

Changes Before and After a Life-Skills Sexuality Education Program for Middle-School Students in Korea : A Longitudinal Study

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Abstract

This study aimed to assess the efficacy and long-term effectiveness of life skills–based sexuality education programs by comparing the experimental and control groups before (Pretest), immediately after (Post-test 1), and one year after (Post-test 2) the implementation of the program. The participants were first-year middle-school students in Seoul, South Korea. Data were collected from 500 adolescents, and statistical analyses including the independent t-test, χ^2 -test, and repeated measures analysis of variance were conducted. The results from the Pretest, Post-test 1, and Post-test 2 indicated that the experimental group scored significantly higher than the control group in terms of sexual and reproductive health knowledge, life-skill levels, and sexual health attitudes. This study demonstrated that the life skills-based sexuality education program was substantially more effective and provided long-term benefits compared general sexuality education. However, as the test scores declined after one year, it is recommended to offer supplemental courses every semester to maintain the effectiveness of the program.

Keywords: *Adolescents, Sexuality Education, Program, Middle School*

INTRODUCTION

During the 21st century information technology era, the rapid circulation of various forms of mass media has brought about significant changes in the way sex-related information is access. As a result, adolescents are increasingly exposed to a range of sex-related challenges, including false information, inappropriate conversations, and instances of digital sexual violence (illegal distribution or nonconsensual capturing of sexual or intimate images) (Ministry of Education, 2019). Inadequate sexual education and the absence of protection during sexual encounters can lead to teenage pregnancy and the contraction of sexually transmitted diseases, such as HIV, especially among middle-school students (Sa et al., 2021). Therefore, implementing comprehensive sexuality education in schools at this stage becomes an essential preventive measure.

The Youth Online Survey indicated that the rates of sexuality education among middle-school students have been increasing over the years (68.3% in 2006, 76.5% in 2010, 78.7% in 2016, and 79.9% in 2022). However, along with this rise in education, there has also been an increase in the rates of sexual relationship experiences among these students (2.2% in 2006, 2.5% in 2010, and 3.0% in 2022). Additionally, the age at which they start engaging in sexual relations is progressively decreasing (Korea Centers for Disease Control and Prevention, 2022). For instance, Lee (2015) reported that girls had a high rate of sexuality education at 97.5%, but their level of sexual knowledge was considerable low at 68%. These girls were found to be vulnerable when it came to coping with sexual problems, and there was no expectation that the school would enhance their knowledge in this area.

The Ministry of Education (2021) in South Korea endorses the compulsory requirement of at least 15 hours of sexuality education in middle schools, which includes relevant curriculum and creative experiences. Therefore, health teachers and tutors provide annual sexuality education to students. However, there is a noticeable gender imbalance among instructors, with a majority being women, and the significant age difference between teachers and students hinders effective education. These obstacles highlight the challenges in providing sexuality education, as it requires a deep understanding of youth sex culture and values (Lee, 2014).

Furthermore, middle-school students face challenges in adapting to psychological, social, and environmental

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changes, as well as physiological changes associated with adolescence (such as menstruation and nocturnal emissions). These challenges can contribute to low self-esteem, which in turn can lead to unhealthy behaviours such as smoking, drinking, and engaging in sex-related problems. In a three-year longitudinal study of first-year Japanese middle-school students, Song *et al.* (2012) found that lower self-esteem scores, higher social skills, and elevated aggressive behaviour scores in the first grade significantly increase the risk of sexual experiences when students reach the third grade. As society evolves, it is important to recognize that youth sexuality is not a simple issue but rather a complex combination of factors, including smoking, drinking, and exposure to pornography.

Therefore, it is recommended to implement life skills-based sexuality education to improve adolescents' self-esteem, develop their sexual identity, and foster their knowledge, skills, and values regarding sex and reproductive health (Lee & Lee, 2019). Despite the demonstrated benefits of school curricula-based sexuality education, children and younger generations often struggle to exhibit responsible behaviour or make informed decisions about their sexual relationships due to a lack of accurate gender-related information (UNESCO, 2018). Consequently, it is necessary to provide sexuality and psychosocial education to 21st-century youths, who are grappling with self-perception issues, as this would strengthen their critical thinking and decision-making skills. Sexual health education is essential for equipping students with the necessary knowledge and abilities to establish healthy relationships, understand their sexual development, and avoid harmful actions (Rose *et al.*, 2019). Interactive education with guidance enables students to express their opinions through discussions and brainstorming sessions, improving their understanding of their peers' perspectives.

Existing research has examined the effects of sexual health education intervention programs in middle schools. These programs include an audio-visual sexual health education program (Kim, 2000), a preventive program addressing sexual health education and sexual violence for middle-school students (Yoon *et al.*, 2009), and life skills-based sexual health education for female adolescents only (Lee & Lee, 2019; Song & Lee, 2018). However, studies on the long-term effects of this education are limited, as previous research has primarily focused on short-term outcomes. Conducting continuity research can help estimate and determine the necessary duration of sexual health education and provide crucial data for the development of effective sexual health education policies.

This study implemented a life skills-based sexuality education program for the experimental group, while the control group received general sexuality education. The program targeted 12-year-old students in their first year of middle school. The study compared the scores of life skills, sexuality knowledge, and sexual attitudes at specific times between the two groups. Both groups covered identical sexuality education topics. The experimental group received instruction from a teacher trained in life skills-based sexuality education, while the control group was taught by an untrained health teacher. Our hypotheses were as follows:

Hypothesis 1: The life skill scores of the experimental group receiving life skills-based sexual health education and the control group receiving general sexuality education would differ.

Hypothesis 2: There would be a difference in sexual knowledge between the experimental and control groups.

Hypothesis 3: There would be a difference in sexual attitudes between the experimental and control groups.

METHODS

Research Design

This research was a non-equivalent control-group pretest–post-test study that compared pretest and post-test sessions twice. The design of the study involved dividing participants into two groups: the experimental group, which received life skills-based sexuality health education, and the control group, which received general sexuality health education (Figure 1).

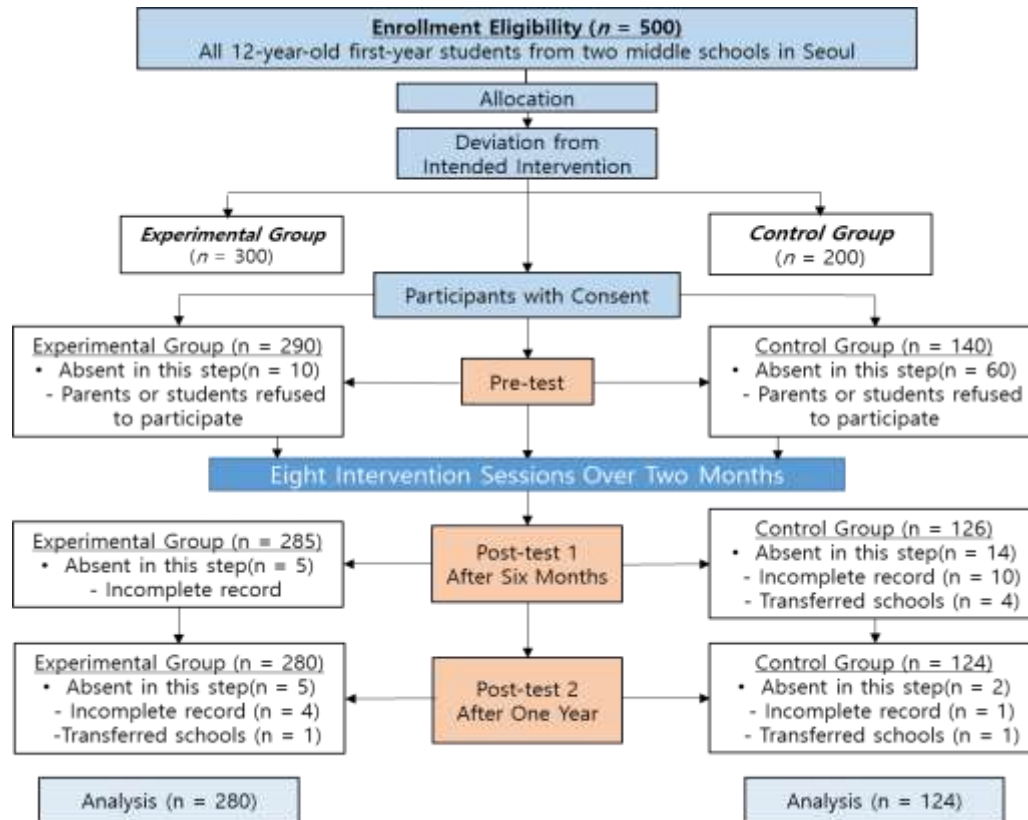


Figure 1. Participant Selection Flow Chart & Desing of This Study

Participants

The participants in this study were first-grade students from two public middle schools located in the S metropolitan zone. The researchers selected two schools in the same region with similar school districts to ensure homogeneity and prevent information exchange. The selection process included obtaining written agreements from both the school’s legal representatives and the parents of the participating students. Students who did not submit the required written agreements, had difficulties with communication, or had a language or developmental disorder were excluded from the study.

First-grade middle-school students were selected as participants so that researchers could observe them longitudinally. Moreover, researchers believed that these students would experience less stress about entering a superior school compared to those in the second or third grade. Therefore, the intervention program with a preventive focus would be suitable for first-grade middle-school students (Song & Lee, 2018).

The survey was distributed among 500 students (experimental group, n = 300; control group, n = 200). A total of 404 copies (80.8%) were collected (experimental group, n = 280, 93%; control group, n = 124, 62.0%). The G*Power 3.1 program was used to determine the sample size, dividing the students into groups based on repetitive measurement and variance analysis. The discrimination variable was set at 3, with an effect size of 0.15, a significance threshold of 0.05, and a power of 0.95. The minimum sample size required was 196 participants. To meet this requirement, a complete enumeration was conducted, resulting in a total of 404 sample participants.

Instruments

The content validity index (CVI) of the questionnaire was verified by ten experts, consisting of sexual health education instructors, education professors, nursing professors, and sexual health education scholars who have experience in middle-school sexual health education. The objective was to validate the overall

characteristics of the survey and the variables related to sexual health education. Each question was evaluated on a scale ranging from 'not appropriate at all' (1 point) to 'very appropriate' (4 points). All questions achieved a CVI of 0.89. The specific details of the questionnaire are summarized below.

General Characteristics

The five general participant characteristics included gender, subjective school grades, economic status, school-based sexuality education experience, and home-based sexuality education experience.

Life Skills

The life skills level was assessed through 40 questions, which were divided into five sub-regions: self-esteem, problem-solving, interpersonal skills, decision-making, and goal-setting. The 20 questions related to self-esteem and problem-solving were adapted from the self-concept questionnaire tools developed by Cho *et al.* (2011). The remaining 20 questions on interpersonal, decision-making, and goal-setting were adapted using the method proposed by Song *et al.* (2012). Participants responded to each question using a 4-point Likert scale, ranging from 1 ('not at all') to 4 ('extremely'), for each sub-region. Cronbach's alpha values for self-esteem and problem-solving were 0.89 and 0.84, respectively.

Sexual Knowledge and Attitude

After analysing the learning goals and textbook contents for each subject, researchers developed a set of 20 questions on sexual knowledge and 13 questions on sexual attitude, which were validated by experts. The answers for sexual knowledge questions were 'correct' (1 point), 'wrong' (2 points), or 'unknown' (3 points). Sexual attitude was assessed using a Likert scale ranging from 1 ('not at all') to 4 ('very much'), with a total of 13 questions. The Cronbach's alpha coefficient for this study was calculated to be 0.76. In terms of sexual attitude, higher scores indicated better coping with sex.

Implementation of a Life Skills-Based Sexual Health Education Program

Sexual education classes were conducted eight times from May to early July 2017 for the 12-year-old first-year students in both the experimental and control groups. The curriculum was divided into chapters focusing on self-esteem, interpersonal relations, self-assertion, critical thinking, and problem-solving. To promote cooperation, students engaged in activities such as brainstorming and mind map activities (Table 1).

Table 1. Life Skills-Based Sexuality Education Program Details

Sector	Session (week)	Contents			
		Topic	Purpose	Educational activity	Key skills
Self-esteem	1	Body/mind during puberty	Orientation; Understanding life skills; Body/mind health.	Create a mind map through group brainstorming and discussion	Self-esteem; Decision-making; Communication
	2	Body/mind changes during puberty	Ask questions regarding body and mind changes during puberty; Understand individual and gender differences in body changes during puberty; Discuss positive lifestyles.	Questions about puberty symptoms through group discussion	Self-esteem; Interpersonal relationships; Stress coping;
Interpersonal relationships	3	Using accurate sexual health information	Describe advantages and disadvantages of various information sources about the body and mind; Select and use reliable sources.	Consider reliable sources through brainstorming and group discussion	Decision-making; Critical thinking; Self-efficacy
	4	Healthy relationships with the opposite gender	Exercise self-determination by learning how to communicate; Self-assertive communication is useful should be recognized and applied.	After reading the scenario, discuss and present the relationship between boys and girls. Apply the Stop-Think-Go method.	Interpersonal relationships; Decision-making; Self-assertiveness; Critical thinking
Self-assertiveness	5	Preventing risky sex behaviour	Learn and apply decision-making skills (Stop-Think-Go) in various scenarios.	After reading the situation, discuss and present risk level evaluations	Decision-making; Critical thinking; Self-assertiveness;
	6	Refusing propositions	Practice self-assertive communication skills through role-playing activities for refusing temptation.	Roleplay; Apply the Stop-Think-Go method	Critical thinking; Decision-making; Refusal

<i>Critical thinking and problem-solving</i>	7	Coping with situational problems	Predict and explain various gender issues relative to the scenario; Correctly cope with situations by applying life skills.	Group discussion; Present situation and problems	Critical thinking; Problem-solving; Decision-making
	8	Considering the future	Build short- and long-term goals to achieve a desired future; Describe risky behaviours that prevent the achievement of goals.	Problem situation activity; Group discussion and presentation; Brainstorming and puzzle games	Self-esteem; Decision-making; Goal-setting

The sexual health instructor at the experimental school had received training in life skills-based sexual health education, whereas the instructor in the control group had not received such training. The former instructor utilized life skills-based sexual health education materials, including textbooks, teacher instructions, educational CDs, and student workbooks (Table 1). In contrast, the latter instructor provided traditional school sexual health education. The training approach for the experimental group included interactive methods such as discussions, role-play, audio-visual materials, brainstorming, and scenarios. In contrast, the control group received lecture-style sexual health education.

Data Collection

This study collected data from the same questionnaire three times over a period of two years. The first questionnaire was collected from April 1 to April 30, 2017. The second questionnaire was collected from July 20 to July 30, 2017, immediately after the completion of the life skills-based sexual health education program. The third questionnaire was administered from July 20 to July 30, 2018, one year after the first.

Data Analysis

The SPSS 25.0 statistical program was employed to assess the survey data with a two-way statistical significance threshold of 0.05. Descriptive statistics were used to analyse general participant characteristics. The normal distribution test for dependent variables was performed using the Kolmogorov–Smirnov test, which confirmed that all variables exhibited a normal distribution. A homogeneity test of the experimental and control groups was conducted through an independent *t*-test and χ^2 test, with the experimental and control group variables as covariates. A repeated measures analysis of variance (ANOVA) test was conducted to determine the efficacy and stability of the program, and the differences between the two control groups were confirmed using an independent *t*-test. Tool reliabilities were calculated using Cronbach’s alpha.

Ethical Considerations

The University Bioethics Review Committee of ** University in the Republic of Korea approved and verified the ethical and scientific validity of this study (IRB NO: 1041078-201703-HRSB-038-01CCC). The researcher visited two middle schools in the S area to explain the purpose of the study to school administrators and obtain permission from the agency’s head. The school health teacher acted as a coordinator and assisted in the investigation and collection of questionnaires. Students and their legal representatives who voluntarily participated were informed that there were no benefits or disadvantages to participating in this study and then a small gift was given to those who responded. The legal representative’s consent was sent to all families as part of a family correspondence, and the legal representative only explained the purpose of the study to those who provided written consent. Questionnaires were sealed in large envelopes, and students were required to answer the questions themselves to enhance the reliability of the study. Each student then resealed the questionnaire in a large envelope and returned it to the coordinator.

RESULTS

Results of Homogeneity Test in Relation to Demographic Characteristics

Table 2. Demographic Characteristics of the Experimental and Control Groups.

Variables	Categories	Total	Exp	Cont	χ^2	<i>p</i>
		(<i>n</i> = 404)	(<i>n</i> = 280)	(<i>n</i> = 124)		
		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)		

<i>Gender</i>	Male	209 (51.7)	141 (50.4)	68 (54.8)	0.69	0.406
	Female	195 (48.3)	139 (49.6)	56 (45.2)		
<i>School record</i>	High	137 (33.9)	104 (37.1)	33 (26.6)	4.80	0.090
	Average	237 (58.7)	158 (56.4)	79 (63.7)		
	Low	30 (7.4)	18 (6.4)	12 (9.7)		
<i>Perceived economic status</i>	High	132 (32.8)	103 (36.9)	29 (23.4)	8.62	0.130
	Average	266 (66.0)	174 (62.4)	92 (74.2)		
	Low	5 (1.2)	2 (0.7)	3 (2.4)		
<i>Experience with parent-provided sexuality education</i>	Yes	85 (21.0)	59 (21.0)	26 (21.0)	0.00	0.995
	No	319 (79.0)	221 (79.0)	98 (79.0)		
<i>Experience with school-provided sexuality education</i>	Yes	380 (94.1)	265 (94.7)	115 (92.7)	0.56	0.451
	No	24 (5.9)	15 (5.3)	9 (7.3)		
<i>Whether school sexuality education was helpful</i>	Yes	274 (68.0)	191 (68.5)	83 (66.9)	0.09	0.762
	No	129 (32.0)	88 (31.5)	41 (33.1)		

Exp, experimental group; Cont, control group.

Table 2 presents the results of the homogeneity test results in relation to the general characteristics of the participants. The experimental control groups showed homogeneity in terms of gender, school records, perceived economic status, sexual health education experience at home, sexual health education experience at school, and the perceived helpfulness of sexual health education at school for life. In terms of gender distribution, 51.7% of the participants were male students, while 48.3% were female students. Regarding school records, 58.7% of students had average records, 33.9% had high records, and 7.4% had low records. The survey also revealed that 79.0% of students did not receive sexual health education from their parents at home, while 94.1% received it from school. Furthermore, 68.0% of students reported that school sexual health education was beneficial for their future.

Homogeneity Test for Life Skills, Sexual Knowledge, and Sexual Attitude

The prescores, based on the homogeneity test assessing life skills, sexual knowledge, and sexual attitude were as follows: overall life skill ($t = 2.82, p = 0.005$), interpersonal skill ($t = 2.92, p = 0.004$), decision-making skill ($t = 4.14; p < 0.001$), and sexual attitude ($t = 3.34, p = 0.001$). Variables that showed significant differences were analysed with covariates.

Results of the Test on the Efficacy of the Life Skills-Based Sexuality Health Program

The test results supported Hypothesis 1. The overall average life skills scores varied significantly between the experimental and control groups (experimental, $F = 14.96, p < 0.001$; control, $F = 6.70, p = 0.002$; Table 3 and Figure 2). In addition, there was a difference in the pattern of change. The life skills score for the experimental group was 3.21 before the training. This score did not change immediately after training but significantly decreased to 3.11 in the follow-up survey one year later. On the other hand, the control group's life-skill scores significantly decreased from 3.10 before training to 3.01 immediately after, and further dropped to 3.00 a year later. The t -test results indicated that the experimental group consistently scored significantly higher than the control group at all points (Pretest $t = 2.82, p = 0.005$; Post-test 1, $t = 4.73, p < 0.001$; Post-test 2, $t = 2.41, p = 0.017$).

Table 3. Repeated measure ANOVA of variables associated with Life Skills, Sexuality Knowledge, and Sexuality Attitude.

Variables	Categories	Pretest	Post-test 1 ^b	Post-test 2 ^c	F	p
		Mean \pm SD	Mean \pm SD	Mean \pm SD		

Total life-skills score	Exp	3.21 ± 0.37 ^a	3.21 ± 0.43 ^a	3.11 ± 0.39 ^a	14.96	< 0.001
	Cont	3.10 ± 0.37	3.01 ± 0.35	3.00 ± 0.41	6.70	0.002
Self-esteem	Exp	3.30 ± 0.44	3.26 ± 0.48 ^a	3.13 ± 0.47	33.70	< 0.001
	Cont	3.25 ± 0.43	3.12 ± 0.44	3.05 ± 0.46	19.68	< 0.001
Problem-solving	Exp	3.02 ± 0.44	3.06 ± 0.48 ^a	2.92 ± 0.44	16.27	< 0.001
	Cont	2.95 ± 0.43	2.85 ± 0.44	2.84 ± 0.46	4.69	0.012
Interpersonal relationships	Exp	3.38 ± 0.44 ^a	3.33 ± 0.50 ^a	3.27 ± 0.45	7.52	0.001
	Cont	3.24 ± 0.43	3.18 ± 0.39	3.19 ± 0.47	1.20	0.298
Decision-making	Exp	3.25 ± 0.44 ^a	3.23 ± 0.53 ^a	3.21 ± 0.60 ^a	1.01	0.362
	Cont	3.06 ± 0.52	2.98 ± 0.53	3.05 ± 0.52	1.56	0.212
Goal-setting	Exp	3.11 ± 0.53	3.15 ± 0.61 ^a	3.03 ± 0.55 ^a	6.26	0.002
	Cont	3.02 ± 0.50	2.92 ± 0.53	2.89 ± 0.56	3.75	0.025
Sexuality knowledge	Exp	9.28 ± 5.96	15.96 ± 5.10 ^a	14.86 ± 5.58 ^a	169.67	< 0.001
	Cont	10.42 ± 5.37	13.77 ± 6.20	12.64 ± 5.82	19.80	< 0.001
Sexuality attitude	Exp	3.24 ± 0.37 ^a	3.37 ± 0.40 ^a	3.25 ± 0.40 ^a	16.10	< 0.001
	Cont	3.12 ± 0.35	3.17 ± 0.36	3.13 ± 0.34	1.06	0.348

Exp, experimental group; Cont, control group; ANOVA, analysis of variance.

^aThe *t*-test result indicates a significant difference between the experimental and control groups. ^bPost-test 1, immediately after the completion of intervention trials; ^cPost-test 2, one year after the completion of intervention trials.

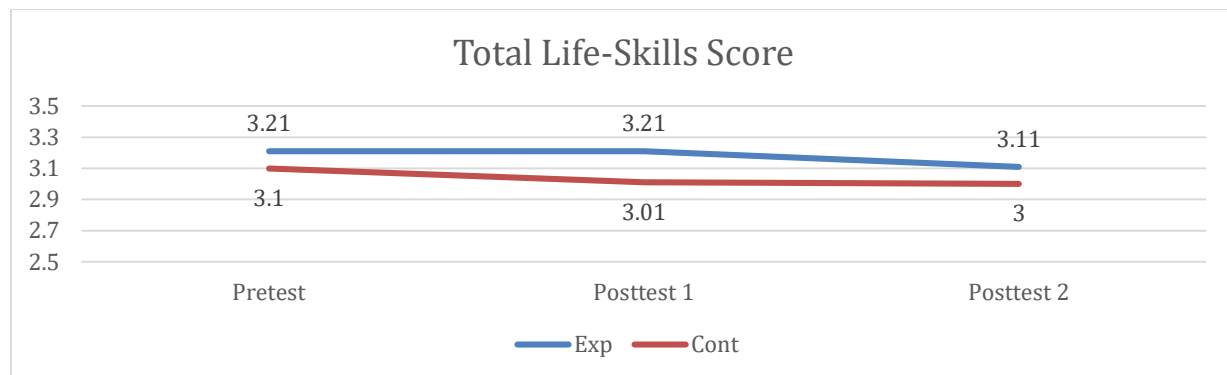
When considering life skills, self-esteem showed significant changes in both groups (experimental, $F = 33.70$, $p < 0.001$; control, $F = 19.68$, $p = 0.002$) and decreased considerably over time. The *t*-test at each point revealed significant differences in the survey immediately after the program, with the experimental group scoring higher than the control group ($t = 2.39$, $p = 0.017$). Problem-solving ability also exhibited notable changes in both groups (experimental, $F = 16.27$, $p < 0.001$; control, $F = 4.69$, $p = 0.012$). The scores of the experimental group increased immediately after the program but decreased a year later; in comparison, the control group scores decreased over time. The *t*-test at each point indicated significant differences in the follow-up immediately after the program, with higher scores in the experimental group than the control group ($t = 3.66$, $p < 0.001$). Only the interpersonal relationship scores of the experimental group significantly changed ($F = 7.52$, $p = 0.001$).

The *t*-test conducted at each point revealed significant differences between the presurvey and postsurvey immediately following the program, with higher scores in the experimental group compared to the control group (Pretest, $t = 2.92$, $p = 0.004$; Post-test 1, $t = 3.56$, $p < 0.001$). No changes over time were identified for decision-making in either group. Furthermore, the *t*-test results at each time point indicated significant differences, with higher scores in the experimental group compared to the control group (Pretest, $t = 4.14$, $p < 0.001$; Post-test 1, $t = 4.51$, $p < 0.001$; Post-test 2, $t = 2.49$, $p = 0.013$). Both groups experienced changes in setting targets (experimental, $F = 6.26$, $p = 0.002$; control, $F = 3.75$, $p = 0.025$). The scores of the experimental group scores increased immediately after the program but decreased a year later, whereas the scores of the control group decreased over time. The *t*-test conducted at each point established significant differences between the post-tests immediately after the program and one year later, demonstrating higher scores in the experimental group compared to the control group (Post-test 1, $t = 3.89$, $p < 0.001$; Post-test 2, $t = 2.27$, $p = 0.024$).

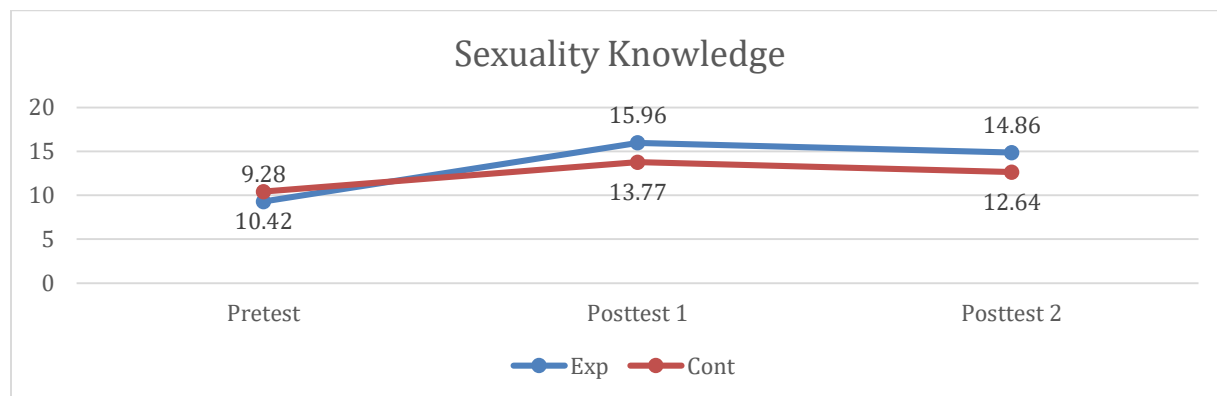
Hypothesis 2 was also validated. Sexual knowledge in the experimental group increased from 9.28 before education to 15.96 immediately after (Table 2). However, this score decreased from 15.96 to 14.86 a year later. Control group scores increased from 10.42 before education to 13.77 immediately after but dropped to 12.64 a year later (Figure 2). Sexual knowledge significantly changed in both groups (experimental, $F = 169.67$, $p < 0.001$; control, $F = 19.80$, $p < 0.001$). Scores in both groups rose immediately after the program but decreased a year later. The *t*-test at each point revealed significant differences between the post-tests immediately after

the program and a year later, indicating higher scores in the experimental group than in the control group (Post-test 1, $t = 3.71, p < 0.001$; Post-test 2, $t = 3.65, p < 0.001$).

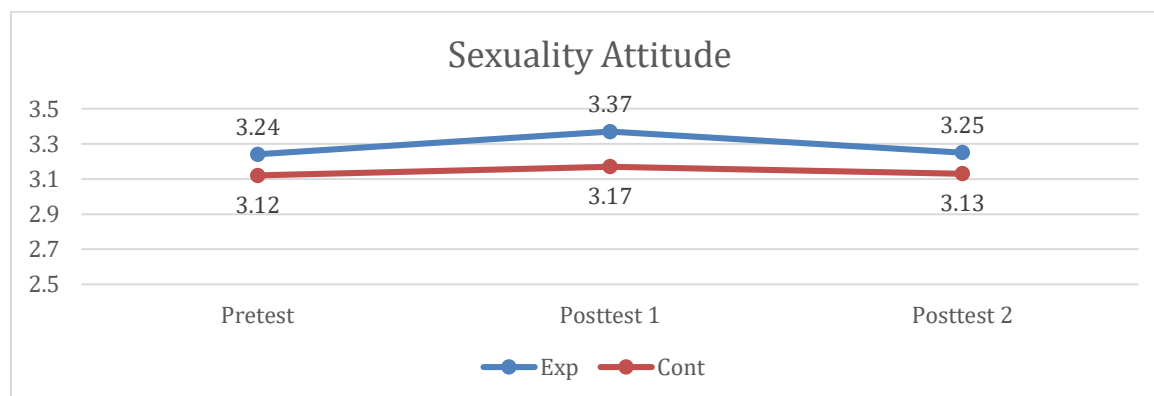
Lastly, Hypothesis 3 was confirmed. Significant changes in sexual attitude were only observed in the experimental group (Table 2; $F = 16.10, p < 0.001$). Scores initially increased after the program but declined after one year (Figure 2). The experimental group consistently scored higher than the control group, with noticeable differences at all time points (Pretest, $t = 3.34, p = 0.001$; Post-test 1, $t = 4.70, p < 0.001$; Post-test 2, $t = 2.86, p = 0.005$).



Exp, Experiment; Cont, Control



Exp, Experiment; Cont, Control



Exp, Experiment; Cont, Control

Figure 2. Changes in Life Skills, Sexuality Education, and Sexuality Attitude by Period

Pre, testing before intervention; Post 1, testing immediately after the completion of intervention trials; Post 2, testing one year after the completion of intervention trials; Exp, experimental group; Cont, control group.

DISCUSSION

This research conducted a longitudinal study to determine the effectiveness and long-term impact of a sexual education program in providing life skills, sexual knowledge, sexuality, and sexual risk education before, immediately after, and one year after its implementation. The participants were first-grade students from two middle schools in the metropolitan area. The main objective of this study was to address the limitations of existing sexual health education programs and establish a new approach based on life skills. Of note, the Ministry of Education's guidelines (2021) recommend 15 hours of sexual health education per year. However, since sexual health education is currently only provided once at the end of the school year, this study aimed to determine the long-term effectiveness of such education.

This study establishes a scientific basis for adjusting the timing and duration of sexual health education. In addition, the effectiveness and long-term viability of life skills-based sexual health education programs are best achieved through a learner-centred education method combining life skills and sexual health education. This approach empowers students to develop self-management skills.

This study identified differences in life skills, including self-esteem and persistence, which were higher in the experimental group compared to the control group. In terms of self-esteem among subregions, there was a noticeable contrast between the experimental and control groups. Specifically, while the control group's life skills scores decreased in the follow-up immediately after the program, the experimental group exhibited relatively small decreases and even increases in several life skills. These results support the effectiveness of this program's efficacy in preventing the decline of adolescent life skills. It is crucial to review the key skill differences in the program and consider student satisfaction when interpreting differences in changes in life skills.

On the other hand, a follow-up survey conducted one year after the program indicated a significant decrease in life skills scores for the experimental group. Unfortunately, the reason for this decline was not clear, and it is necessary to expand and further review the program's scope. However, implementing a booster session could enhance the program's effectiveness and prevent this decline. Previous studies evaluating life skills programs have emphasized the importance of booster sessions in maintaining the impact of early sessions and extending their long-term effects (Botvin et al., 1983; Botvin & Griffin, 2004). Botvin *et al* (1995) reported that the most effective approach involved three years of education, with one year dedicated to a basic course and the following two years including booster sessions. Studies on school-based life skills programs, specifically in relation to drug abuse prevention, suggest that these programs should also include booster sessions over a two-year period. Therefore, the design of this program should consider providing basic sex education to students in their first year of middle school and conducting booster sessions every six months for students in their second and third years.

Self-esteem is generally stable but declines during puberty (Huang, 2010; Robbins & Trzesniewski, 2005). There are several reasons for this decline, including physical factors (such as the development of secondary sex characteristics, rejection, and conflict due to changes in appearance) and environmental factors (such as advancing to a higher school level) (Kato, 2018). The development of abstract thinking and self-awareness are the main factors that impact self-esteem. Harter (1998) found that adolescents in this period often experience psychological turmoil, confusion, and depression due to conflicting aspects of themselves. In addition, self-reflection increases as abstract thinking develops. Considering their strong correlation with self-esteem, a decline in other life skills is also expected (Japanese Know Your Body, JKYB, 2010).

This study was the first to design a program for preventing risky sexual behaviour in youth by improving self-esteem and other life skills. Furthermore, the effectiveness of the program was evaluated using a quasi-experimental research design. Although significant improvements in sexual knowledge were observed in the first and second post-tests, there was no difference between the experimental and control groups in the pretest. This observation is consistent with the findings reported by Song and Lee (2018) in their study on middle-

school girls. Proper sexual knowledge is crucial for adolescent sexual health and influences their engagement in healthy sexual practices (Min et al., 2006). The higher sexual knowledge scores observed in the experimental group compared to the control group verified the efficacy of this program. Therefore, this program is more effective in imparting sexual knowledge compared to traditional lecture-based classes, although further studies are necessary to determine its overall effectiveness.

The experimental group achieved a higher sexual attitude score compared to the control group, likely because sexuality is connected to self-esteem. Sexual attitude plays a significant role in predicting individual sexual behaviour, and an unhealthy sexual attitude negatively affects the mental health development of adolescents. Sexual attitudes, especially those formed during puberty, shape attitudes towards sexuality throughout one's life (Park, 2017). In this study, it is possible that the high self-esteem of the experimental group influenced their sexual attitude scores. In addition, receiving sexual knowledge (Oh, 2008) and sexual health education (Im & Park, 2014) affects sexual attitudes, which positively impacts the validity of life skills-based sexual health education or sexual attitude in the experimental group. However, since the experimental group already had high sexual attitude scores during the preliminary investigation, it is challenging to conclude that this was solely due to the effectiveness of the program. Therefore, additional research is necessary to verify these findings regarding the impact of life skills-based sexual health education on sexual attitudes.

LIMITATIONS

A limitation of this study was that it only focused on two middle schools in a single region called Seoul, which restricts its generalization. Furthermore, due to the sensitive nature of the research topic as sexuality. It remains unclear how candidly participants responded. In addition, the experimental and control groups consisted of a limited number of participants from each school. Moreover, since this study observed the long-term effects of only one sexual health education program, it is necessary to conduct iterative studies to examine the long-term impact of sexual health education. Lastly, some of the life skills of the experimental group were already higher than those of the control group, which poses a challenge in ensuring homogeneity. Therefore, the differences observed in this study cannot be solely attributed to the proposed program, and additional research at different schools is needed to ensure the long-term effectiveness of the program.

CONCLUSION

The proposed life skills-based sexual health education program was found to be more effective and enduring compared to general sexual health education. However, a year after the program was implemented, there was a decrease in the life skills scores, indicating that the program's long-term sustainability has limitations. Therefore, it is recommended to include booster sessions to prolong the program's impact.

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Conflict of Interest

The authors declare no conflicts of interest.

Author Contributions

All authors designed the research, collected data, analyzed the data, wrote the manuscript, edited the manuscript, and approved the final manuscript.

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