

ORIGINAL RESEARCH ARTICLE

Jalanan Kasih android mobile phone application improves knowledge, attitude, and practice regarding early marriage among high school students: Evidence from quasi-experimental study

DOI: 10.29063/ajrh2024/v28i5.6

Lusi Andriani¹, Demsa Simbolon², Frensi Riastuti³, Ade Sissca Villia⁴ and Zamharira Muslim⁵

Department of Midwifery, Health Polytechnic of the Ministry of Health Bengkulu, Indonesia¹; Department of Nutrition, Health Polytechnic of the Ministry of Health Bengkulu, Indonesia²; Representative Office of the National Population and Family Planning Board (BKKBN) of Bengkulu Province, Indonesia³; Department of Health Promotion, Health Polytechnic of the Ministry of Health Bengkulu, Indonesia⁵; Department of Pharmacy, Health Polytechnic of the Ministry of Health Bengkulu, Indonesia⁵

*For Correspondence: Email: lusi@poltekkesbengkulu.ac.id; Phone: +6285290534500

Abstract

Child marriage has a significant health impact on young mothers and their offspring. This study aims to compare the effectiveness of the Jalanan Kasih Android-based application, the Marriage Age Maturity (PUP) module, and the lecture method in improving knowledge, attitude, and practice regarding early marriage among high school students. A quasi-experiment with control groups was conducted, involving 72 students selected from three high schools in Bengkulu City, Indonesia who met the inclusion criteria. The participants were divided into three groups: 24 individuals in the application intervention group, 24 individuals in the module intervention group, and 24 individuals in the control group. The Jalanan Kasih application group showed an increase in average scores before and after the intervention, in terms of knowledge (6.46), attitude (6.79) and practice (1.75), with a p-value of 0.000, 0.000 and 0.17, respectively. The Jalanan Kasih application had a greater influence on knowledge, attitude and practice compared to the PUP module and the lecture method with a p-value of 0.000. In other words, the Jalanan Kasih mobile application was effective in improving the knowledge, attitude, and practice of high school students regarding early marriage through the use of its contents and consultation feature. It is recommended that the Jalanan Kasih application be used as an educational medium to prevent early marriage and improves family planning. (*Afr J Reprod Health* 2024; 28 [5]: 47-54).

Keywords: Mobile application, marriage age, knowledge, attitude, practice

Résumé

Le mariage des enfants a un impact significatif sur la santé des jeunes mères et de leur progéniture. Cette étude vise à comparer l'efficacité de l'application basée sur Android Jalanan Kasih, du module Marriage Age Maturity (PUP) et de la méthode magistral pour améliorer les connaissances, l'attitude et la pratique concernant le mariage précoce chez les lycéens. Une quasi-expérience avec des groupes témoins a été menée, impliquant 72 étudiants sélectionnés dans trois lycées de la ville de Bengkulu, en Indonésie, qui répondaient aux critères d'inclusion. Les participants ont été divisés en trois groupes : 24 personnes dans le groupe d'intervention d'application, 24 personnes dans le groupe d'intervention du module et 24 personnes dans le groupe témoin. Le groupe d'application Jalanan Kasih a montré une augmentation des scores moyens avant et après l'intervention, en termes de connaissances (6,46), d'attitude (6,79) et de pratique (1,75), avec des valeurs p de 0,000, 0,000 et 0,17, respectivement. L'application Jalanan Kasih a eu une plus grande influence sur les connaissances, l'attitude et la pratique par rapport au module PUP et à la méthode magistral avec une valeur p de 0,000. En d'autres termes, l'application mobile Jalanan Kasih a été efficace pour améliorer les connaissances, l'attitude et la pratique des lycéens concernant le mariage précoce grâce à l'utilisation de son contenu et de sa fonction de consultation. Il est recommandé d'utiliser l'application Jalanan Kasih comme support pédagogique pour prévenir les mariages précoces et améliorer la planification familiale. (*Afr J Reprod Health* 2024; 28 [5]: 47-54).

Mots-clés: Application mobile, âge du mariage, connaissances, attitude, pratique

Introduction

The substantial increase in the population can be attributed to the higher rates of birth and marriage.

According to estimates from 98 countries representing 77% of the population of adolescent female population, 12 million of them are married annually. In 2015, Indonesia was ranked 37th in the

world and second in Southeast Asia in terms of the prevalence of early marriages¹. The Indonesian National Family Planning Coordination Board (*Badan Koordinasi Keluarga Berencana Nasional* (BKKBN) believes that a healthy marriage is initiated by a man who is 25 years old and a woman who is 20 years old based on the readiness of the couple and their reproductive system. Nevertheless, the prevalence of child marriage remains high. Approximately one in four girls is married before the age of 18 years².

Bengkulu Province ranks sixth Indonesian provinces for the prevalence of child marriages among girls between the ages of 10 and 14 years³. In Bengkulu Province, the prevalence of women who were married before the age of 19 years was 38%. Meanwhile, in Bengkulu City, the prevalence of women who were married before the age of 19 years were 19%⁴. Child marriage has a significant health impact on young mothers and their offspring. It also poses a serious threat to the development of young women and deny them educational and employment opportunities⁵. The incidence of stunting among teenage pregnant women was found to be 1.3 times higher than that of pregnant women of reproductive age, with an estimated prevalence of 42%⁶.

Factors that contribute to early marriage include the lack of knowledge and attitude adolescents regarding early marriage as well as the lack of counseling services and media. In addition, three primary drivers of child marriage include poverty, the necessity to strengthen social ties and protection⁷. Many parents believe that marriage will provide their daughter with security and stability and alleviate the economic burden on the family. Furthermore, the lack of knowledge among adolescents about sexually transmitted diseases is a contributing factor to the occurrence of unwanted pregnancies that lead to early marriage. A correlation was identified between premenstrual syndrome and gender in students at State Senior High School 2 of Banyumas, Central Java, Indonesia⁸.

A study conducted in Tabriz, Iran found that girls who believe the appropriate age for marriage is below 20 years are approximately 13 times more likely to agree to child marriage than girls who believe the appropriate age for marriage is above 20 years⁹. In addition, the attitude of adolescents towards the age of marriage is more

influenced by their own beliefs than by those of their parents^{10,11}. A study conducted in Erbil, Iraq identified several factors that contribute to early marriage including poor economic status, efforts to protect girls and boys, low education levels, and traditions. The study also identified consequences of early marriage, including divorce and violence against women¹². Age, gender, and level of education are among the sociodemographic factors significantly associated with marriage age¹³.

In Indonesia, the program designed to prevent early marriage is known as the Marriage Age Maturity (*Pendewasaan Usia Perkawinan/PUP*). The PUP module, which is currently used as a medium for disseminating knowledge has limitations, one of which is its lack of practicality. The use of the PUP module by youth counselors in schools remains relatively limited. There is a correlation between teenage marriage and family resilience. Research shows that marriages that occur among teenagers are more likely to cause conflict or divorce in the household¹⁴.

A study conducted in Birjand, Iran on the efficacy of counseling methods for couples before marriage revealed that although the average scores of knowledge and attitude about reproductive health increased after counseling, it was recommended that more stable behavioral change be encouraged and the quality of counseling be improved¹⁵. Although the implementation of the PUP program affected the decision-making for early marriage in adolescents, the use of the PUP module was only 17.9%. It was found that adolescents did not like the counseling approach using the lecture method. Therefore, an innovative Android-based technology that could provide online adolescent health education would be preferable and necessary¹⁶. A correlation has been identified between mass media exposure and the role of peers in sexual activity. In this context, mass media and peers serve as effective media for disseminating information about sexual activity since adolescents are more likely to engage in open discussion about sensitive topics with their peers¹⁷.

Based on this explanation, the researchers attempt to develop a new methodology for preventing early marriage and improving reproductive health by using the Jalanan Kasih (JK) Android-based application. This application provides a plethora of resources and valuable information for young women to understand the importance of postponing marriage and focusing on

their personal growth and future prospects. This application is designed with an intuitive and attractive interface to facilitate easy access and use of its available features, such as FAQs (frequently asking questions) and live chat consultations with counselors, enabling direct interaction and tailored assistance. Previous research shows that the provision of health education through the "NutriHealth" Android-based application has a significant effect on the knowledge of young women¹⁸.

Methods

This study was conducted from August 25, 2023 until September 25, 2023. This study used a quasi-experimental design with control groups. The JK Android-based application used in this study has been tested for feasibility by design experts, media professionals, and practitioners. The JK application provides various resources and valuable information for young women to understand the importance of postponing marriage and preventing early marriage. In addition, the application contains health education materials covering reproductive health in adolescents and marriage age maturity. The application was designed with an intuitive and attractive interface to facilitate easy access and use of its available features such as FAQs (frequently asked questions) and live chat consultations with counsellors, enabling direct interaction and tailored assistance. A pilot test was conducted in 2022 on a sample of 40 high school students with similar characteristics. Subsequently, the application was uploaded to Play Store.

A total of three high schools in Bengkulu City, Indonesia were selected for this study. The schools were located in different areas and were divided into two groups: an intervention group and a control group. The selection of research locations was based on data indicating areas with the highest rates of early marriage in Bengkulu City. The sample consisted of 72 high school students who met the inclusion criteria, namely high school students aged from 17 to 18 years. In addition, participants in the JK application group must own an Android smartphone. The sample size was calculated used the Lemeshow minimum sample formula, resulting in 24 individuals being assigned to the JK application intervention group, 24 individuals to the module intervention group and 24

individuals to the control group taken, which were selected randomly. The JK group received intervention through the JK Android-based application which had been downloaded by the participants via Play Store. The PUP module group received intervention using the PUP module issued by BKKBN. Meanwhile the control group received intervention through the lecture method. The intervention in the JK application and the PUP module groups was carried out for one month, including dissemination, pre-test, provision reinforcement and post-test. Meanwhile, the intervention in the control group was carried out for three days.

This study received ethical approval from the Research Ethics Committee of the Health Polytechnic of the Ministry of Health Bengkulu with a certificate number (KEPK/115/04/2022). The participants in this study were provided with informed consent and received an incentive of Rp300,000 per individual. Data were collected using a questionnaire that had been tested for validity and reliability. This study was carried out for one month, starting from dissemination and pre-test, followed by mentoring. After one month of mentoring, post-test was conducted. The questionnaire administered consists of items assessing knowledge, attitude and practice. The knowledge questionnaire consists of 15 questions about the meaning of early marriage, the ideal age for marriage, the purpose of marriage, the factors that influence early marriage, the impact of early marriage, the impact of early marriage on women's health and the objectives of the marriage age maturity program. The attitude questionnaire consists of 10 statements using a Likert scale assessing attitudes about early marriage, including the perception that early marriage can reduce the burden on parents, women who do not marry when they reach the age of 20 years are considered old maids, young marriage has a negative impact on health, the ideal age for women to marry is above 19 years, of delaying marriage until the age of 20 years, of delaying the age of marriage to pursue with higher education. The practice questionnaire consists of a question about the participants' planned age of marriage. The assessment results were analyzed using SPSS version 23, with statistical analysis including the dependent t-test, Wilcoxon test, and Bonferroni test, with a 95% confidence level.

Results

Table 1 shows that in the JK application group, knowledge was found to increase from the mean score of 15.1 to 21.5 (p-value 0.000), attitude was found to increase from the mean score of 71.21 to 78 (p-value 0.000) and practice was found to increase from the mean score of 24.04 to 25.79 (p-value 0.017). These indicate significant differences between knowledge, attitude, and practice before and after the intervention using the JK application.

In contrast, in the PUP module group, only attitude showed a p-value of less than 0.05, indicating significant differences in attitude before and after the intervention, but no significant differences between knowledge and practice before and after the intervention. In the control group, attitude showed a p-value of less than 0.05, indicating significant differences in attitude before and after the intervention. At the same time, no significant differences were found between knowledge and practice because the p-values were more than 0.05.

Table 1: Differences in knowledge, attitude and practice before and after the intervention

Variable	JK Application Group (N = 24)			PUP Module Group (N = 24)			Control Group (N = 24)		
	Mean	SD	p	Mean	SD	p	Mean	SD	p
Knowledge			0.000			0.82			0.254
- Before	15.04	1.876		15	1.622	2	14.21	1.841	
- After	21.50	1.978		22	2.143		14.83	1.736	
Attitude			0.000			0.00			0.001
- Before	71.21	5.548		64.25	3.674	0	71	4.969	
- After	78	2.106		69.38	3.499		74.21	4.354	
Practice			0.017			0.09			
- Before	24.04	1.429		24.88	1.454	1			
- After	25.79	0.932		24.33	1.239				

Source: *Dependent t-test*

Table 2: Differences in practice before and after the intervention in the control group

Variable	Control Group (N = 24)			
	Mean	SD	Z	p
Practice				
- Before	24.46	1.978	-2.116	0.034
- After	25.21	1.021		

Source: *Wilcoxon test*

Table 2 shows that the Z value of practice in the control group is -2.116, with a p-value of 0.034, which is less than 0.05. This indicates a significant difference in practice before and after the intervention in the control group.

Table 3 shows a comparison of the significance values of educational media that were found to improve knowledge, attitude, and practice. Statistically different scores were found between the JK application and the PUP module in terms of knowledge (p- 0.001), attitude (p- 0.021), and practice (p- 0.015). Statistically difference scores were also found between the JK application and the conventional method in terms of knowledge (p- 0.001), attitude (p- 0.013), and practice (p- 0.005). Therefore, the JK application as an educational

medium had a statistically significant impact on improving practice (on average). Although differences were found between the PUP module and the conventional method, the significance value was greater than that of the JK application.

Discussion

This study revealed differences in the scores of knowledge, attitude, and practice, especially in the Jalanan Kasih application intervention group because the students were provided with educational materials through smartphones and could consult through the features available in the application. It has been demonstrated that mobile-based learning leads to higher levels of engagement and retention than the conventional lecture method. In addition, mobile-based learning enables young women to access designed contents at their convenience, making it more flexible and comfortable. Furthermore, this Android-based application enables researchers to observe the progress and development of adolescent behavior in real time through the questions they ask. It allows researchers to provide more effective and targeted interventions to address the needs of adolescents.

Table 3: The effect of educational media on increasing knowledge, attitude, and practice

Dependent Variable	Media		Mean Difference (I-J)	Sig.
Knowledge	JK application	PUP module	6.58*	.000
		Conventional	5.83*	.000
	PUP module	JK application	-6.58*	.000
		Conventional	-.75	.951
	Conventional	JK application	-5.83*	.000
		PUP module	.75	.951
Attitude	JK application	PUP module	2.71*	.021
		Conventional	3.63*	.013
	PUP module	JK application	-1.71	.511
		Conventional	1.92	.374
	Conventional	JK application	-3.63*	.013
		PUP module	-1.92	.374
Practice	JK application	PUP module	1.29*	.015
		Conventional	1.25*	.005
	PUP module	JK application	-1.29*	.015
		Conventional	-1.29*	.035
	Conventional	JK application	1.25*	.005
		PUP module	1.29*	.015

Source: Bonferroni test

Similarly, a study which created the Mozzify application to raise awareness, enhance understanding, and alter perceptions regarding dengue disease found that the application had a significant impact¹⁹. In accordance with this study, another study created an instant messaging application called the Tú application to assist young Bolivian women in using contraception more effectively and acceptably. Information about standard family planning is provided through the application. The usage and acceptance of at least one effective method of contraception is measured at the fourth month²⁰. Furthermore, it was found that the provision of educational content via WhatsApp can influence knowledge about adolescent reproductive health, such as menstruation, infertility, undetected disrupted ectopic pregnancy and infection²¹.

This study is consistent with another study indicating that respondents who receive education through an application are influenced by the learning process because it transforms complex concepts into easily comprehensible and acceptable ideas²². The Android application was demonstrated to be more effective and recommended than the lecture method because the application is more accessible to teenagers. Therefore, the application is readily accessible and convenient. A study demonstrated the use of smartphone applications to

monitor the nutritional status of high school students²³. The application was designed to assist in regulating and managing their health. The appearance and features of the application, including interface design, multimedia content, and social influence, make adolescents interested in downloading it. The application contains adolescent health contents to facilitate communication between them and provide information about sexual health²⁴. Another study developed the Layanan Keperawatan Kesehatan Reproduksi Remaja (Lawan Roma) application available on both Android and iOS smartphones. The application is a valuable resource for adolescents, offering reproductive health services and providing information that can be accessed according to the developmental stage of adolescents. In addition, the Lawan Roma application can serve as a convenient and confidential service for them. Furthermore, health workers or nurses can provide adolescent reproductive health services in a convenient, comprehensive, cost-effective, and time-efficient manner. In this context, adolescents can play an active role in accessing reproductive health services²⁵. Another study developed the Suami Siaga Plus Android-based application as an innovation in birth preparedness and complication readiness (BP/CR). The combination of counseling and the Suami Siaga Plus application significantly

increases the scores of husbands and wives on BP/CR compared to those who receive counseling alone²⁶.

The results of this study indicate no significant impact of knowledge about counseling methods using the PUP module and conventional method on increasing adolescent knowledge in the comparison group. During this study, the participants appeared to be less focused on oral education. For instance, some participants engaged in conversation with each other. Other participants engaged in activities on their mobile devices. As a result, they needed assistance in understanding the materials presented by the researchers. This finding is consistent with research indicating that the lecture method positions students as passive listeners²⁷. The method of receiving the information is less effective because no process of repeating the information is involved, despite the process of strengthening memory in the form of monotonous and linear note-taking. The students might perceive the learning situation as somewhat boring which might result in suboptimal learning outcomes for some students.

Table 3 shows, the JK application as an educational medium had a statistically significant impact on improving knowledge, attitude, and practice with a p-value of less than 0.05 compared to that of the PUP module and the conventional method. Overall, mentoring young women through an Android-based application makes the learning provided more effective and efficient than through the conventional module or lecture-based method.

Nevertheless, the researchers suggest that smartphone-based learning should not completely replace conventional methods. Rather, it should be used as a supplementary tool to enhance and enrich the learning experience of young women in improving their behavior, especially in terms of marriage age maturity and reproductive health. It is evident that certain sensitive matters are more effectively addressed in a face-to-face setting than via online communication. For instance counseling about sexuality problems experienced by young women is better conducted in person. In conclusion, although Android-based education has more favorable advantages regarding engagement, flexibility, personalization, and real-time tracking, educational institutions should consider using mobile-based learning to provide students with a more effective and efficient learning experience. It is intended to provide young women with

contemporary and practical learning experiences to meet the demands of rapidly evolving digital world. Furthermore, the incorporation of interactive and gamification elements can enhance the effectiveness of mobile-based learning making it more enjoyable for students.

This finding is consistent with other research indicating that the information disseminated through the media is not necessarily accurate because anyone can contribute any information to the media, which can influence adolescent perceptions and behavior, including their knowledge, attitude, and practice. If the media is created by a clear and reliable source, the information obtained by teenagers is likely to be easier to understand and lead to more positive behavior. Unfortunately, there are many sites that disseminate information with questionable accuracy, including social media²⁸.

One of the studies that created an application to improve the PUP found that smartphone-based educational materials and counseling sessions are effective in improving premarital education among couples²⁹. Therefore, it is suggested that educational contents be disseminated through mobile applications to encourage participation in premarital education classes. Other research also indicate that Android-based reproductive health education media can effectively increase the knowledge of pregnant women³⁰.

Conclusion

The Jalanan Kasih application had a positive impact on high school students. The mobile application was able to improve the knowledge, attitude, and practice of high school students in terms of marriage age maturity through the use of its contents and consultation feature.

Acknowledgement

The researchers would like to thank the Director of the Health Polytechnic of the Ministry of Health Bengkulu, Indonesia for facilitating this study.

References

1. United Nations Children's Fund (UNICEF) Indonesia. Situasi anak di Indonesia 2020. Jakarta; 2020.

2. King, Maurice. Buku III Pernikahan dini pada beberapa Provinsi di Indonesia: Akar masalah dan peran kelembagaan di daerah. Jakarta: BKKBN; 2012.
3. Sunaryanto, Heri. Analisis Sosial-Ekonomi Faktor Penyebab Perkawinan Anak di Bengkulu: dalam Perspektif Masyarakat dan Pemerintah (Studi Kasus di Kabupaten Seluma). *Jurnal Sosiologi Nusantara* 2019;5(1):22–42.
4. Biro Pusat Statistik. Statistik Kesejahteraan Rakyat Provinsi Bengkulu 2018.
5. Irani, Morvarid; Roudsari, Robab Latifnejad. Reproductive and Sexual Health Consequences of Child Marriage: A Review of literature. *Journal Midwifery Reproductive Health [Internet]*. 2019;7(1):1584–90.
6. Simbolon, Demasa; Riastuti, Frensi and Jumiyati; Suryani, Desri. Is there a Relationship Between Pregnant Women ' s Characteristics and Stunting Incidence in Indonesia. *Journal Kesehatan Masyarakat*. 2021;16(3):331-339
7. Mahato. Causes and Consequences of Child Marriage: A Perspective. *Int Journal Sci Eng Res*. 2016;7(7):698–702.
8. Afifah. Hubungan Pengetahuan Tentang Penyakit Menular Seksual Terhadap Jenis Kelamin Pada Siswa-Siswi MAN 2 Banyumas. *Prosiding*. 2018;8.
9. Naghizadeh, Somayyeh; Mirghafourvand, Mogjan; Mohammadi Azam; Azizi, Marzieh; and Taghizadeh-Milani, Saba; Ganbari, Hadiseh. Knowledge and viewpoint of adolescent girls regarding child marriage, its causes and consequences. *BMC Womens Health* 2021;21(1):1–10.
10. Naghizadeh, Somayyeh; Mirghafourvand, Mogjan. Knowledge and attitudes of adolescent girls and their mothers about early pregnancy: a cross-sectional study. *BMC Pregnancy Childbirth*. 2022;22(1):1–10.
11. Allendorf, Keera; Thornton, Arlan; Ghimire, Dhira.J and Young-DeMarco, Linda; Mitchell, Colter. A Good Age to Marry? An Intergenerational Model of the Influence of Timing Attitudes on Entrance into Marriage. *European Journal of Population*. Springer Netherlands; 2021. Vol. 37:179–209
12. Saleh, Abubakir; Othman, Samir. M and Ismail, Kameran. H; Shabila, Nazar. P. Exploring Iraqi people's perception about early marriage: a qualitative study. *BMC Womens Health*. 2022;22(1):1–10.
13. Guan, Ming. Sexual and reproductive health knowledge, sexual attitudes, and sexual behaviour of university students: Findings of a Beijing-Based Survey in 2010-2011. *Archives Public Health*. 2021;79(215):1–17.
14. Lestari, Rahayu Puji. Hubungan Antara Pernikahan Usia Remaja Dengan Ketahanan Keluarga. *Jurnal Kesejahteraan Keluarga dan Pendidikan*. 2015;2(2):84-91.
15. Moodi, Mitra; Miri, Mohammad-Reza; Sharifirad and Gholam Reza. The effect of instruction on knowledge and attitude of couples attending pre-marriage counseling classes. *Journal of Education and Health Promotion*. 2013;2(1):1-5.
16. Hasanah, Uswatun; Tarma and Jaelani, Muhammad Wahyudin. Pengaruh Implementasi Subtansi Program Pendewasaan Usia Perkawinan (PUP) Terhadap Pengambilan Keputusan Menikah Usia Dini Pada Remaja. *Jurnal Kesejahteraan Keluarga dan Pendidikan*. 2019;6(2):141–145.
17. Istawati, Rika. Hubungan Keterpaparan Media Massa , Peran Teman Sebaya Terhadap Tindakan Seksual. *Journal Endurance*. 2019;2(2):124–131.
18. Prasetyaningrum, Yunita Indah; Yuliati, Endri. Evaluasi kelayakan kesehatan berbasis android aplikasi untuk remaja putri: “NutriHealth.” *Ilmu Gizi Indonesia*. 2020;4(1):75–86.
19. Herbuela, Von Ralph Dane Marquez; Karita, Tomonori and Francisco, Micanaldo Ernesto; Watanabe, Kozo. An integrated mhealth app for dengue reporting and mapping, health communication, and behavior modification: development and assessment of mozzify. *JMIR Res Protoc* 2020;4(1):1–11.
20. McCarthy, Ona L; Calderon, Veronica Osorio and Free, Caroline. An intervention delivered by mobile phone instant messaging to increase acceptability and use of effective contraception among Young Women in Bolivia: Randomized controlled trial. *Journal Med Internet Res*. 2020;22(6):1–12.
21. Nugroho, Nehru; Hartati, Ida and Wulandari, Asmawati. Pengaruh Edukasi Menstruasi melalui WhatsApp terhadap Self Care Disminore Pada Remaja Putri SMA di Kota Bengkulu. *Journal Nurse Public Health*. 2019;7(1):88–93.
22. Dinengsih, Sri; Hakim, Nurzakirah. Pengaruh Metode Ceramah Dan Metode Aplikasi Berbasis Android Terhadap Pengetahuan Kesehatan Reproduksi Remaja. *Jurnal Kebidanan Malahayati*. 2020;6(4):515–522.
23. Ramadhan, Alfi Syahri; Wahjuni, Endang Sri and Siantoro, Gigih. Perkembangan Remaja Berbasis Smartphone aplikasi pemantau status gizi (montuza) untuk siswa SMA. *Journal Education and Development* 2021;9(3):301–305.
24. Isni, Khoiriyah; Putra, Lovandri Dwanda and Anwar, Nuril. Analisis Kebutuhan “Sidika” Sebagai Media Promosi Kesehatan Remaja. *Jurnal Forum Ilmiah Kesmas Respati*. 2019;4(1):11.
25. Mawardika, Tina; Indriani, Dian and Liyanovitasari. Peningkatan Pengetahuan Dan Sikap Remaja Tentang Kesehatan Reproduksi Melalui Pendidikan Kesehatan Berupa Aplikasi Layanan Keperawatan Kesehatan Reproduksi Remaja (Lawan Roma) Di SMP Wilayah Kerja Puskesmas Bawen Kabupaten Semarang. *Jurnal Keperawatan dan Kesehatan Masyarakat STIKES Cendekia Utama Kudus*. 2019;8(2):99–109.
26. Dana S, Hanna Y, Supriyana B, Widyawati MN, Fatmasari, Diyah, Sudiyono and Widyastari, Diah Anantalia; Sinaga, Doni Marisi. Android Application Model of “Suami Siaga Plus” as an Innovation in Birth Preparedness and Complication Readiness (BP/CR) Intervention. *Journal of Family and Reproductive Health*. 2017;11(1):30–36.
27. Islamiah A, Inayatul R and Ariwinanti, Desi. Perbedaan Pengetahuan Siswa Tentang Infeksi Menular

- Seksual (IMS) Menggunakan Metode Ceramah dan Metode Brainstorming di Sekolah Menengah Atas. *Sport Science and Health*. 2019;1(3):176–183.
28. Solehati T, Rahmat A and Kosasih CE. Hubungan Media Dengan Sikap Dan Perilaku TRIAD Kesehatan Reproduksi Remaja. *Jurnal Penelitian Komunikasi dan Opini Publik*. 2019;23(1):40–53.
29. Torkian S, Mostafavi F, Pirzadeh A. Intervention on knowledge, attitude and practice related to healthy. *Journal of Education and Health Promotion*. 2020;9(1):1–5.
30. Hasrida H. Desain media edukasi kesehatan reproduksi tentang leukorea berbasis android dalam meningkatkan pengetahuan ibu hamil. Universitas Hasanuddin; 2021. Available from:<http://repository.unhas.ac.id:443/id/eprint/3136>.