ORIGINAL ARTICLE

The Effect of Mobile Application on HIV Preventive Behavior Among Adolescent in Indonesia

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ABSTRACT

Introduction: Adolescents are at high risk for HIV transmission affected to the higher HIV prevalence. HIV prevention programs, particularly education for adolescents, must have begun to take advantage of existing technical innovations. Mobile application-based HIV prevention is a strategy that is widely accepted today, particularly among teenagers, with information that is simple but instructive. **Methods:** This study used a quasi-experimental two-group pre-posttest design, where the subject group was monitored before and after an intervention. The HIV prevention behavior questionnaire is based on the Sexual behavioral abstinence and avoidance of high-risk situations questionnaire (SBAHAQ). **Results:** The average respondent's age is 16.98 (SD=0.99). Most responses are male (56%) and in class X (38%). There is a substantial difference between HIV preventive behavior ratings in the intervention group and the control group before and after the mobile application intervention (p<0.05). **Conclusion:** It is hoped that future study would examine the effectiveness of this mobile application-based education using a bigger sample size and over a longer period of time.

Keywords: Mobile application, HIV, Preventive behavior, Adolescent

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INTRODUCTION

Adolescent is known as the stage of character and identity formation, as well as the transition time from child to adult (1). Adolescents are at high risk for HIV because they are more likely to explore new things, such as sexually active behavior; make the adolescents are a vulnerable age group for HIV transmission (2). According to the Joint United Nations Program on HIV and AIDS (UNAIDS), the number of young people infected with HIV in 2019 was 1,740,000 (1,000,000 females and 740,000 boys). Southeast Asia has the world third highest HIV prevalence (3). The projected number of HIV-positive individuals was 3.8 million (3). Indonesia has the highest number of HIV cases among adolescents aged 15-19 years in Southeast Asia, with 1,458 cases (4). The majority of HIV transmission is attributed to unsafe sexual activity (5,6).

Mobile application-based HIV prevention is a strategy that is widely accepted today, particularly among teenagers, with information that is simple but instructive (7). It is projected that 30 million children and adolescents in Indonesia utilize the internet and digital media, which are the primary sources of information, communication, and entertainment for teenagers (8) Statistics show that 25.7 percent of people used WhatsApp, 19.8 percent used Facebook, 16.2 percent used Instagram, and 12.3 percent used YouTube (9). According to these findings, teenagers have a high engagement with technology. Thus, HIV prevention programs, particularly education for adolescents, must have begun to take advantage of existing technical innovations, such as the use of mobile applications.

Numerous researches have evaluated the effects of mobile applications on adolescents' sexual behavior. For instance, Kuhns (10) did a study in Chicago, United States, utilizing MyPEEPS mobile for 3–9 months and found that it reduced HIV risk behaviors and improved health behaviors. In addition, research conducted in Yogyakarta by Muflih and Setiawan (11)

regarding a mobile application called SMS Gateway for one month revealed that the mobile application program had a substantial impact on the avoidance of free sexual behavior and HIV/AIDS. Meanwhile, research conducted by Lindayani (2) in Bandung on school-based programs, specifically peer-led technology for three to four months, found that the program had a substantial impact on HIV prevention connected to sexual behavior. According to the aforementioned studies, the application still has limitations, including its monotonous form, its continued use of the website and the SMS method, its incompatibility with the development of millennial youth, the inability of users to select the features they wish to access, and its limited use of mobile applications. On the basis of these issues, researchers are interested in determining if mobile applications have an effect on adolescents' HIV prevention behavior. Researchers produced a mobile application in the form of an HIV info corner application that is easily accessible and has content in the form of health information, interesting educational videos, and teen-specific information. This application may be downloaded from the Google Play Store. Therefore, the goal of this study was to investigate the efficacy of mobile application use on adolescents' HIV prevention behaviors.

MATERIALS AND METHODS

Study design
This study used a quasi-experimental two-group pre-posttest design, where the subject group was monitored before and after an intervention (12). This approach is used to examine how mobile applications affect adolescents' HIV preventive behavior. This study has a control and an intervention group. Respondents received the mobile app intervention in 5 meetings (45 minutes each) over 4 weeks, utilizing PowerPoints and apps to address HIV prevention behavior. In April and May of 2021, the research was conducted at a senior high school in Bandung, West Java, Indonesia.

Sample
Adolescents aged 13 to 19 years old who could converse well, did not have vision or hearing problems, could read and write, were willing to participate in research, and had access to Android devices were eligible for this study. The exclusion criteria are HIV-positive adolescents.

The estimated sample size is calculated using F-test, ANCOVA: Fixed effects, main effects, and Interactions assuming two tails, = 0.1, Effect size = 0.25 (Cohen, 1988), power level = 0.8, the minimum estimated sample is 101 and as well as an attrition rate of 10-15% with a total of 9 respondents, so the total sample size is 110. There are two groups in this study, so each group has an estimated sample size of 55.

The two groups' respondents were chosen randomly by lottery.

Instrument
The HIV prevention behavior questionnaire is based on the Sexual behavioral abstinence and avoidance of high-risk situations questionnaire (SBAHAQ). This questionnaire contains 14 question items, including four self-efficacy (SE) questions about individual control, rejecting risky situations, and having the behavioral ability to say no, four behavioral intention (BI) questions about abstinence and refusing negative answers, and six perceived benefits questions. (PB) on the personal and social benefits of abstinence, rejecting risky behavior, negative responses to dangerous offers, and avoiding high-risk situations. Scoring is done on a 0-5 linkert scale, with the higher the number of scores indicating worse conduct. Each question has three possible answers: Yes, no, and don't know. The validity of the Sexual behavioral abstinence and avoidance of high-risk situation questionnaire (SBAHAQ) comprising 14 items, consisting of 4 self-efficacy questions, 6 perceived benefit questions, and 4 behavioral intention questions, was pronounced valid with a Content Validity Ratio (CVR) of 0.85 (13). The Sexual behavioral abstinence and avoidance of high-risk situation questionnaire (SBAHAQ) reliability test yielded values of self-efficacy (SE) 0.85, perceived benefit (PB) 0.87, and behavioral intention (BI) 0.77. (13)

Procedure
This research was conducted at the Sekolah Tinggi Ilmu Keperawatan PPNI Jawa Barat after obtaining permission to conduct research and ethical testing connected to conducting research. Researchers picked respondents at random using a traditional lottery and then contacted teachers at senior high schools in Bandung, Indonesia, for assistance in facilitating meetings between researchers and prospective respondents who satisfied the predetermined inclusion criteria. The researcher began by joining the WhatsApp group and identifying himself before addressing the chosen respondents to explain the goal, advantages, and duration of the study, as well as the respondent's rights and the time contract to undertake the research process with the respondent. Afterward, if the respondent is willing to participate in the research, he or she will sign the informed consent form, which the researcher will divide into two groups: the intervention group and the control group. Using the SBAHAQ questionnaire, two groups of respondents were given a pre-test. After both groups had completed the pre-test, the intervention group received a mobile application for 45 minutes over the course of five meetings over a period of four weeks. The intervention was provided with an explanation of the info corner's application. This application provides multiple health-related educational films.

and is available in the Google Play Store for Android users. After receiving a mobile application, HIV preventive behavior scores were measured for the post-test evaluation. Before being processed, the gathered questionnaire data was validated. The control group received the same intervention, a mobile application, so that the control group also received advantages and benefits.

Ethical consideration
Prior to data collection, ethics committees of the Institutional Review Board (III/045/KE.STIKEP/2021) granted approval. Before beginning the survey, the consent form was discussed in detail to participants. The data was collected on a separate drive that only management could access.

Data analysis
Univariate analysis was performed using the mean, standard deviation, minimum and maximum values. The paired sample T-test was developed to compare two groups of related data from the same population. Using the IBM SPSS software application version 3.1.9.7, the ANCOVA statistical test was used to determine the difference in the overall score of the pretest and posttest scores, as well as the effect of treatment. If the p-value is less than 0.05, the hypothesis is considered to be accepted (p<0.05).

RESULTS

The average respondent's age is 16.98 (SD=0.99). Most responses are male (56%) and in class X (38%). Most respondents (98% and 96.7%) use social networking apps daily. Bivariate analysis with independent t-test and chi-square found no significant differences between the intervention and control groups in age, gender, class, use of social media apps, and time of use social media (Table I).

Table II demonstrates that HIV prevention behavior declined from 2.02 (SD=1.920) to 0.65 (SD=1.205) with a t-value of 6.220 and p-value of 0.000. In the control group, the p-value was 0.260. The intervention group data showed a significant decrease in self-efficacy from 0.57 (SD = 0.989) to 0.13 (SD = 0.342) with a p-value= 0.000, behavioral intention from 0.69 (SD = 0.885) to 0.29 (SD = 0.610) with a p-value= 0.000, and perceived benefit from 1.09 (SD = 1.578) to 0.29 (SD = 0.673) with a p-value =0.000.

Table III reveals differences in HIV prevention behavior scores after the mobile application intervention, with a p-value = 0.000 (p<0.05) between the treated and untreated groups. This means that the second hypothesis, Ho, is rejected and Ha is accepted,

Table I : Demographic comparison between intervention and control group (N=150)

Variabels	Total	Intervention group, n=75 (%)	Control group, n=75 (%)	*p-value*
Age (Mean ± SD)	16.98±0.99	16.39 ± 0.75	17.57±0.84	0.276
Sex				0.139
Female	66(44.0)	38(25.3)	28(18.7)	
Male	84(56.0)	37(24.7)	47(31.3)	
Grade				0.113
X	57(38.0)	31(20.7)	26(17.3)	
XI	39(26.0)	23(15.3)	16(10.7)	
XII	54(36.0)	21(14.0)	33(22.0)	
Used of media social				0.155
Yes	148(98.7)	75(50.0)	73(48.7)	
No	2(1.3)	0(0.0)	2(1.3)	
Social media used time in a day				0.645
Very frequent	145(96.7)	73(48.7)	72(48.0)	
Frequent	5(3.3)	2(1.3)	3(2.0)	

Table II : Comparison of HIV preventive behavior before and after intervention in two groups

Variable	Pre-test (Mean±SD)	Post-test (Mean±SD)	t	Mean difference	p-value
Total score					
Intervention group	2.02 ± 1.920	0.65 ± 1.205	6.220	1.364	0.000
Control group	3.76 ± 2.958	4.25 ± 2.746	1.136	0.493	0.260
Domain Skor					
Self Efficacy					
Intervention group	0.57 ± 0.989	0.13 ± 0.342	4.020	0.440	0.000
Control group	0.61 ± 0.884	0.53 ± 0.890	0.569	0.080	0.571
Behaviour Intention					
Intervention group	0.69 ± 0.885	0.29 ± 0.610	4.132	0.400	0.000
Control group	1.43 ± 1.200	1.44 ± 1.307	-0.121	-0.013	0.904
Perceived Beneft					
Intervention group	1.09 ± 1.578	0.29 ± 0.673	4.571	0.800	0.000
Control group	1.72 ± 2.103	1.47 ± 2.036	0.789	0.253	0.433

Table III : HIV preventive behavior score comparison between intervention and control group

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Pre-test score	22.191	1	22.191	5.169	.024
Group	392.567	1	392.567	91.437	.000
Error	631.116	147	4.293		
Corrected Total	1121.473	149			

which means there is a substantial difference between HIV preventive behavior ratings in the intervention group and the control group before and after the mobile application intervention.

DISCUSSION

According to the study's findings, some adolescents' HIV prevention behaviors were worse than before the intervention. This study supports Sumartini and Maretha's research in Yogyakarta, which found that HIV prevention behavior in teenagers remained low (14).

This study is also consistent with research conducted by Akbar et al. in South Mobagu City, which found that adolescent understanding of HIV/AIDS prevention and free sex is still poor, despite technological breakthroughs in accessing information, particularly pornographic material, which is becoming simpler. Teenagers' aberrant behavior will be exacerbated by access to the internet or cell phones, combined with free association (15).

Following a mobile application intervention, there is a decline in HIV preventive behavior. This is consistent

with previous research conducted by Manurung (16), which found a difference in scores before and after the intervention. His research also stated that providing HIV prevention information via a mobile application will aid in the development of positive changes in adolescents (16). Self-efficacy is the domain with the lowest score. This study supports the findings of Muflih and Setiawan (11), who found that an increase in these values indicates that counseling through applications can boost knowledge, resulting in an increase in self-efficacy to avoid free sex behavior and HIV/AIDS. AIDS Setiawan and Muflih (11) The highest scoring domains are behavior intention and perceived gain. This study supports the findings of Angela et al.'s Jakarta study, which found that the majority of respondents had a favorable attitude towards HIV/AIDS and practiced good HIV/AIDS prevention (15). As a result, HIV prevention behavior is related to the function of the social environment that can be achieved at school or in the youth environment, so health workers must strengthen health promotion in HIV prevention efforts, particularly in adolescents.

This research is also supported by Muflih's (11), which used successful application approaches to increase adolescent knowledge and self-confidence. Thus, health education interventions using mobile application media are effective in lowering risky sexual behaviors in HIV prevention in adolescents, most respondents understand that sexual behavior before marriage might transmit sexual diseases, one of which is HIV, following intervention (11). This health education intervention using mobile application media is effective in increasing HIV prevention behavior in adolescents; after completing the intervention, some respondents understand the importance of avoiding HIV-triggering behaviors. Thus, this study can be recommended as an effort to prevent HIV in adolescents.

There are a number of limitations in this study, including the fact that the research was not conducted over an extended period of time due to time constraints. The sample size is less representative since it uses a minimum number of samples from quasi-experimental research.

CONCLUSION

There was a significant difference between the HIV preventive behavior scores of the group that received the mobile application intervention and those of the group that did not. The anticipated outcome of this research on mobile applications is an additional health innovation that can assist nursing services in the execution of HIV prevention programs. It is hoped that future study would examine the effectiveness of this mobile application-based education using a bigger sample size and over a longer period of time.

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REFERENCES

1. Ahyani L, Astuti RD. Buku Ajar Psikologi Perkembangan Anak dan Remaja. 2018.
2. Lindayani L, Purnama H, Darmawati I, Lucya V. The Effectiveness of Peer-led Technology on HIV Prevention Among Adolescent in Bandung. J Pendidik KEPERAWATAN Indones. 2018;4(2):97–104.
3. UNAIDS. Global Report: UNAIDS report on the global AIDS epidemic [Internet]. 2018. Available from: http://www.unaids.org/sites/default/files/media_asset/UNAIDS_Global_Report_2016_en_1.pdf .
4. Kemenkes RI. Infodatin HIV AIDS. Kesehatan [Internet]. 2020;1–8. Available from: http://www.depkes.go.id/resources/download/pusdatin/infodatin/Infodatin AIDS.pdf
5. Kana IMP, Nayoan CR, Limbu R. Gambaran perilaku pencegahan hiv dan aids pada lelaki suka lelaki (lsl) di kota kupang tahun 2014. Unnes J Public Heal. 2016;5(3):252–62.
6. Lindayani L, Purnama H, Darmawati I, Lucya V. The Effectiveness of Peer-led Technology on HIV Prevention Among Adolescent in Bandung. J Pendidik Keperawatan Indones. 2018;4(2).
7. Darmawati I, Lindayani L. Pemanfaatan mobile phone app dalam pencegahan dan penanggulangan HIV pada Remaja: A Community-Based HIV Prevention program. Int J Community Serv Learn. 2020;4(3):192–9.
8. Ministry of Health RI. Report on the Progress of HIV AIDS & Sexually Transmitted Infectious Diseases (STIs) Quarter I 2021. Jakarta; 2021.
9. Hootsute & We are social. Digital 2020: Essential insights into how people around the world use the internet, mobile devices, social media,and ecommerce. 2020;
10. Gannon B, Davis R, Kuhns LM, Rodriguez RG, Garofalo R, Schnall R. A mobile sexual health app on empowerment, education, and prevention for young adult men (MyPEEPS mobile): acceptability and usability evaluation. JMIR Form Res. 2020;4(4):e17901.
11. Muflih M, Setiawan DI. Pengaruh konseling short message service (SMS) gateway terhadap self efficacy menghindari seks bebas dan hiv/aids remaja. J Keperawatan Padjadjaran. 2017;5(1).

12. Sugiyono PD. Quantitative, qualitative, and R&D research methods. Bandung(ALFABETA, Ed). 2018;

13. Najarkolaei FR, Niknami S, Shokravi FA, Tavafian SS, Fesharaki MG, Jafari MR. Sexual behavioral abstine HIV/AIDS questionnaire: Validation study of an Iranian questionnaire. J Educ Health Promot. 2014;3.

14. Sumartini S, Maretha V. Efektifitas Peer Education Method dalam Pencegahan HIV/AIDS terhadap Pengetahuan Dan Sikap Remaja. J Pendidik Keperawatan Indones. 2020;6(1):77–84.

15. Akbar H, Langingi ARC, Darmin D. Hubungan Pengetahuan Dengan Perilaku Pencegahan Hiv/Aids Pada Remaja Di Desa Poyowa Besar 1 Kecamatan Kotamobagu Selatan. JIKI J Ilm Kesehat IQRA. 2020;8(2):100–5.

16. Manurung IFE, Maulesu R, Weraman P, Roga AU. Sikap, Keyakinan, Niat Dan Perilaku Masyarakat Binaan Kader Warga Peduli Aids (Wpa) Terhadap Penanggulangan Hiv Dan Aids Di Kota Kupang. IAKMI J Kesehat Masy Indones. 2020;1(1):25–34.