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Effects of a Nurse's Support for the Adolescent-led HIV/AIDS Sexual Transmission Prevention Program using Social Media

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Abstract

In 2019, 1.1 to 2.4 million adolescents between the ages of 10 and 19 were living with HIV worldwide. In Thailand, there were approximately 5,400 new HIV cases among children and adolescents between the ages of 10 to 19 as a result of unprotected sex. This study, using 2-group pretest-posttest and repeated measures quasi-experimental design, examined the effects of the nurse's support for the adolescents-led HIV/AIDS sexual transmission prevention program using social media on behavioral intention and perceived effectiveness of HIV/AIDS preventive behaviors among adolescents with HIV/AIDS. The study was conducted from April 2016 to July 2017. Purposive sampling was performed to recruit 70 adolescents with HIV/AIDS. The data were collected before day 1 and after receiving the program on days 15 and 30. The program and questionnaires were validated by 3 experts. The reliabilities of the behavioral intentions and perceived effectiveness of HIV/AIDS preventive behaviors questionnaires were examined, yielding Cronbach's alpha coefficients of 0.80 and 0.96 respectively. Data were analyzed using a Friedman-test, a Wilcoxon matched-pairs signed-rank test, and a Mann-Whitney U-test. Results revealed that there were significant differences in the overall mean ranks of behavioral intention and perceived effectiveness of HIV/AIDS preventive behaviors at the baseline, on days 15 and 30 in the experimental group ($p < 0.001$) whereas there were no significant differences in the control group ($p > 0.05$). There were significant differences in the mean ranks of behavioral intention and perceived effectiveness of HIV/AIDS preventive behaviors measured on days 15 and 30 between the control and experimental groups ($p < 0.001$). Thus, nurses implementing a social media program for adolescents with HIV/AIDS may have a significantly positive impact on sexual transmission prevention.

Keywords: Adolescent leader, Adolescents with HIV/AIDS, HIV/AIDS prevention, Nurse's support, Social media

Introduction

In 2019, there were between 1.1 to 2.4 million children and adolescents ages 10 to19 living with HIV worldwide [1]. In Thailand, there were 170,000 children and adolescents between the ages of 10 and 19 with HIV infection [1]. Young people between the ages of 10 to 24 were newly infected with HIV around 460,000 of whom 170,000 were adolescents between the ages of 10 and 19 [1]. A literature review was conducted from UNICEF in July 2019. The search found that in Thailand, around half of the new HIV infections occurred among adolescents between the ages of 10 and 19, around 5,400, because of unprotected sex [1]. Approximately 26 % of the adolescents contracted HIV/AIDS infection from

unprotected sexual transmission [2-4]. Furthermore, an assessment of adolescents with HIV/AIDS found that misconceptions of beliefs, attitudes, and factors associated with sexual risk behaviors were associated with higher transmission among this population [5]. For example, first-time intercourse does not transmit HIV/AIDS, or having sexual intercourse without ejaculating inside the vagina does not transmit HIV/AIDS [6]. Compounding risk related to beliefs is that all adolescents have a desire to have an intimate relationship. Adolescents infected with HIV/AIDS by their mothers are not different in their desires and can have the same misconceptions about transmission of HIV/AIDS. There were several studies on behavioral evaluation in adolescents. For example, there was a study in Tanzania [7] about perceived behavior control and intention to use condoms among adolescents. The result showed that 49.7 % of adolescents did not use a condom the last time they had sexual intercourse and 49.8 % of them had multiple sex partners. Thus, these behaviors have placed adolescents at high risk for HIV/AIDS transmission.

These findings have led to a goal by Thailand's Department of Disease Control, Ministry of Public Health is to reduce new HIV infections from sexual transmission by two-thirds and to implement strategies for 0 new HIV infections [2]. Specifically, safe sex behavior assessment has been added as an indicator to measure outcomes in clinic patients with HIV/AIDS. In Thailand, the nurse is still the main person who drives the health system as their role includes educator, supporter, facilitator, etc. [8]. Moreover, reviews of the literature have illustrated that not only nurses but also peer groups or peer leaders are a strong point and serve as powerful reinforcements prevention programs. Their strong point is related to peers as a source of acceptance and comfortableness for receiving information and relating to information provided by persons of the same age group [9].

Thus, the development of the HIV/AIDS prevention program for adolescents with HIV/AIDS needs to use a mix of strategies in both the nurse's role and peer leaders to achieve the goals. Not only are adolescents influenced by their peers, but technology nowadays has become a massive influencing factor on adolescents also. Because the development of adolescents (aged 10 - 19 years) is the most challenging time of one's life and with today's adolescents, who are born between 1995 - 2012 and known as generation Z, are noted for being the generation to be influenced by communication technologies such as emails, mobile phones, text messaging, and social networking sites [11]. Because of the National Strategy and Thailand 4.0 policy in terms of science and technology, research, and innovation, this study was undertaken using technology integrated with nursing care [12]. Thus, the development of the program in this study was based on the TPB theory. The theory of Planned Behavior (TPB) identifies the specific constructs that predict behavior beyond behavioral intentions and perceived behavioral control, related to behavioral change [10]. TPB was able to explain the behavior which is determined by intentions, attitudes, subjective norms, and wherein perceived behavioral control and behavioral intentions predict behavior [10]. In addition to TPB, the leadership skills of adolescent leaders, and adolescent development. Besides, creating an application and various media via Facebook, the researcher applied the uses and gratification theory to create all media used in the program to be most attractive for adolescents.

Therefore, the aim of this study was to examine the effects of a nurse's support for the adolescents-led HIV/AIDS sexual transmission prevention program using social media on behavioral intention and perceived effectiveness of HIV/AIDS preventive behaviors among adolescents with HIV/AIDS. By adolescents with HIV/AIDS who led and drove the HIV/AIDS sexual transmission prevention program via Facebook with a nurse as a supporter.

Objectives of research

To compare behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior among adolescents with HIV/AIDS before, and after receiving the nurse's support for the adolescents-led HIV/AIDS sexual transmission prevention program using social media on days 15 and 30.

To compare behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior among adolescents with HIV/AIDS who receive the nurse's support for the adolescents-led HIV/AIDS sexual transmission prevention program using social media and those who

do not receive the nurse's support for the adolescents-led HIV/AIDS prevention program using social media before and after the intervention on days 15 and 30.

Research hypotheses

Mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior among adolescents with HIV/AIDS after receiving the nurse's support for the adolescents-led HIV/AIDS sexual transmission prevention program using social media on days 15 and 30 are higher than those of before receiving the nurse's support for the adolescents-led HIV/AIDS prevention program using social media.

Mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior among adolescents with HIV/AIDS who received the nurse's support for the adolescents-led HIV/AIDS sexual transmission prevention program using social media are higher than those of who do not receive the nurse's support for the adolescents-led HIV/AIDS prevention program using social media on days 15 and 30.

Materials and methods

Establishment of an application and various media via Facebook

All the media used in this program were developed from the focus groups, adolescent social development, and review of related literature. The media selection was created based on the uses and gratifications theory. The contents of the media built the consistent core concepts which were made up of short films, an animation about using male/female condoms, videos, and posters. The uses and gratifications theory identified the needs to use media and distinguished these needs into 5 general categories consisting of cognitive needs, affective needs, personal integrative needs, social integrative needs, and tension free needs [13]. Firstly, cognitive needs, in terms of HIV/AIDS knowledge content with animation cartoon was created. Secondly, affective needs, often characterized by rapidly fluctuating emotions [14], were, in this study, measured by using picture posts for relaxation and shared ideas of interest. Thirdly, personal integrative needs, short film VDO, and music were applied to build inspiration and the self-esteem of adolescents with HIV/AIDS to prevent HIV/AIDS transmission to others. Fourthly, social integrative needs, adolescent leaders to chat, share and conduct individual chats with the adolescents within the HIV/AIDS group were used to keep social contact and continuously communicate with friends in the group. Lastly, tension-free needs, negotiation skills with short film VDOs that show situations where adolescents are using negotiation skills were applied and they then assigned group members to act and share ideas. The program was implemented via Facebook. Face validity of the program was performed by 3 experts. The experts consisted of 1 pediatrician whose expertise was in HIV/AIDS care in children from Maharat Nakhon Si Thammarat Hospital and 1 nursing instructor who had expertise in program development using information technology from the Faculty of Nursing, Prince of Songkla University. The other expert was a practice nurse who had expertise in HIV/AIDS care from Nakhon Si Thammarat Provincial Public Health Office. These experts validated the contents of the program consisting of content relevance, content repetition, and content clarification of the program and all media used in the study. Afterward, the researcher revised the program based on the comments and suggestions of the experts

Design

This study employed a quasi-experimental, 2-group pretest-posttest, repeated measures design.

Sample and setting

The sample consisted of 70 adolescents with HIV/AIDS at a pediatric outpatient HIV/AIDS clinic of a tertiary hospital in the south of Thailand. The inclusion criteria for adolescents were: 1) aged 12 to 19 years old diagnosed with HIV/AIDS by a pediatrician at stage N or stage A, 2) the adolescent has known about their status for at least 3 months, 3) the laboratory results showed that CD4 > 350 cells/mm^3 and Viral Load < 40 copies/mL, 4) drug adherence > 95 % per 3 months, 5) able to communicate, listen, read,

and write in Thai language, and 6) can use the internet (Facebook) and has access via a computer or smartphone. Exclusion criteria were: 1) the samples who cannot continuously attend the program, and 2) the samples developed HIV/AIDS greater than stage C during the study. In this study, no adolescents were excluded. The sample size was estimated based on the previous study [15]. The effect sizes (Eta^2) were calculated with the free statistics calculators on the internet. Based on the power = 0.80, alpha = 0.05, the eta-square (Eta^2) was 0.13; thus, the sample size was 30 per group [16]. However, to prevent sample size dropout of 10 % [17], the sample size was 35 per group. Thus, the total sample size was 70. Sampling and allocation (**Figure 1**): A purposive sampling was used to recruit 102 eligible adolescents with HIV/AIDS who met the inclusion criteria. Thirty-two adolescents were excluded because 10 were trained to be leaders, 2 had participated in the pilot study, and 20 were the samples for testing the reliability. The remaining 70 eligible adolescents were allocated to either the experimental group (n = 35) or the control group (n = 35) using simple random sampling (drawing lots of hospital numbers of adolescents with HIV/AIDS).

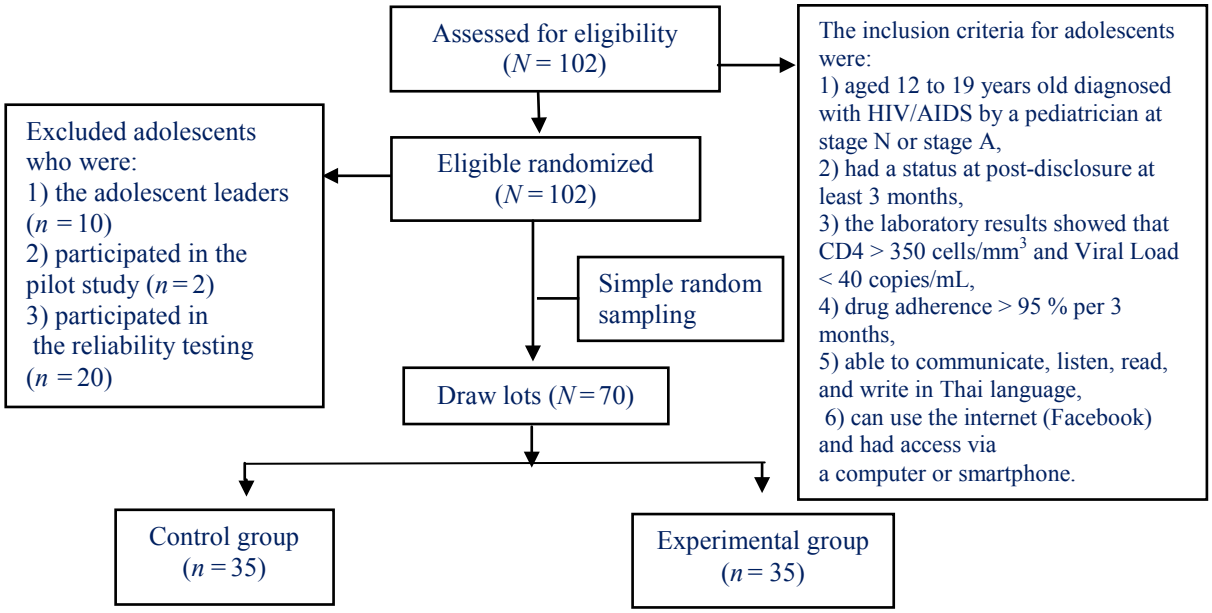

Figure 1 The diagram of sample sampling.

Instrumentation

The study instruments consisted of 1) the experimental instrument, and 2) the instruments for data collection. Details of the instruments are as follows.

Experimental instrumentation: The researcher developed the nurse's support for the adolescent-led HIV/AIDS sexual transmission prevention program using social media.

Instruments for data collection: These consisted of a demographic data questionnaire. The researcher developed the demographic data questionnaire. It consisted of gender, age (years), religion education, occupation, source of HIV-infected, age that the child perceived that they had HIV (year), having boy/girlfriend, the status of marriage, history of having sex, sexual prevention, selection method for safer sex, causes of unprotected sex, use of social online network, frequency of using social online networks, use of online networking sites, device for using a social online networks, types of family, the marital status of parents, number of siblings, number of siblings from different mothers, number of members living in the same house, living with, family occupation, and family income (baht/month). Behavioral

intentions to HIV/AIDS prevention questionnaire of Misovich, Fisher, and Fisher [16]. This scale consisted of 8 items to measure each performance of the HIV/AIDS preventive behaviors. The format of this scale is a 5-point rating scale from very likely (1) to very unlikely (5). The total score ranges from 8 to 40. Mean scores 8 to 16 reflect that the self-instruction for the likelihood of performing behavior intention is very good; however, mean scores more than 16 reflect that the self-instruction for the likelihood of performing behavior intention is poor. Perceived effectiveness for HIV/AIDS preventive behaviors scale of Misovich, Fisher, and Fisher [18]. The participant was given a hypothetical situation and s/he had to make a decision based on the situation. This scale consisted of 24 items and 4 domains: Safer-sex discussion (10 items), condom accessibility (6 items), condom use during sexual intercourse (6 items), and HIV testing behavior (2 items). The format of this scale is a 5-point rating scale from very effective (1) to very ineffective (5). The total score ranges from 24 to 120. Mean scores 24 to 36 reflect the perceived effectiveness of HIV-preventive behavior as very good; however, the mean scores of more than 36 reflect the perceived effectiveness of HIV-preventive behaviors as poor.

Validity testing

Three experts performed face validity. The internal consistency reliabilities of the behavioral intentions for HIV/AIDS prevention questionnaire and the perceived effectiveness of HIV/AIDS preventive behaviors scale after back translation were tested with 20 adolescents with HIV/AIDS who met the inclusion criteria and had the same characteristics as the participants in this study. The Cronbach's alpha coefficients of these 2 instruments were 0.80 and 0.96, respectively.

Back translation

All of the original instruments consisting of the behavioral intentions for HIV/AIDS prevention questionnaire and the perceived effectiveness of HIV/AIDS preventive behaviors scale were translated from the English version to the Thai version using the back translation technique [19].

Ethical considerations

This study was conducted after obtaining permission from the Research Ethical Committee, Faculty of Nursing, Prince of Songkla University (Reference number0521.1.05/0778), and the Ethical Committee Review Board of Maharat Nakhorn Si Thammarat Hospital (Reference number 23/2559), and permission was granted from the hospital and the Pediatric Outpatient Department and the informed consent procedures. The adolescents who are 12 - 17 years old were informed of assent consent and their parents or caregivers signed the consent form before the data collection. The adolescents who are 18 - 19 years old signed the consent form before the data collection as well. The researcher protected the adolescents' privacy through anonymity by using a coding system to identify the adolescents.

Data collection

After obtaining permission, the researcher trained 10 adolescents with HIV/AIDS in leadership skills to be effective leaders. Thus, 10 adolescents with HIV/AIDS were trained by the researcher based on the leader program developed on the concept of leadership skills, social development of adolescents, and peer groups. This took 18 h of training face-to-face and via the social networking site (Facebook). All 10 trained adolescents are effective leaders because they passed all leadership skills scores consisting of communication, decision-making, and leadership skills by cutoff point scores of ≥ 56, ≥ 67, and ≥ 53, respectively [20]. All the 10 leaders passed in 100 % of the skills to implement the program.

The control group

The researcher contacted and trained the research assistant who was a registered nurse with a master's degree in nursing to be a data collector. The research assistant collected the data on day 1 (pre-test) from the participants by self-report using the demographic data questionnaire, the behavioral intentions for HIV/AIDS prevention questionnaire, and the perceived effectiveness HIV/AIDS preventive behaviors scale. Next, adolescents in the control group received the usual care from a health care provider team in the hospital. The usual care was composed of nursing care to promote safe sex, skills training

(e.g., to use condoms, negotiate to delay sexual intercourse), knowledge, and HIV/AIDS transmission. Each adolescent participated in the usual care for 4 weeks. Finally, the research assistant collected the data (post-test) using the same questionnaires after receiving the usual care on days 15 and 30 of the study.

The experimental group (**Figure 2**)

The research assistant collected the data (pre-test) using the demographic data questionnaire, the behavioral intentions for HIV/AIDS prevention questionnaire and the perceived effectiveness HIV/AIDS preventive behaviors scale before the adolescents received the program. Then, the adolescent leaders were divided into 3 groups by drawing lots, and each group had 3 to 4 leaders. Approximately 11 to 12 adolescents were randomly assigned to one of the 3 groups. There were 3 activities in this step which took about 2 h 30 min face-to-face. Adolescents signed up to Facebook and were added to a closed group. Facebook was used to create a closed group page for privacy, which was unable to be accessed or searched for by non-group members. Adolescents were trained to use Facebook by the researcher and the adolescent leaders for 1 h 30 min. During the following 2 weeks, the adolescent leaders drove the program via Facebook. The adolescent leaders drove the program step by step as follows: The 1st step on day 2, the adolescent leaders began the activity of providing HIV/AIDS knowledge. There were 4 sub-activities consisting of learning with HIV/AIDS, opportunistic infections, antiretroviral HIV/AIDS, and health promotion, which took 4 h. The 2nd step on day 3 was the activity of adjusting a positive attitude. This activity took approximately 2 h. On day 4 was the activity of subjective norms. This step took about 1 h. On day 5 was the activity of perceived behavioral control. In conclusion, the intervention program was performed for 14 days with 21 times per week.

Data analysis

The data were analyzed using SPSS Version 21.0 statistic software, and the alpha level was set at 0.05. Descriptive statistics, Chi-square and independent t-test were used to determine differences in demographic data. Non-parametric statistics including a Friedman-test, a Wilcoxon Matched Pairs Signed Rank test, and a Mann-Whitney U-test were chosen for data analysis because the data distribution of the means of behavioral intention for HIV/AIDS prevention measured on day 15, perceived effectiveness of HIV/AIDS preventive behaviors measured at baseline and on day 15 showed non-normality.

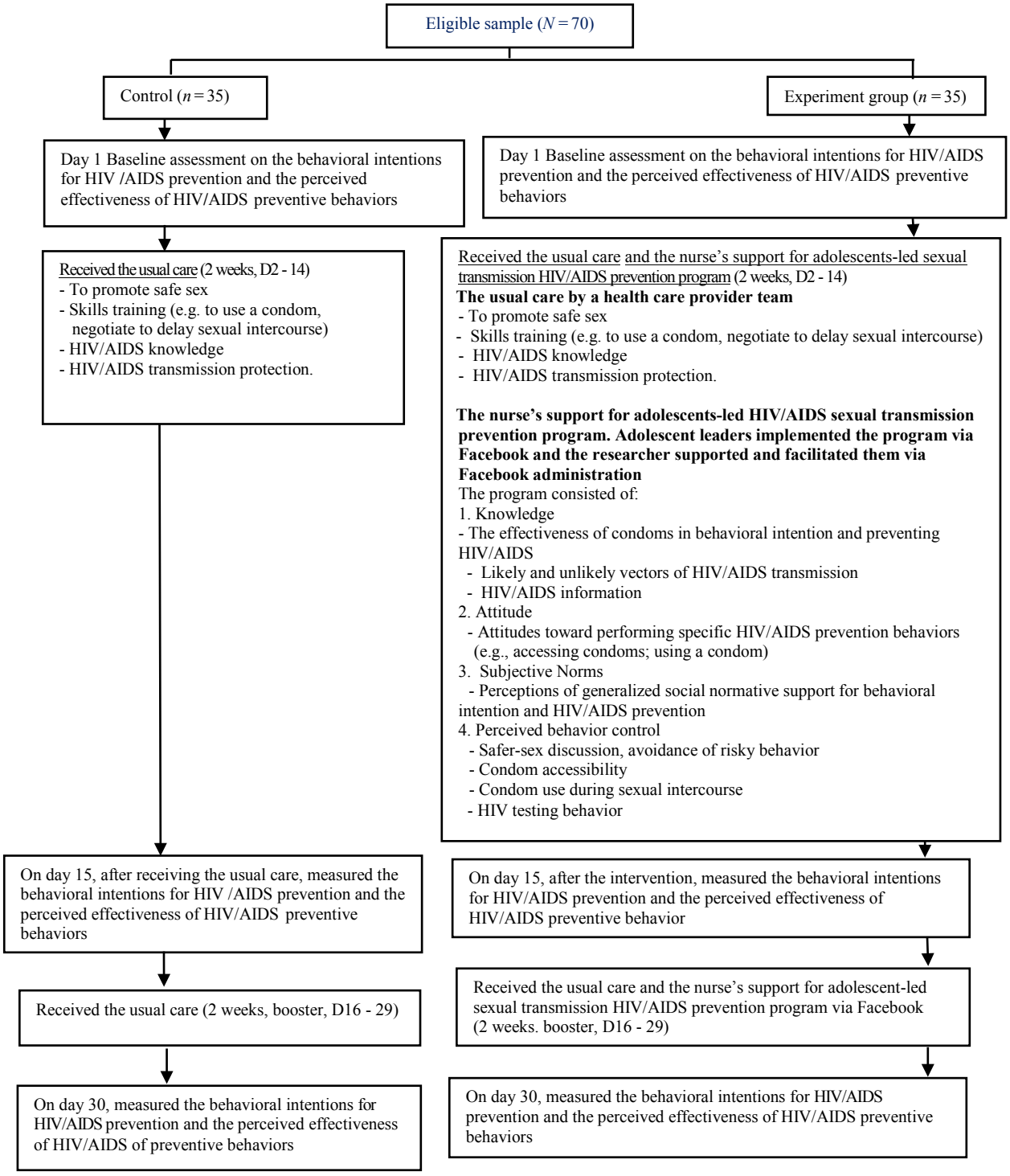

Figure 2 The process of testing the effects of a nurse's support for adolescents-led HIV/AIDS sexual transmission prevention program using social media.

Results and discussion

Results

Demographic data (**Table 1**), there were no significant differences in the adolescent characteristics between the control and experimental groups except having a boy/girlfriend. Most adolescents in the control group were male (60 %) whereas that of the experimental group were female (57.1 %). The mean of age in the control group was 16 years old (*SD* = 0.85) whereas that of the experimental group was 15.74 years old (*SD* = 1.95). All adolescents in both groups had received HIV from their mothers. The age of the adolescents in both groups when they perceived that they had HIV was approximately 9 years old. Most of them in both groups had never had sex and for the ones who had had sex, all of them used sexual prevention. For some of them who had had sex, the reason for not using any methods of protection during sexual intercourse because they were afraid if their partners would know that they had HIV/AIDS. In terms of the method of choice for safe sex, all of them selected the male condom. All of the adolescents in both groups used a social network site online and most of them used it every day. Most of the participants in both groups used Facebook and a smartphone

Table 1 Frequency, percentage, chi-square, and t-test results of adolescents with HIV/AIDS in the control and experimental groups identified by demographic characteristics (N = 70).

Demographic characteristics	Control group (*n* = 35)		Experimental group (*n* = 35)		χ^2	*t*	*p*
	n	%	*n*	%			
Gender							
Male	21	60.0	15	42.9	2.06	-	0.151
Female	14	40.0	20	57.1			
Age (years)	$M \pm SD = 16.00 \pm 0.85$		$M \pm SD = 15.74 \pm 1.95$			0.57	0.573
Source of HIV-infection							
Mother to child	35	100	35	100	-	-	-
Having a boy/girlfriend							
Yes	8	22.9	17	48.6	5.04	-	0.025*
No	27	77.1	18	51.4			
Age of child when perceived that they had HIV (years)	$M \pm SD = 9.37 \pm 2.97$		$M \pm SD = 9.63 \pm 2.22$			-0.41	0.683
History of having sex							
Yes	7	20.0	11	31.4	1.20	-	0.274
No	28	80.0	24	68.6			
Sexual prevention (only the ones who had sex)							
Yes	7	100	11	100	-	-	-
Selected method for safe sex	35	100	35	100			
Male condom					-	-	-
Reasons for unprotected sex[b]							
Partner does not want to use preventive measures	1	2.9	0	00.0	2.83	-	0.243
Afraid that partner will know	25	71.4	21	60.0			

Demographic characteristics	Control group (n = 35)		Experimental group (n = 35)		χ^2	t	p
	n	%	n	%			
Dislike	9	25.7	14	40.0			
Use of social network site online							
Yes	35	100	35	100	-	-	-
Frequency of using social network site online[b]							
Every day	16	45.7	22	62.9	6.92	-	0.075
Every other day	4	11.4	5	14.3			
Once a week	15	42.9	6	17.1			
Once a month	0	0.00	2	5.7			
Types of online networking site use[b]							
Facebook	20	57.1	24	68.5	2.79	-	0.425
Line	3	8.6	1	2.9			
Instagram	0	0.0	1	2.9			
Line and Facebook	12	34.3	9	25.7			
Device for accessing social network site online[b]							
Smartphone	24	68.6	29	82.8	4.27	-	0.234
Notebook	2	5.7	0	0.0			
Computer pc	2	5.7	3	8.6			
Smartphone and notebook	7	20.0	3	8.6			

Note. a = Yates' Continuity correction, b = Fisher's exact test, * p < 0.05

Comparison within groups at baseline, day 15 and 30

Control group

Comparisons of the overall mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior among adolescents with HIV/AIDS in the control group measured at baseline, on days 15 and 30.

Friedman's test (**Table 2**) revealed that there were no significant differences of the overall mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior at baseline, day 15 and 30 in the control group ($\chi2$= 3.46, p = 0.18; $\chi2$ = 0.26, p = 0.88, respectively). Thus, it was not necessary to further perform a post hoc analysis.

Experimental group

Friedman's test (**Table 2**) showed that there were significant differences in the overall mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior at baseline, day 15 and 30 in the experimental group (χ^2 = 51.87, χ^2 = 33.31, p < 0.001, respectively). A post hoc analysis using a Wilcoxon Matched Pairs Signed Rank test (**Table 3**) revealed that there were significant differences of mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior between baseline and day 15 (Z = −5.04, Z = −4.72, p < 0.001, respectively), and baseline and day 30 (Z = −5.14, Z = −4.66, p < 0.001, respectively). The significant differences of mean ranks of behavioral intention for HIV/AIDS prevention between day 15 and 30 were found (Z = −2.31, p < 0.01) whereas the non-significant difference of mean ranks of perceived effectiveness of HIV/AIDS preventive behavior between day 15 and 30 was found (Z = −0.62, p = 0.27).

Table 2 Friedman's test comparison on overall mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior at baseline, on days 15 and 30 in the control and the experimental group ($N = 70$).

Time	Median	IQR	Mean Rank	χ^2	*df*	*p*
Control group (n = 35)						
Behavioral intention for HIV/AIDS						
baseline	20	14	2.20	3.46	2	0.178
Day 15	21	16	1.77			
Day 30	25	13	2.03			
Perceived effectiveness of HIV/AIDS						
baseline	55	29	2.00	0.26	2	0.879
Day 15	54	33	2.06			
Day 30	49	41	1.94			
Experimental group (n = 35)						
Behavioral intention for HIV/AIDS						
baseline	20	9	1.09	51.87	2	0.000**
Day 15	10	1	2.26			
Day 30	9	3	2.66			
Perceived effectiveness of HIV/AIDS						
baseline	52	18	1.26	33.31	2	0.000**
Day 15	34	4	2.34			
Day 30	33	6	2.40			

Note. ** $p < 0.001$

Table 3 Wilcoxon matched-pair signed-rank test on mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior at baseline, on days 15 and 30 in the experimental group ($N = 35$).

Time	Experimental Group ($n = 35$)	
	Z-value	*p (1-tailed)*
Behavioral intention for HIV/AIDS		
baseline * Day 15	−5.04	0.000**
baseline * Day 30	−5.14	0.000**
Day 15 * Day 30	−2.31	0.01*
Perceived effectiveness of HIV/AIDS		
baseline * Day 15	−4.72	0.000**
baseline * Day 30	−4.66	0.000**
Day 15 * Day 30	−0.62	0.269

Note. ** $p < 0.001$

Comparison between groups at baseline, day 15 and 30

Comparisons of the mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior among adolescents with HIV/AIDS between the control and experimental groups at baseline, on days 15 and 30.

A Mann-Whitney U-test (**Table 5**) revealed that there were significant differences of mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior measured at day 15 and 30 between the control and experimental groups ($Z = -5.14$, $p < 0.001$; $Z = -5.77$, $p < 0.001$, $Z = -5.40$, $p < 0.001$, $Z = -4.35$, $p < 0.001$, respectively). In contrast, there was no significant difference in the mean ranks of behavioral intention for HIV/AIDS prevention measured at the baseline between the control and experimental groups ($Z = -0.77$, $p = 0.22$; $Z = -0.15$, $p = 0.44$).

Table 5 Mann-Whitney U-test on mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior between the control group and experimental group at baseline, on days 15 and 30 (N = 70).

Time	Experimental group (n = 35)		Control group (n = 35)		Median	IQR	Mann-Whitney U- test	*Z*	*p*
	Mean rank	Sum of ranks	Mean rank	Sum of ranks					
Behavioral intention for HIV/AIDS									
baseline	37.37	1308.00	33.63	1177.00	20	11	547.00	−0.77	0.221
Day 15	23.14	810.00	47.86	1675.00	12	13	180.00	−5.14	0.000**
Day 30	21.57	755.00	49.43	1730.00	11	16	125.00	−5.77	0.000**
Perceived effectiveness of HIV/AIDS									
baseline	35.14	1230.00	35.86	1255.00	52	23	600.00	−0.15	0.442
Day 15	22.40	784.00	48.60	1701.00	38	20	154.00	−5.40	0.000**
Day 30	24.97	874.00	46.03	1611.00	38	16	244.00	−4.35	0.000**

Note. ** $p < 0.001$

Discussion

Based on the literature review, few studies study had been conducted with adolescents infected with HIV and prevention programs using social media at the time this study was conducted. One study looked at the effect of a social cognitive theory-based HIV education prevention program among high school students in Nanjing, China by Li *et al.* [21]. The result showed that there were no significant differences in mean scores of stigmatizing attitude, HIV knowledge, and intention of having sex and other health issues at baseline between the intervention and the control group. This is similar to the study of Kerr *et al.* [22] who showed that there were no significant differences in the mean scores at the baseline of HIV knowledge and stigma between the intervention and control groups ($p > 0.10$). The findings from this study and that of the other studies indicate that most of the intervention studies demonstrated no significant differences at baseline when compared between groups. Additionally, there were no significant differences in mean ranks of behavioral intention for HIV/AIDS prevention and perceived effectiveness of HIV/AIDS preventive behavior measured at the baseline.

The program was based on the Theory of Planned Behavior (TPB), the related literature review, the findings from focus groups with Thai adolescents with HIV/AIDS, adolescents' social development, and social media. The TPB theory involves attitudes, subjective norms, and perceived behavioral control, leading to intention over the performance of positive behavioral change. Concerning attitude toward the

positive behavior, this means that the degree to which a person has a favorable or unfavorable evaluation or appraisal of the questions' behavior. Subjective norms refer to the perceived social pressure or social support to perform or not to perform the behavior, and perceived behavior control refers to people's perception of the ease or difficulty of performing the behavior and effectiveness of perception to HIV/AIDS preventive behavior. Therefore, the TPB is the accumulated ability to predict, understand and change behavior, including attitudes, subjective norms, and perceived behavioral control increase significantly to the influence of behavioral intentions; meanwhile, perceived behavioral control might affect the performance of HIV/AIDS preventive behavior directly [10]. Moreover, the core contents of the program were integrated from focus groups and literature reviews. This program consisted of 4 main components: HIV/AIDS knowledge, attitude, subjective norms, and perceived behavioral control by using a short film in the program. The short film was used on the topics of positive attitude, subjective norms, and perceived behavioral control. In addition, animation cartoon was used on the topic of knowledge. This is similar to the study of Kalolo and Kibusi [23] on the influence of perceived behavior control, attitude, and empowerment on condom use in adolescents in rural Tanzania. The study showed that perceived behavior control predicted intentions to use condoms (AOR = 3.059, 95 % CI 1.324 - 7.065), and a positive attitude predicted condom use (AOR = 3.484, 95 % CI 1.132 - 10.72). The study showed especially that subjective norms had an indirect effect on intention.

There were several studies both in Thailand and in other countries regarding peer leaders. The results showed that adolescents could openly talk and discuss the sensitive topics regarding HIV/AIDS within their peer groups, which also served as powerful reinforcements during adolescence as sources of acceptance [24-26]. Moreover, adolescent leaders or peer leaders are part of a homogeneous group so they can access as well as talk within their group easier and better than talking with others [27]. This is similar to the literature review that showed that being peer-led has a strong influence on individual behavior because of trust, and feeling more comfortable in more open discussions of sensitive topics [28] leading to a major social influence on adolescent sexual behavior. In addition, being peer-led has been determined as an effective approach for education and empowerment in adolescents, as they feel comfortable when receiving information and relating to information provided by a person of the same age group [29].

Especially, the leader in this study was well trained by the researcher which is supported by the 100 % self-report evaluation. The program was implemented via Facebook which is suitable for the young generation with HIV. It can be described that the adolescents with HIV/AIDS received the program by adolescent leaders who drove the program step by step. In each step, they talked, shared ideas, and discussed the story of a short film. From literature, reviews regarding good learning practices of humans is a learner had to participate and discuss topics. They must conclude and summarize the lesson learned with their group as this will make the learning sustainable [30]. Similar to this study, adolescents with HIV/AIDS were stimulated by adolescent leaders under the supervision of the researcher. They had to share ideas, participate within the group, and the group dealt with any issues that came up in each step. Finally, the adolescent leaders summarized the discussion from the group. Thus, in all steps, the adolescents with HIV/AIDS had learned and sustainable learning had been aroused. Especially, at present, the influence of the internet has increased enormously and has become an important part of adolescents' daily lives because of its convenience and ease of access [31,32]. This is similar to this study, in that Facebook was used to run the program. It could maintain the relationships between the adolescent leaders and the participants.

However, in this study, there was no significant difference in the mean ranks of perceived effectiveness of HIV/AIDS preventive behavior between day 15 and 30 ($Z = -0.62$, $p = 0.27$). The possible reasons might be the influence of sexual beliefs of adolescents with HIV/AIDS. In this study, most samples had boyfriends and girlfriends influencing the adolescent's decision to refuse or negotiate for safer sex practices to maintain the HIV/AIDS preventive behavior. Because having a girl or boyfriend or special friend is normal because everyone else does lead to the difficulty to say no or refuse to have sex with their boy or girlfriend [29]. This factor might influence the perceived effectiveness of HIV/AIDS prevention. Similarly, in a focus group, adolescents with HIV/AIDS mentioned, "having boy/girlfriends influenced the expression of sexual behavior so most teenagers believed that having sex with a girlfriend

or boyfriend is a fashionable lifestyle". Especially, adolescents with HIV/AIDS who are female said, "although we perceive safer sex, it is very difficult to refuse to have sex with our boyfriend because we are afraid that they will know our status." Similarly, the study of Ounjit [29] showed that refusing to have sex with a partner for a female was more difficult than for a male. Similar to this study, most participants in the experimental group were female (n = 20); thus, this reason might support this issue. Although there were no significant differences in the mean ranks of perceived effectiveness of HIV/AIDS preventive behavior between day 15 and 30, the mean rank at day 15 increased from 2.34 to 2.40 on day 30. It might be claimed that the samples had perceived effectiveness of HIV/AIDS preventive behaviors.

Conclusions

The findings showed that there were significant differences in mean ranks of behavioral intention and perceived effectiveness of HIV/AIDS preventive behavior measured on days 15 and 30 between the control and experimental groups ($p < 0.001$). This study could offer nurses an opportunity to think about and become more aware of using technology and social networking to integrate it into nursing practice. This is the art of nursing to implement with patients via social networking online since nursing and technology are a specialized field that combines nursing science with technology management and scientific analytics to identify, define and manage. The sustainability of the program's effectiveness is needed for further study.

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