased use of condoms and other contraceptive methods and negative attitudes toward unplanned pregnancy in adolescents.[4-8] Additionally, mother-daughter sexual communication can help daughters establish positive attitudes toward delaying sex because this communication enhances daughters' performance of appropriate sexual behavior.[8]

In Thai society, parent-adolescent communication about sex is not generally done, and parents frequently do not know how to start sexual communication with their children.[9] Most mothers discuss physical development with children, but avoid talking about pregnancy, contraceptive methods and sexual intercourse.[10] A significant barrier to parents' sexual communication is their reluctance and embarrassment to communicate with their children about sexual matters[3,9,11] and their lack of sexual communication skills.[10,12] Discussions about sex are perceived as immoral and inappropriate, and considered by parents to have the potential of triggering teenagers' sexual interest.[12,13] Today, the typical Thai family structure has evolved into a nuclear family, and most mothers work outside the home. Consequently, mothers have less time for communication with their children and perhaps less time to supervise their children's behavior.[14]

Computer-based mother-daughter sexual communication programs (CMDSC) are currently up-to-date, relatively easy and convenient for mothers to access.[15] Additionally, such programs have been found to increase adolescents' sexual abstinence and condom use, while positively influencing their perceived norms about sex,[16] improving sexual communication skills and decreasing sexual risks for AIDS/HIV and other STDs among female adolescents.[17] These programs for parents can increase parent-adolescents' sexual communications.[18,19] Establishing positive attitudes using mother-daughter communication is an essential method for the prevention of sexual risk behaviors. Mothers are identified as the most significant persons influencing their daughters' decisions about sexual abstinence, while firmer mother-daughter bonds make them the best advisors for sexual information.[5,10] According to Ajzen,[20] not only does attitude influence one's behaviors, but also subjective norms and perceived behavior control through intention.

There are many studies on both Thai and Western approaches to the programs addressing issues concerning middle or late adolescents[8,16,21-23] with few studies in pre-adolescents.[16] This is because parents' attitudes toward sexual communication indicate that early adolescence is too young to discuss sexuality.[12,13] An attitude barrier is the belief that sexual communication induces adolescents' interest in having sex.[13] To date, most studies have implemented interventions for middle or late adolescents.[16,22] Thus, these programs should start early and ideally before initiating sexual behavior. The best method for preventing the sexual risk behavior of early adolescents is delaying the initiation of sexual behavior. Mothers are the most important resource for their adolescents' sex education,[10] and their knowledge about sex is an important tool in advising daughters on these issues. In addition, many studies have found that CMDSC programs have rarely been employed in Thailand to promote mother-daughter sexual communication compared to other countries due to a lack of program availability. These programs

are a critical component in reducing the risks for risky sexual behaviors and delaying adolescents' sexual initiation.[16]

Our Program was developed and appropriately designed for mothers by the primary investigator (PI) based on the Theory of Planned Behavior (TPB) since several components in this theory assume that changes in human behavior are associated with attitudes toward behavior and that subjective norms and perceived behavior control can predict changes in behavioral intention.[20] CMDSC-Thailand Program consists of imparting knowledge about sexual communication, rehearsal of sexual communication, increasing sexual communication skills and holding group discussions. Thus, this study sought to determine the effectiveness of this program with the following hypotheses:

1) The mean scores of mothers' attitudes toward sexual communication, subjective norms in sexual communication, perceived behavioral control, sexual communication intention and mothers' sexual communication behaviors in the intervention group were significantly higher than in the control group immediately and at one month after the intervention.

2) The mean scores for the sexual abstinence intention of pre-adolescent daughters in the intervention group were significantly higher than the control group immediately and at one month after the intervention.

Method

Design: A quasi-experiment, pretest-posttest design with a comparison group was used.

Participants and Settings: The participants were mothers and their pre-adolescent daughters, and the estimated sample size was calculated based on the effect size of a previous study at 0.25.[24] Power of test was set at .80 with a significance level of .05. The sample size was approximately 30 pairs per group with an added attrition rate of 30% for a total of 39 pairs per group, so 40 pairs of participants were included in each group. The inclusion criteria for the mothers were those living their daughters for at least one year and possessing computers or smartphones with the ability to connect to the internet independently. The inclusion criteria for daughters were females aged 10-12 years, studying in fifth and sixth grade and living with a mother.

Random sampling was used to select one of fifty regions in Bangkok, and two primary schools in this region with similar characteristics in size and a standardized sexual health education curriculum. The two schools were randomly assigned into an intervention or control group. From each school, one Grade 5 and Grade 6 classroom was randomly selected for each group. Next, the pairs of daughters-mothers from these two classes at each school were randomly selected (40 pairs for each group). When the program started, only 20 mothers in the intervention group participated. Thus, one school in the same region with similar characteristics was randomly selected and the same procedures for obtaining 20 pairs at the previous school were repeated. However, three mothers in the intervention group dropped out of the study. Finally, 37 pairs in the intervention group and 40 pairs in the control group remained for an attrition rate of 7.5%.

Instruments: There were two sets of instruments for obtaining data on outcomes, variables and the intervention Program for a total of eight instruments used. Four instruments were developed by the PI, and four were developed by others in Thai. The latter were used and/or modified with permission from the originators. Then content validity was reviewed by 3-5 experts in adolescent health and public health nursing. The intervention was then piloted with 30 participants not included in the main study.

1. Two Demographic Forms were developed by the PI. The mothers' form included the mother's age, age of spouses, occupation, level of education, family income, parental marital status and sexual experience. The daughters' form included age and level of education.

2. Mothers' Attitudes toward Sexual Communication Questionnaire (MASCQ) was developed by Powwattana and Manora,[25] this instrument consists of 20 items with both positive and negative items. Each item is rated on a Likert scale from 0 (strongly disagree) to 3 (strongly agree). Scores on negative items are reversed before summing the total score. The range of total scores is 0-60 points with higher scores meaning more positive attitudes toward sexual communication. An example of positive is, "Discussing the use of condoms can prevent sexual problems." An example of a negative item is, "You should avoid asking your child about physical changes." Cronbach's alpha coefficient in the pilot and the main study were .83 and .79, respectively.

3. Mothers' Subjective Norms in Sexual Communication Questionnaire (MSSCQ) was developed by the PI from the literature review and focus groups. It consists of five items on visual scales rated from 1 (no and disagree) to 7 (yes and agree). An example is, "Most people who are important to me (husband, parents, relatives and friends) think I should discuss sexual matters with my daughter." The range of total scores is 5-35, with higher scores indicating higher consistency with mothers' subjective norms in sexual communication. The CVI was 1. Cronbach's alpha coefficient in the pilot and main study were .80 and .85, respectively.

4. Mothers' Perceived Behavioral Control Questionnaire (MPBCQ) was developed by Klabtablang et al.[26] and modified by the PI. The instrument consists of 10 items with rating scales from 1 (strongly uncertain) to 7 (almost certain). An example is, "You are certain you can teach your daughter how to refuse sexual initiation." The range of total scores is 10-70 points with higher scores meaning a higher degree of perceived behavioral control in sexual communication. The CVI was 0.9. Cronbach's alpha coefficient in the pilot and main study were .95 and .91, respectively.

5. Mothers' Sexual Communication Intention Questionnaire (MSCIQ) was also developed by the PI, based on the TPB[20] and focus group interviews. The instrument consists of four items range on 5-point rating scales ranging from 1 (strongly disagree) to 5 (strongly agree). An example is, "I intend to discuss sex with my daughter within 7 days." The range of total scores is 4-20 points with higher scores meaning a higher intention for sexual communication with daughters. The CVI was 1. Cronbach's alpha coefficient in the pilot and main studies were .88 and .97, respectively.

6. Mothers' Sexual Communication Behavior Questionnaire (MSCBQ) was developed by Niamkan and Sornchai[27] and modified by the PI. The instrument consists of 12 items ranging on 4-point rating scales from 1 (never) to 4 (often). An example is, "You teach your child about STDs." The range of total scores is 12-48 points with higher scores indicating a higher degree of mother's sexual communication behavior. The CVI was 1. Cronbach's alpha coefficient in the pilot and main study were .91 and .93, respectively.

7. Pre-Adolescents' Sexual Abstinence Intention Questionnaire (PASAIQ) was developed by Fongkaew et al.,[28] and modified by Chareonsuk.[29] The instrument consists of four items rated on 5-point Likert-type scales ranging from 1 (strongly disagree) to 5 (strongly agree). An example is, "I intend to practice sexual abstinence until I am 20 years old." The range of total scores is 4-20 points with higher scores indicating greater sexual abstinence intention among pre-adolescent daughters. The CVI was 0.9. Cronbach's alpha coefficient in the pilot and main study were .79 and .79, respectively.

Computer-Based Mother-Daughter Sexual Communication Thailand Program (CMDSC-Thailand Program) was developed by the PI from literature review and focus groups, including use of the computer Program with a learning management system (LMS) module. The Program was validated for content validity by five experts: four adolescent and one public health nursing instructors. This Program presents pictures, graphics, videos, animation, sound and posttests for the mothers in the following five sessions in five weeks (**Table 1**). The mothers accessed the Program on

a website developed and administrated by the PI. The Program included interactive questions and homework for the mothers to practice skills with their daughters at home. Higher correct responses to the questions by mothers suggest higher mother-daughter sexual communication ability.

Table 1 Content and activities for the CMDSC-Thailand Program

Week/Session	Activities
Week 1 (at school) Session 1 and Session 2 (3 hrs.)	**Session 1: News on Adolescent Pregnancy Situation Problems: What Worries you About Your Daughter?** The mothers studied situations and news on adolescents' sexual risk behaviors and homework from the computer-based Program for mothers to practice with their daughters at home; attitudes about sexual communication were evaluated with interactive questions in the computer-based Program. The mothers then held a group discussion and exchanged experiences with attitudes about sexual communication with their daughters. **Session 2: Talk before Sharing** The mothers studied video interviews with the mothers, daughters and teachers about sexual communication, significance and methods of sexual communication with daughters, strategy for initiating sexual communication and homework from CMDSC-Thailand Program for mothers to practice with their daughters at home. The mothers' perceived subjective norms in sexual communication were evaluated by interactive questions in the computer-based Program. **Group Discussions** This activity was conducted for the mothers to participate in group discussions.
Week 2 (at home) Sessions 3-5 (any time)	**Session 3: Update on Adolescents** The mothers studied sexual and psychological development in adolescents, managing sexual emotions and relationships with the opposite sex, including homework from the computer-based Program for the mothers to practice with their daughters at home. Perceived behavioral control in sexual communication was evaluated with interactive questions in the computer-based Program. **Session 4: IT Era Moms** The mothers studied methods of sexual refusal skills and situations at risk for sexual activity with homework from CMDSC-Thailand Program for mothers to practice with their daughters at home. Perceived behavior control in sexual communication was evaluated with the interactive questions in the computer-based Program. **Session 5: Mothers Teach about Contraceptive Methods** The mothers studied methods and basic knowledge about STDs from CMDSC-Thailand Program. Perceived behavior control in sexual communication was evaluated with interactive questions in the computer-based Program.
Weeks 3 and 4 (at home) (any time)	The researcher called the mothers to offer consultation and advice about their problems and homework about sexual communication with their pre-adolescent daughters.
Week 5 (at school) (3 hrs.)	**Group Discussions** This activity was conducted for the mothers to participate in group discussions with feedback on sexual communication skills, homework, problems with sexual communication and evaluation of the Program.

Ethical Considerations: This study was approved by the Committee on Human Rights Related to Research Involving Human Subjects, Faculty of Medicine Ramathibodi Hospital, Mahidol University (No. MURA 2016/665). All participants were informed about the research objectives, procedures, benefits, protection of confidentiality, protection of human rights of the subjects and details of participation with the assurance of no risks associated with participation. The participants were assured that this study was completely voluntary, and they were free to withdraw at any time. Their anonymity and confidentiality were also protected. Informed consent was obtained from the mothers and their pre-adolescent daughters with permission from school authorities.

Data Collection: Data were collected data from November 2017 to April 2018. The mother-daughter pairs in both groups completed demographic questionnaires at baseline. The mothers completed the MASCQ, MSSCQ, MPBCQ, MSCIQ and MSCBQ, whereas the daughters completed PASAIQ at baseline. The intervention group received the CMDSC-Thailand Program. The PI conducted group discussions among the mothers in school settings at Weeks 1 and 5. The PI was able to monitor the participants by checking user login and answering interactive questions from the Program. However, the control group received the details of the website for the CMDSC-Thailand Program after the study was completed. All participants completed the questionnaires immediately and at one month after the intervention at school and at home.

Data Analysis: Data were analyzed by using SPSS version 18.0. Statistical significance was set at $p<.05$. Chi-square and independent t-tests were used to examine the differences in the demographic data. Generalized Estimating Equations (GEE) tested the hypotheses about the effects of CMDSC-Thailand Program across time and across two groups. GEE was utilized to compare mothers' attitudes, subjective norms, perceived behavioral control, intention and sexual communication behaviors, as well as the sexual abstinence intention of pre-adolescent daughters between the intervention and control groups across time (before the intervention, immediately after, and at one month after). GEE was used to examine the effectiveness of the intervention and repeated measures effects with longitudinal data and responses correlated within subjects.

Results

The mothers' mean ages in the control and intervention groups were 39.98 (6.91) and 40.65 (8.07) years, respectively. Their spouses' mean ages in the control and intervention groups were 44.64 (8.36) and 42.97 (7.51) years, respectively. Most of the mothers' education in both groups was at the primary school level. The majority of the others in both groups were married, worked as employees and had incomes ranging from 10,001 baht (323 USD) to 20,000 baht (645 USD) per month. The sexual experience of the mothers before 20 years of age was 40% in the control group and 51.40% in the intervention group. The majority of the daughters in both groups were aged 11 years. The number of daughters in the control group in Grades 5 and 6 was equally distributed (50%), whereas the majority of the intervention group was in Grade 6 (64.90%). The demographic characteristics of the mothers and daughters showed no significant differences between the two groups.

The mean scores for normally distributed variables between the control and intervention groups were compared by using the independent t-test while non-normally distributed variables were compared by using the Mann-Whitney U test. At baseline assessment, the attitudes, perceived behavioral control, intention and mothers' sexual communication behavior of the intervention group were not significantly different from the control group. However, the mothers' subjective norms in sexual communication and sexual abstinence intention of pre-adolescent daughters were statistically significantly different between the groups (**Table 2**).

Table 2 Comparisons of the study variables between control group and intervention group at baseline

Variables	Possible Range	Control Group (n=40)		Intervention Group (n=37)		t and z	df	p-value
		Mean	SD	Mean	SD			
Mothers								
Attitude	0-60	43.68	6.03	42.70	6.86	.66	75	.510
Subjective Norms	5-35	25.83	6.63	29.30	5.39	-2.61[z]	-	.009
Perceived Behavioral Control	10-70	55.65	10.10	57.00	11.22	-.556	75	.580
Intention	4-20	14.30	3.75	14.08	4.23	.24	75	.810
Sexual Communication Behavior	12-48	32.50	9.15	31.03	11.49	.63	75	.534
Pre-adolescent Daughters								
Intention	4-20	14.28	4.62	17.43	2.19	-2.99[z]	-	.003

Z = Mann-Whitney U test

The GEE statistic was used to compare mothers' attitudes toward sexual communication, subjective norms, perceived behavioral control, intention, sexual communication behavior of mothers and sexual abstinence intention of pre-adolescent daughters between the intervention and control groups over time at baseline, immediately after and at one month after the intervention (**Tables 3-5**).

The findings showed that the scores for attitudes toward sexual communication, subjective norms, perceived behavioral control, and sexual communication intention for the mothers in the intervention group were not significantly different from those of the control group at Week 5 or immediately after the intervention. However, the scores for the sexual communication behaviors of the mothers in the intervention group were significantly different from those of the control group at immediately after the intervention (**Table 3**).

Table 3 Comparisons of the effects of CMDSC-Thailand Program on mothers' sexual communication behavior at immediately (Week 5) after the intervention by Generalized Estimating Equations (GEE)

Variables	Baseline M(SD)	Week 5 M(SD)	β	SE	95%CI	p-value
Attitudes						
Control	43.68 (6.03)	42.60 (6.29)	-	-	-	-
Intervention	42.70 (6.86)	44.73 (7.15)	2.74	1.48	[-.17, 5.66]	.065
Subjective Norms						
Control	25.83 (6.63)	26.10 (5.13)	-	-	-	-
Intervention	29.30 (5.39)	30.54 (4.35)	.80	1.44	[-2.00, 3.62]	.574
Perceived Behavioral Control						
Control	55.65(10.10)	55.70(11.46)	-	-	-	-
Intervention	57(11.22)	61.05 (8.16)	3.51	2.29	[-9.97, 8.00]	.124
Intention						
Control	14.30 (3.75)	14.75 (3.71)	-	-	-	-
Intervention	14.08 (4.23)	15.95 (3.42)	1.47	1.05	[-.58, 3.51]	.161
Sexual Communication Behavior						
Control	32.50 (9.15)	33.38 (7.68)	-	-	-	-
Intervention	31.03(11.49)	36.70 (8.89)	4.85	1.78	[1.36, 8.34]	.006

The scores for mothers' attitude toward sexual communication, perceived behavioral control and sexual communication intention in the intervention group at one month after the intervention were significantly different from those of the control group. However, the mothers' scores on subjective norms and sexual communication behaviors in the intervention group at one month after the intervention were not significantly different from those of the control group (**Table 4**). The pre-adolescent daughters' scores for sexual abstinence intention in the intervention group at immediately after and one month after the intervention were not significantly different from those of the control group (**Table 5**).

Table 4 Comparisons of the effects of CMDSC-Thailand Program on mothers' sexual communication behavior at one month (Week 9) after the intervention by Generalized Estimating Equations (GEE)

Variables	Baseline (SD)	Week 9 M(SD)	β	SE	95%CI	p-value
Attitude						
Control	43.68 (6.03)	43.05 (6.18)	-	-	-	-
Intervention	42.70 (6.86)	46.84 (7.31)	4.62	1.87	[.96, 8.27]	.013
Subjective Norms						
Control	25.83 (6.63)	26.33 (6.22)	-	-	-	-
Intervention	29.30 (5.39)	30.24 (4.62)	.47	1.72	[-2.91, 3.86]	.784
Perceived Behavior Control						
Control	55.65(10.10)	52.55(13.14)	-	-	-	-
Intervention	57(11.22)	61.14 (8.50)	7.15	3.11	[1.05, 13.24]	.022
Intention						
Control	14.30 (3.75)	14.20 (3.65)	-	-	-	-
Intervention	14.08 (4.23)	16.35 (3.71)	2.43	1.15	[.17, 4.68]	.035
Sexual Communication Behavior						
Control	32.50 (9.15)	36.68 (8.89)	-	-	-	-
Intervention	31.03(11.49)	39.73 (9.16)	4.14	2.47	[-.70, 8.98]	.094

Table 5 Comparisons of the effects of CMDSC-Thailand Program on pre-adolescent daughters' sexual abstinence intention at immediately (Week 5) and one month (Week 9) after the intervention by the Generalized Estimating Equations (GEE)

Variable	Baseline (nc=40,ni=37) Mean (SD)	Follow-up (Week 5) (nc=40,ni=37) Mean (SD)	Follow-up (Week 9) (nc=40,ni=37) Mean (SD)	β	SE	95%CI	p-value
Intention of Daughters							
Control group	14.28(4.62)	15.78(4.67)	-	-	-	-	-
Intervention group	17.43(2.19)	18.27(1.64)	-	-.53	.77	[-2.05, .99]	.491
Control group	14.28(4.62)	-	16.73(3.49)	-	-	-	-
Intervention group	17.43(2.19)	-	18.86(1.48)	-.88	.95	[-2.75, .99]	.355

c= control group, i = intervention group

Discussion

The results show that CMDSC-Thailand Program did not change the attitudes of the mothers of pre-adolescents about sexual education in this study immediately after the intervention was completed, but there was a change one month after the intervention. These insignificant findings can be explained in that it takes time for individuals to change their attitudes,[21] especially towards sensitive subjects, or sex-education communication with their daughters in this case. This is in line with results of a previous study where a sex education intervention was introduced to mothers of preschoolers in Iran and the effects of the intervention did not show until Week 8.[30] For future studies, surveying and adding the component of sex education, including content about the negative consequences of early sexual interactions, may enhance maternal knowledge resulting in earlier attitude modification towards communication with daughters about sexual matters.[31] Evidence shows that providing such knowledge along with interactive questions and rehearsals for mothers can increase maternal sexual communication skills and potentially lead to faster positive attitude changes about sexual communication with their daughters.[31]

The findings also show that CMDSC-Thailand Program did not affect the subjective norms in maternal sexual communication in the intervention group, as the subjective norm scores were already high at baseline, and about half of the mothers in both groups reported that they themselves had had sexual experience before entering adolescence. Therefore, it is not surprising to find that CMDSC-Thailand Program did not change maternal subjective norm scores over time. Having the first experience with sexual intercourse at this young age is the new norm for Thais today, as the beliefs and family structure in Thailand have changed dramatically in past decades.[14] Nevertheless, clearly unplanned teenage pregnancies and sexual risk behaviors of adolescents are significant issues in Thai society. Previous research has found that many Thai mothers acknowledge these problems to be rapidly worsening, partly due to the irresponsible messages coming from entertainment and the Internet, often along with negative influences from peers.[32] Relying solely on promoting safe sex through governmental campaigns (such as "Stop Teen Moms"[33(p.50)]) cannot solve all adolescent pregnancy problems. Greater national efforts need to focus on attitude changes toward free sex along with the safe sex practices of abstinence and delaying one's first sexual intercourse among Thai youths.[33]

The results found a significant effect for the intervention at one month after its completion. It is possible that immediately after the intervention was too early to evaluate the intervention's success or failure to develop the delayed response of the mothers' perceived behavioral control. Akers and colleagues[34] suggested that parents' sexual communication interventions should be examined in terms of the long-term effects of the intervention. In addition, sexual communication Programs in VCD enhance changes in the perceived behavioral control of mothers' sexual communication.[35] The CMDSC-Thailand Program had an impact on the perceived behavioral control of the mothers. It also enhanced the mothers' perceived behavioral control about sexual communication by developing sexual communication skills, rehearsing communication by interactive questions in the computer-based Program and practicing discussion about sexual issues with pre-adolescent daughters through homework and focus group discussions. The findings indicate that the mothers in the intervention group developed perceived behavioral control from all program activities at one month after the intervention. This study further demonstrates that an increase in perceived behavioral control of the mother's sexual communication skills was gained from the sexual communication intervention and could maintain the long-term effects of the intervention.

The CMDSC-Thailand Program did not influence mothers' intention about sexual communication immediately after the intervention, but it did have an influence one month later. Thai mothers are embarrassed and sensitive about communicating with their children on sexual topics.[3,9,11] Consequently, mothers may need a longer time to enhance intention and confidence in their sexual communication ability with pre-adolescent daughters. In this study, when the mothers' intended to engage in sexual communication with positive attitudes and experience with social pressure were evaluated, they gained confidence in their ability and beliefs based on opportunities to engage in sexual communication. This finding supports the Theory of Planned Behavior, which illustrates that attitude toward a behavior, subjective norms and perceived behavioral control influence a person's intention to perform a behavior.[36]

The CMDSC-Thailand Program is effective in enhancing mothers' sexual communication behavior within the short-term. Thus, the mothers' sexual communication behavior in the intervention group was significantly higher than in the control group at immediately after the intervention, but it was not significantly different at one month after the intervention. It is clear that further program application is required over a longer period. However, the mothers' sexual communication behavior at one month after the intervention was higher than at immediately after the intervention. This Program gained the mothers' attention with VDO clips, cartoon animation, problem-solving simulations and answering questions. Furthermore, the focus group discussions and the homework practice with their daughters helped the mothers build confidence and understanding of their ability to engage in sexual communication with their daughters. As a result, the mothers performed sexual communication behavior with their pre-adolescent daughters. Communication about sex between mothers and early adolescents by using content knowledge, role play and group discussions can enhance mother-daughter sexual communications.[3,9,37] If the Program used a more extended time of intervention, it would be of benefit in promoting mothers' sexual communication behavior.

The CMDSC-Thailand Program was only conducted with mothers. Therefore, the sexual abstinence intention of the pre-adolescent daughters in the intervention group was not significantly higher than that of the control group at immediately one month after the intervention. Additionally, CMDSC-Thailand Program had no impact on the sexual abstinence intention of the pre-adolescent daughters, because this needs more time to be changed. If the program were to be conducted in both mothers and their pre-adolescent daughters within long-term duration, it might be able to promote sexual abstinence intention among the pre-adolescent daughters. The findings are consistent with those of the study of Hattakitpanichakul et al.[18] who found that sex education using a sexual abstinence program among parents and early female adolescents did not change sexual abstinence intention compared with the comparison group after Week 5 of the intervention.

Limitations

This study used a quasi-experimental design, employing randomly assigned schools in the intervention and control groups. Thus, internal validity cannot be avoided. The two schools might have some different factors such as different environments or teachers, or confounding factors that might influence the dependent variables. The other limitation is that the participants were only from Bangkok and the data were collected only in middle-sized primary schools. Thus, generalization is limited. The intervention was conducted for mothers, which might not have affected the sexual abstinence intention of the pre-adolescent daughters. Thus, future research should develop interventions also directed toward changes in daughters' intention.

Conclusions and Implications for Nursing Practice

The effects of this program were partly able to help develop positive attitudes toward sexual communication, improve perceived behavioral control, boost intention for sexual communication, and promote mothers' sexual communication behavior. However, the program was not able to promote sexual abstinence intention among the pre-adolescent daughters. Hence, enhancing mothers' competency to communicate about sex with their daughters is essential. Additionally, this program will be undergoing further testing and possible modification in the future to promote adolescents' sexual health and facilitate mothers' sexual communication in preventing adolescent sexual risk behaviors.

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ผลของโปรแกรมคอมพิวเตอร์เพื่อการสอนการสื่อสารเรื่องเพศระหว่างมารดากับบุตรสาวก่อนวัยรุ่น: การวิจัยกึ่งทดลอง

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บทคัดย่อ: พฤติกรรมเสี่ยงทางเพศของวัยรุ่นเป็นปัญหาที่อาจส่งผลต่อผลลัพธ์สุขภาพในระยะยาว ซึ่งทั่วโลกต้องการวิธีและโปรแกรมต่างๆ เพื่อช่วยลดความเสี่ยงของปัญหานี้ วัตถุประสงค์ของการวิจัยกึ่งทดลองเพื่อศึกษาผลของโปรแกรมคอมพิวเตอร์เพื่อสอนการสื่อสารเรื่องเพศระหว่างมารดากับบุตรสาวเพิ่มทัศนคติ บรรทัดฐานทางสังคม การรับรู้ความสามารถในการควบคุมพฤติกรรม ความตั้งใจและพฤติกรรมของมารดาในการสื่อสารเรื่องเพศ และความตั้งใจละเว้นเพศสัมพันธ์ของบุตรสาวก่อนวัยรุ่นเพื่อพยายามลดพฤติกรรมเสี่ยงของวัยรุ่น กลุ่มตัวอย่างเป็นมารดาและบุตรสาวก่อนวัยรุ่นของโรงเรียนประถมศึกษาในกรุงเทพมหานคร ประเทศไทย โดยกลุ่มทดลอง (37 คู่) ได้รับบทเรียน 1 บทเรียนทุกสัปดาห์ติดต่อกันเป็นระยะเวลา 5 สัปดาห์ของโปรแกรมการสอนการสื่อสารเรื่องเพศระหว่างมารดากับบุตรสาว ส่วนกลุ่มควบคุม (40 คู่) ไม่ได้รับโปรแกรม ในการเก็บข้อมูลของมารดาและบุตรสาวก่อนวัยรุ่นใช้เครื่องมือวิจัย 8 ฉบับ โดยเก็บข้อมูลก่อนได้รับโปรแกรม สัปดาห์ที่ 5 หลังได้รับโปรแกรมทันที และ 1 เดือนหลังสิ้นสุดโปรแกรม วิเคราะห์ผลการวิจัยโดยใช้ Generalized Estimating Equations

ผลการศึกษาพบว่า มารดาในกลุ่มทดลองมีทัศนคติด้านบวก การรับรู้ความสามารถของตนเอง และความตั้งใจในการสื่อสารเรื่องเพศหลังได้รับโปรแกรม 1 เดือน และพฤติกรรมการสื่อสารเรื่องเพศของมารดาหลังได้รับโปรแกรมทันทีสูงกว่ากลุ่มควบคุม แต่พบว่าบรรทัดฐานทางสังคมของมารดา และความตั้งใจละเว้นเพศสัมพันธ์ของบุตรสาวไม่มีความแตกต่างกันระหว่าง 2 กลุ่ม ผลการวิจัยนี้มีข้อเสนอแนะว่าโปรแกรมนี้ควรจะมีการนำไปทดสอบและพัฒนาปรับเปลี่ยนต่อไปเพื่อส่งเสริมสุขภาพของวัยรุ่น

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