# BUILDING AN ANDROID-BASED APPLICATION FOR TEENAGE WOMEN'S REPRODUCTIVE HEALTH EDUCATION

**Hesti Kusumaningrum, Dewi Marhaeni Herawati, Hadi Susiarno**

**STIKes RSPAD Gatot Soebroto**
**Coresspondence Email : khesti988@gmail.com**

**ABSTRAK : MEMBANGUN APLIKASI PENDIDIKAN KESEHATAN REPRODUKSI REMAJA WANITA BERBASIS ANDROID**

Latar Belakang: Asupan gizi yang tidak tepat pada masa remaja dapat menimbulkan gangguan kesehatan, seperti: gangguan pertumbuhan fisik, peningkatan risiko kekurangan zat besi (Anemia Defisiensi Besi), penurunan kapasitas intelektual, gangguan kesehatan tulang, gangguan fungsi organ seksual, gangguan konsentrasi dan kinerja di sekolah, gangguan makan dan obesitas, serta gizi buruk, namun pengetahuan remaja tentang gizi sangat terbatas. Remaja mudah beradaptasi dengan literasi digital. Pemberian intervensi digital dapat memberikan dampak positif pada berbagai aspek kesehatan sehingga upaya pemberdayaan remaja melalui peningkatan promosi kesehatan dan deteksi dini permasalahan kesehatan remaja secara digital semakin berkembang pesat. Tujuan: Penelitian ini bertujuan untuk mengetahui kebutuhan remaja putri terhadap aplikasi edukasi gizi dan kesehatan reproduksi berbasis Android. Metode: Metode penelitian kualitatif adalah wawancara mendalam melalui aplikasi Zoom, video call WhatsApp, atau voice call WhatsApp. Hasil: Hasil penelitian kualitatif menunjukkan bahwa remaja putri lebih menyukai media edukasi yang mudah dan cepat dalam memberikan informasi kesehatan sehingga upaya edukasi melalui smartphone yaitu aplikasi berbasis Android menjadi solusi efektif dalam memberikan informasi yang tepat dan akurat tentang asupan gizi dan kesehatan. kesehatan reproduksi.

Kata Kunci: Kesehatan Reproduksi, Remaja Putri, Aplikasi

**ABSTRACT**

Background: Improper nutritional intake during adolescence can cause health problems, such as: impaired physical growth, increased risk of iron deficiency (Iron Deficiency Anemia), decreased intellectual capacity, impaired bone health, impaired sexual organ function, impaired concentration and performance at school, eating disorders and obesity, as well as malnutrition, but teenagers' knowledge about nutrition is very limited. Teenagers easily adapt to digital literacy. Providing digital interventions can have a positive impact on various aspects of health so that efforts to empower teenagers through increasing health promotion and early detection of adolescent health problems digitally are growing rapidly. Aim: The aim of this research is to explore the needs of young women for Android-based nutritional and reproductive health educational applications. Method: The qualitative research method is in-depth interviews via the Zoom application, WhatsApp video call, or WhatsApp voice call. Result: The results of qualitative research show that young women prefer educational media that is easy and fast in providing health information so that educational efforts via smartphones, namely Android-based applications, are an effective solution in providing precise and accurate information about nutritional intake and reproductive health.

Keywords: Reproductive Health, Young Women, Application

## INTRODUCTION

Improper nutritional intake during adolescence can cause health problems, such as: impaired physical growth, increased risk of iron deficiency (Iron Deficiency Anemia), decreased intellectual capacity, bone health problems, impaired sexual organ function, impaired concentration and performance at school, eating disorders and obesity, as well as malnutrition. This has long-term impacts in later life such as increasing the risk of osteoporosis, diabetes and heart disease.1

Adolescents' knowledge about nutrition is very limited. Holzmann et al (2019) research on 293 teenagers aged 12-18 years in 6 junior high schools in Southern Germany. Questions regarding nutrition are based on the German Nutrition Society. The results showed that 5.5% (16 teenagers) were able to answer all questions regarding nutrition correctly.6

 DOI 10.33024, http://ejurnalmalahayati.ac.id/index.php/kebidanan

Efforts to empower teenagers through increasing health promotion and early detection of adolescent health problems digitally, by realizing the fact that teenagers and smartphones are inseparable parts, it is necessary to have a smartphone application that is attractive and meets the needs of teenagers to make it easier for teenagers to carry out early detection of their health and contains health recommendations to form young women who are physically and reproductively healthy.

Based on this background, the researcher formulated a research problem, namely what the needs of young women are for Android application-based educational media regarding nutritional intake and reproductive health.

## RESEARCH METHODS

The qualitative research design is in the form of in-depth interviews via the Zoom application, Whatsapp video call, or Whatsapp voice call. The aim of the qualitative stage is to build an educational medium for nutritional intake and reproductive health for young women.

This research instrument is a human instrument using interview guidelines to obtain as much information as possible from respondents. Researchers used a voice recorder during the in-depth interview process which was conducted via the Zoom and Google Meeting applications.

Qualitative data was obtained through in-depth interviews in the form of recordings and then documentation was made in the form of written transcription. The qualitative data analysis process is through the process of transcription, reduction, coding and categorization, then carrying out interpretive analysis until things emerge that are the needs of young women to increase knowledge and attitudes about nutritional intake and reproductive health. The validity of qualitative data is obtained through trustworthiness.

This research permit application was submitted to the Research Ethics Commission of Padjadjaran University by issuing an Ethics Approval Letter Number: 932/UN6.KEP/EC/2020.

## RESEARCH RESULT

The qualitative research subjects were 7 young women, 1 parent, and 6 experts using in-depth interview methods with respondents to build good applications that suited the needs of young women, namely using the FGD (Focus group discussion) and IDI (in-depth interview) methods which resulted in 22 transcription sheet, 181 codes, 22 categories, and 4 themes outlined in the form of a conceptual model for building the Android-based application AJIB (Quality Adolescent Girls Application).

The results of qualitative interviews show that on the theme of nutritional intake there are 8 categories, namely frequency of eating, type of food, healthy eating menu, nutrients, frequency of drinking, type of drink, body mass index (BMI) and junk food. The perspective of young women regarding nutritional intake is still limited, this can be seen from several respondents who are still mistaken in stating a balanced menu correctly, such as the following statement:

*"Eat three times a day with a menu of rice, vegetables, nuts, calcium milk and eggs." (R-3)*

*"Eat twice a day, the menu consists of fruit, vegetables, side dishes and carbohydrates such as rice or brown rice." (R-1)*

Adolescents' knowledge about nutritional intake is the result of interactions from various sources of information they obtain, but the family is the most dominant factor in providing health information.

Respondents with a fat body image think that food sources of carbohydrates should be avoided because they can increase their weight so they will get fatter. Apart from that, the body image of other family members can also influence the perspective of young women. This can be seen from respondents 1 and 5 who have a fat body image, giving the answer to only consuming small amounts of rice when asked about a healthy food menu or even reducing the frequency of eating from 3 times to 2 times a day.

Young women's perspectives on food menus are also influenced by the customs of their region of origin. Respondents from the Sundanese tribe prefer to eat food that comes from plants. In this case, respondent 3 comes from the Sundanese tribe and the family's eating habits which prefer vegetables and nuts as a daily diet influence his perspective on eating habits.

Young women do not know about the ideal body weight for them and do not know how much calorie intake their bodies need. This causes respondents to never calculate their body mass index. Perceptions about one's body image are obtained based on the results of estimates when looking in the mirror or comparing with peers. The six interview respondents stated that they did not know their ideal body weight and had never calculated their body mass index.

Respondents' knowledge about junk food is quite good as can be seen from the respondents' answers regarding the meaning of junk food and the types of food that fall into the junk food category, such as the following statement:

*"Junk food is like food that has no nutrition, for example KFC chicken."* (R-1)
*"Junk food is artificial food other than rice such as burgers, KFC chicken, sausages, fried foods."* (R-2)
*"Foods that should not be eaten are like KFC, burgers, kebabs, junk food because they are oily"* (R-3)
*"Snack foods that have no nutrition and are dangerous because they contain preservatives"* (R-5)

Respondents agreed that junk food is fast food and does not contain nutrients and even contains dangerous substances such as preservatives.

The results of qualitative interviews with respondents regarding the theme of reproduction produced 10 categories, namely reproductive organs, function of reproductive organs, menstrual physiology, characteristics of menstruation, pre-menstrual syndrome, care for reproductive organs, vaginal discharge, characteristics of vaginal discharge, overcoming pre-menstrual syndrome, and menstrual myths. Respondents' knowledge about reproductive organs is quite limited. This can be seen from the respondents' statements when they mentioned the reproductive organs, namely the uterus and one respondent added the ovaries. The first thing respondents asked about reproduction was menstruation during menarche. The reproductive problems most frequently asked about by respondent mothers were menstruation, pre-menstrual syndrome and vaginal discharge, as stated by respondents as follows:

*"The female reproductive organ is the uterus for pregnancy. "Most often I ask my mother, for example, about menstruation, why when I'm menstruating my stomach hurts and what should I do" (R-1)*
*"Reproduction is about sex, in order to have offspring. I once asked my mother about menstruation and vaginal discharge." (R-3)*
*"Reproductive organs such as the uterus as a place for fetal growth, ovaries as a place to produce egg cells." (R-6)*

Adolescent girls begin to find out about reproduction when they begin to experience menarche. This is due to a very significant change, namely the release of menstrual blood for the first time, so adolescents must adapt quickly to these changes. The role of those closest to the respondent is very important in providing information about menstruation so that young women can adapt well to the changes they experience.

Respondents agreed that mothers as parents were the main source of information to obtain satisfactory answers. Parents' knowledge which comes from personal experience when facing the same thing gives rise to respondents' trust in the information they provide, such as the following statement:

*"Asked my mother about menstruation, I used the internet when looking for vaginal discharge but it was in medical language so I didn't understand what it was." (R-1)*
*"never looked for it on the internet, just from mom and school" (R-2)*
*"I once asked my mother about menstruation and vaginal discharge. But I still don't understand that the important thing is that vaginal discharge doesn't smell because it means it's normal, Mom said." (R-3)*

Respondents tried to find complete answers about menstruation such as the physiology of menstruation, how to deal with pre-menstrual syndrome, and vaginal discharge through other sources of information they preferred such as the internet but did not get satisfactory answers, as the respondent expressed as follows:

*"I don't know where menstrual blood comes from. First menstruation at 12 years old, lasts a week, changes sanitary napkins twice a day. "It's just that every time I want to menstruate, I get angry easily, but when I'm clean, I'll be normal again." (R-3)*
*"The first time I menstruated was 11 years old. During menstruation there is so much pain in the lower abdomen that I can't do anything. And it always happens every month, it seems like menstrual blood comes from the uterus." (R-6)*

Parents' knowledge that comes from their experience when dealing with menstruation, pre-menstrual syndrome, and vaginal discharge provides limited information to young women. This causes young women to need other sources of information to provide reproductive information that is more accurate and appropriate to their needs.

Based on the results of qualitative interviews with respondents, 2 categories for the theme of risky behavior were produced, namely: types of risky behavior and the impact of risky behavior. Respondents can mention types of risky behavior that could endanger their future, such as: smoking, drug consumption, and dating that leads to promiscuity. Respondents stated the impact of each of these risky behaviors, such as the following statement:

*"Smoking, drugs, dating. I don't know why drugs are not allowed, but smoking is not allowed because it can cause cancer, is dangerous for the uterus and lung cancer. And if you're dating you*

 DOI 10.33024, http://ejurnalmalahayati.ac.id/index.php/kebidanan

*can't be with your parents because you're afraid of getting pregnant out of wedlock." (R-1)*

Information regarding health behavior was obtained from parents. The role of parents as the main source of information is very important, but not all information is provided completely by parents. Adolescent girls receive limited information regarding the causes of avoiding risky behavior. Reproductive health education according to the needs of young women, especially risky behavior, including the types and impacts of risky behavior, must be provided accurately so that young women are willing to avoid risky behavior.

The results of qualitative interviews with respondents produced 3 categories of Android-based educational application display themes, namely pictures and explanations, animated menstrual videos, and basic colors blue and white. Respondents obtained reproductive health information through learning materials at school, but the information provided was still limited.

Respondents provided an overview of health services at schools which were carried out through collaboration between health workers from the Community Health Center, namely health checks and providing health promotion to students. Health examination activities include measuring height and weight for grade 7 students, providing health promotion to grade 8 and 9 students regarding clean and healthy living behavior and education about preventing anemia for young women, as well as providing Fe tablets to female students. However, the limitations of this activity are related to the limited number of health workers compared to the number of students so that the frequency of the activity is only once. Apart from that, the provision of educational media in the form of the book My Health Report, Health Information for Middle School/MTs Students was only given to the School Guidance and Counseling Department because the number of books was limited, as stated by the following respondent:

*"Every student is examined once during school, because there are so many students, it is only intended for students who have never been examined. Usually students are carried out to final 7th grade students. "From the Community Health Center, the My Health Report book was given to the children but the quantity was small so it was not distributed to the students" (R-1)*

Young women need sources of information that are accurate and can provide complete education about reproductive health in order to form good knowledge, attitudes and behavior in maintaining their reproductive health.

The role of smartphones as a source of information for young women can be developed as an effective and efficient educational medium. Young women's expectations for Android-based smartphone applications include information content and an attractive application display as in the following quote from the respondent's statement:

*"Interesting explanations such as pictures and writing, there are also videos about menstruation to make it easier to understand." (R-4)*

*"Every good piece of information has a picture to make it clearer. To explain menstruation, it's better to use an animated video. "As for color choices, my friends and I usually like blue." (R-3)*

The use of smartphone applications as a medium for reproductive health education according to the needs of young women is an effort to increase knowledge, attitudes and behavior of young women.

## CONCLUSION

Based on the results of qualitative research, young women prefer educational media that are easy and fast in providing health information, so educational efforts via smartphones, namely Android-based applications, are an effective solution in providing precise and accurate information about nutritional intake and reproductive health.

## REFERENCES

IDAI SR. Nutrisi Pada Remaja2013: Available from: http://www.idai.or.id/artikel/seputar-kesehatan-anak/nutrisi-pada-remaja.

RI BPdPKK. HASIL RISET KESEHATAN DASAR 2018. In: RI KK, editor. 2018 ed. DKI Jakarta2018.

Oddo VM, Roshita A, Rah JH. Potential interventions targeting adolescent nutrition in Indonesia: a literature review. Public Health Nutr. 2019 Jan;22(1):15-27.

Wang D. Effect of interventions to improve adolescents' nutrition knowledge in China. Health Education. 2014;114(5):322-30.

Vani K R, K S V, L S, Kumar V R H, A B. Menstrual abnormalities in school going girls - are they related to dietary and exercise pattern? J Clin Diagn Res. 2013;7(11):2537-40.

Holzmann SL, Dischl F, Schäfer H, Groh G, Hauner H, Holzapfel C. Digital Gaming for Nutritional Education: A Survey on Preferences, Motives, and Needs of Children and Adolescents. JMIR Form Res. 2019 2019/02/13;3(1):e10284.

Strasburger VC, Jordan AB, Donnerstein E. Health Effects of Media on Children and Adolescents. Pediatrics. 2010;125(4):756-67.

Maylasari I, Rachmawati Y, Agustina R, Silviliyana M, Dewi F, Annisa L, et al. Statistik Pemuda Indonesia 2018. Jakarta, Indonesia: Badan Pusat Statistik; 2018. Available from: www.bps.go.id.

Morrison LG, Hargood C, Pejovic V, Geraghty AWA, Lloyd S, Goodman N, et al. The Effect of Timing and Frequency of Push Notifications on Usage of a Smartphone-Based Stress Management Intervention: An Exploratory Trial. PLOS ONE. 2017;12(1):e0169162.

Peraturan Daerah Nomor 1 tahun 2018 tentang RPJMD Provinsi DKI Jakarta Tahun 2017-2022. In: Jakarta PDPD, editor. 2018 ed2018.

Fund UNCs. Towards an AIDS-free generation : children and AIDS - Sixth Stocktaking Report. New York, UNICEF;2013.

N K. Model of Adolescent Reproductive Health Information Dissemination in Bandung Indonesia. Atlantis Press. 2018;98.

Steinberg L. A Social Neuroscience Perspective on Adolescent Risk-Taking. Dev Rev. 2008;28(1):78-106.

3 Global Accelerated Action for The Health of Adolescents (AA-HA!): guidance to support country implementation, (2017).

Rachmi C, Wulandari E, H K, Wiradnyani L, Ridwan R, Akib T. Buku Panduan Untuk Siswa: Aksi Bergizi, Hidup Sehat Sejak Sekarang Untuk Remaja Kekinian. Jakarta: Direktorat Jenderal Kesehatan Masyarakat Kementerian Kesehatan RI; 2019.

Wiweko B, Riyanti A, Olivia S, Priangga M, Silvana V, Putro AL, et al. Community Perspectives about Reproductive Health and JAKPROS Smart Mobile Application. IOP Conference Series: Earth and Environmental Science. 2019;248:012038.

KELUARGA DK. Upaya Pemenuhan Hak Kesehatan Reproduksi Melalui Pelayanan Kesehatan Reproduksi Terpadu (PKRT). Jakarta: Direktorat Kesehatan Keluarga Kementerian Kesehatan Republik Indonesia; 2017 [diunduh 06/06/2020 2020]. Tersedia dari: kesga.kemkes.go.id/berita-lengkap.php?id=35.

Lestyoningsih IH. Implementasi Model Kesehatan Reproduksi Berbasis Masalah Pada Remaja Putri Di Indonesia Tahun 2018. Jurnal Berkala Kesehatan. Literature Review. 2018 November 2018;4(2):8.

Jarzabek-Bielecka G, Mizgier M, Kedzia W. Metrorrhagia iuvenilis and Premenstrual Syndrome as frequent problems of adolescent gynecology with aspects of diet therapy. Ginekol Pol. 2019;90(7):423-9.

Rosen MW, Weyand AC, Pennesi CM, Stoffers VL, Bourdillon CM, George JS, et al. Adolescents Presenting to the Emergency Department with Heavy Menstrual Bleeding. J Pediatr Adolesc Gynecol. 2019 Nov 22.

Lugos M, Vwamdem N, Polit U, Ofojekwu M, Damen J. Screening for Anaemia at Different Phases of the Menstrual Cycle among Female Students in a Nigerian University. ResearchGate. 2019 6 May 2019;022(6):6.

Bahrami A, Gonoodi K, Khayyatzadeh SS, Tayefi M, Darroudi S, Bahrami-Taghanaki H, et al. The association of trace elements with premenstrual syndrome, dysmenorrhea and irritable bowel syndrome in adolescents. Eur J Obstet Gynecol Reprod Biol. 2019 Feb;233:114-9.

Mizgier M, Jarzabek-Bielecka G, Jakubek E, Kedzia W. The relationship between body mass index, body composition and premenstrual syndrome prevalence in girls. Ginekol Pol. 2019;90(5):256-61.

Nisa F. Tipe Gabungan Mendominasi Jenis *Pre Menstrual Syndrome* (PMS) Pada Mahasiswi Tingkat I dan II Prodi DIII Kebidanan UNUSA. Jurnal Ilmiah Kesehatan.11(1):4.

Kusumawardani E, Adi A. Aktivitas Fisik Teratur, Asupan Makanan Tinggi Kedelai, dan Sindrom Premenstruasi pada Wanita Dewasa Muda : Penelitian Deskriptif. Jurnal Ilmiah Kedokteran Wijaya Kusuma. 2019;8(1):15.

LJ G, PMS OB, N P. On Behalf of The Royal College of Obstreticioans and Gynaecologist. Management of Premenstrual Syndrome. BJOG. 2017;124:37.

Widiatami T, Nurul W M, Admini. Study Literature Tentang Pemberian Minuman Kunyit Terhadap Tingkat Nyeri Menstruasi Pada Remaja Putri. Jurnal Kebidanan. 2018;8(2):6.

Evrianasari N, Tuasela sV. Pengaruh Alpukat Terhadap Gejala *Premenstrual Syndrome* (PMS) Pada Mahasiswa Kebidanan Tingkat I Di Prodi Kebidanan Universitas Malahayati Bandar Lampung Tahun 2017. Jurnal Kebidanan. Journal Article. 2018 2 April 2018;4(2):68-71.

Wrisnijati D, Wiboworini B, Sugiarto S. Effects of Pineapple Juice and Ginger Drink for Relieving Primary Dysmenorrhea Pain among Adolescents. Indonesian Journal of Medicine. 2019;4(2):96-104.

Suparmi, Raden A, Mawarti R. Upaya Mengurangi Dismenore Primer Dengan Ekstrak Jahe Asam Jawa Pada Mahasiswi Kebidanan STIKES Aisyiyah Surakarta. GASTER. Journal Article. 2016;XIV(2):12.

Khalesi ZB, Beiranvand SP, Bokaie M. Efficacy of Chamomile in the Treatment of Premenstrual Syndrome: A Systematic Review. J Pharmacopuncture. 2019 Dec;22(4):204-9.

Wijayanti, Ernawati, Apriani A. Effectiveness of Mint Leaf Extract (*Montha Piperita Linn.)* on Menstrual Pain Level in Adolescents. Advances in Health Sciences Research. 2020;20:5.

Febrianti R. Akupresur Titik *SP10* Menurunkan Tingkat Nyeri Menstruasi Pada Mahasantri Pondok Pesantren K.H. Sahlan Rosjidi. 2018.

Ayu N. The Effectiveness of Cananga Aromatherapy With Warm Compress in Reducing Premenstrual Syndrome (PMS) Amongest Teenage Girls. Jurnerawatan Soedirmanal Kebidanan. 2019;14(3):10.

<65__RPJMD_DKI_Jakarta_2017-2022.pdf>.

Susilawati. Pengaruh Aromaterapi Lavender Terhadap Penurunan Tingkat Kecemasan Remaja Putri Saat Pre Menstrual Syndrome (PMS) Di SMPN 07 Kotabumi Lampung Utara Tahun 2017. Jurnal Kesehatan Holistik. Journal Article. 2017;11(4):4.

Maharani Y, Fatmawati E, Widyaningrum R. Pengaruh Aromaterapi Bunga Lavender (*Lavandula angustifolia*) Terhadap Intensitas Nyeri Haid (*Dismenore*) Pada Mahasiswi STIKES Madani Yogyakarta. Jurnal Kesehatan Madani Medika. Journal Article. 2016;7(1).

Todd A, Street S, Ziviani J, Byrne N, Hills A. Overweight and Obese Adolescent Girls: The Importance of Promoting Sensible Eating and Activity Behaviors from the Start of the Adolescent Period. International Journal of Environmental Research and Public Health. 2015;12(2):2306-29.

Indonesia KKR. Rapor Kesehatanku Buku Inforrmasi Kesehatanku Peserta Didik Tingkat SMP/MTS Dan SMA/SMK/MA.2017.

M K. Ringkasan Studi "Prioritaskan Kesehatan Reproduksi Remaja Untuk Meningkatkan Bonus Demografi". Depok: Lembaga Demografi FEB-UI Indonesia FEDBU;2017 Juni 2017.

Azinar M, Fibriana A. Health Reproduction E-Booklet Multimedia Health To Improve Motivation and Knowledge at Students in Localization Areas. Advances in Social Science, Education and Humanities Research. 2019;362:4.

Pedrana AE, Pina J, Padmawati RS, Zuhrina R, Lazuardi L, Lim MSC, et al. A quasi-experimental text messaging trial to improve adolescent sexual and reproductive health and smoking knowledge in Indonesia. Sex Health. 2020 Feb 5.

Felton JW, Shadur JM, Havewala M, Goncalves S, Lejuez CW. Impulsivity Moderates the Relation between Depressive Symptoms and Substance Use across Adolescence. J Clin Child Adolesc Psychol. 2019 Jan 15:1-13.

Hong SA, Peltzer K. Early Adolescent Patterns of Alcohol and Tobacco Use in Eight Association of South-East Asian Nations (ASEAN) Member States. Subst Use Misuse. 2019;54(2):288-96.

P2P DJ. Laporan Perkembangan HIV AIDS & Penyakit Infeksi Menular Seksual (PIMS) Triwulan II Tahun 2019. In: Indonesia KKR, Penyakit DJPDP, editors. Jakarta2019. p. 169.

Wiegrebe L. An autocorrelation model of bat sonar. Biol Cybern. 2008 Jun;98(6):587-95.

Helmawati. Pembelajaran dan Penilaian Berbasis HOTS Higher Order Thinking Skills. Latifah P, editor Bandung: PT Remaja Rosdakarya Offset;2019. hlm. 1.

Huda TM, Alam A, Tahsina T, Hasan MM, Khan J, Rahman MM, et al. Mobile-Based Nutrition Counseling and Unconditional Cash Transfers for Improving Maternal and Child

Nutrition in Bangladesh: Pilot Study. JMIR Mhealth Uhealth. 2018 Jul 18;6(7):e156.

JC Y, SM R. Are the Qualities of Adolescens' Offline Friendships Present in Digital Interactions?2018 [cited 2018; 3(Issue 3): Available from: link.springer.com/article/10.1007/s40894-017-0059-y#citeas.

SJ L. Online Communication and Adolescent Social Ties: Who benefit more from Internet use? Journal of Computer-Mediated Communication. original article. 2009;14(3):509-31.

Mattebo M, Bogren M, Brunner N, Dolk A, Pedersen C, Erlandsson K. Perspectives on adolescent girls' health-seeking behaviour in relation to sexual and reproductive health in Nepal. Sexual & Reproductive Healthcare. 2019;20:7-12.

Sani R. Inovasi Pembelajaran. Edisi ke-1. Hayati Y, editor Jakarta: PT Bumi Aksara;2016.

Ghani MTA, Hamzah M, Ramli S, Daud WAAW, Romli TRM, Mokhtar NNM. A Questionnaire-Based Approach on Technology Acceptance Model for Mobile Digital Game-Based Learning. Journal of Global Business and Social Enterpreneurship (GBSE). Journal Article. 2019;5(14):11-21.

Wardani F, Sari I. Hubungan Komunikasi Keluarga dan Sekolah Remaja Puteri dengan Pengetahuan tentang Pre Menstruasi Sindrom (PMS) di SMPN 1 Tanjung Morawa. Jurnal Bidan Komunitas. 2018 12/14;1:1.

Gance-Cleveland B, Leiferman J, Aldrich H, Nodine P, Anderson J, Nacht A, et al. Using the Technology Acceptance Model to Develop StartSmart: mHealth for Screening, Brief Intervention, and Referral for Risk and Protective Factors in Pregnancy. J Midwifery Womens Health. 2019 Sep;64(5):630-40.

Russell E, Lloyd-Houldey A, Memon A, Yarker J. Factors Influencing Uptake and Use of a New Health Information App for Young People. Journal of Technology in Human Services. 2018 2018/10/02;36(4):222-40.

Kontos E, Blake KD, Chou W-YS, Prestin A. Predictors of eHealth Usage: Insights on The Digital Divide From the Health Information National Trends Survey 2012. J Med Internet Res. Original Paper. 2014;16(7):e172.

Brayboy LM, Sepolen A, Mezoian T, Schultz L, Landgren-Mills BS, Spencer N, et al. Girl Talk: A Smartphone Application to Teach Sexual Health Education to Adolescent Girls. J Pediatr Adolesc Gynecol. 2017 Feb;30(1):23-8.

Nartey E. The Effect of 'You Must Know Mobile Application' On the Knowledge and Use of Sexual and Reproductive Health Services among Young People in the Greater Accra Region, Ghana. Thesis. 2019.

Canavan CR, Fawzi WW. Addressing Knowledge Gaps in Adolescent Nutrition: Toward Advancing Public Health and Sustainable Development. Current Developments in Nutrition. 2019;3(7).

Strasburger VC, Jordan AB, Donnerstein E. Health effects of media on children and adolescents. Pediatrics. 2010 Apr;125(4):756-67.

Novadela N, Marita E. Pengaruh Susu Kedelai Dalam Meringankan Gejala Sindrom Premenstruasi Pada Remaja Putri. Jurnal Keperawatan Journal Article.XIV(1):5.

Sugarman A. The Transitional Phenomena Functions of Smartphones for Adolescents. The Psychoanalytic Study of the Child. 2017 2017/03/31;70(1):135-50.

Eschler J, Menking A, Fox S, Backonja U. Defining Menstrual Literacy With the Aim of Evaluating Mobile Menstrual Tracking Applications. Comput Inform Nurs. 2019 Dec;37(12):638-46.

Appleton KM, Passmore D, Burn I, Pidgeon H, Nation P, Boobyer C, et al. An Interactive Mobile Phone App (SMART 5-A-DAY) for Increasing Knowledge of and Adherence to Fruit and Vegetable Recommendations: Development and Pilot Randomized Controlled Trial. JMIR Mhealth Uhealth. 2019 Nov 20;7(11):e14380.

McDermott MS, Oliver M, Svenson A, Simnadis T, Beck EJ, Coltman T, et al. The theory of planned behaviour and discrete food choices: a systematic review and meta-analysis. Int J Behav Nutr Phys Act. 2015 Dec 30;12:162.

Ernsting C, Dombrowski SU, Oedekoven M, et al. Using Smartphone and Health App to Change and Manage Health Behaviors: Apopulation-Based Survey. JMIR. 2017 ;19(4):e101.

Kwasnicka D, Dombrowski SU, White M, Sniehotta F. Theoretical explanations for maintenance

of behaviour change: a systematic review of behaviour theories. Health Psychol Rev 2016;10: 277–96.

Barker M, Dombrowski SU, Colbourn T, Fall CHD, et a. Preconception health 3: Intervention Strategies to Improve Nutrition and Health Behaviours Before Conception. www.thelancet.com. 20198;16(4):1-12.

Kurniasih N. Model of Adolescent Reproductive Health Information Dissemination in Bandung Indonesia. ASSEHR. 2018;98:206-209