mHealth intervention to knowledge level and family planning participation of unmet need women in Sleman District: Randomized Controlled Trial (RCT)

Danila[1], Lutfan Lazuardi[2]

[1]Prodi Ilmu Kesehatan Masyarakat, Fakultas Kedokteran, Kesehatan Masyarakat dan Keperawatan, Universitas Gadjah Mada, Yogyakarta
[2]Prodi Ilmu Kesehatan Masyarakat, Fakultas Kedokteran, Kesehatan Masyarakat dan Keperawatan, Universitas Gadjah Mada, Yogyakarta
[1] danila.htb@gmail.com, [2]lutfan.lazuardi@ugm.ac.id

ABSTRAK

Latar Belakang: Rendahnya pencapaian program keluarga berencana di Indonesia selama tahun-tahun ini membutuhkan pendekatan yang komprehensif tetapi memiliki tujuan. Salah satu eksposur informasi yang menargetkan wanita menikah usia reproduksi telah ditetapkan sebelumnya sebagai proyek percontohan di beberapa daerah di Indonesia dengan aplikasi Skata. Kabupaten Sleman sebagai populasi terbesar dan terpadat di Provinsi DIY menjadi tantangan dan peluang sementara wanita unmet need adalah yang tertinggi sebagai perhatian tentang efek samping dari metode kontrasepsi. Menerima informasi yang salah dan kurangnya sumber daya manusia / konselor keluarga berencana yang tersedia di setiap desa menjadi alasan untuk mengeksplorasi efektivitas Skata dalam mencapai indikator keluarga berencana di lapangan.
Tujuan: Mengukur efektivitas intervensi kesehatan terhadap tingkat pengetahuan dan partisipasi dalam program keluarga berencana di kalangan wanita unmet need di Kabupaten Sleman.
Metode: Penelitian eksperimental dengan desain uji terkontrol acak (RCT). Populasi penelitian adalah wanita unmet need di Kabupaten Sleman, sampel diperoleh secara acak yang memenuhi kriteria inklusi dan eksklusi. Ukuran sampel adalah 207 peserta menggunakan rumus Lemeshow dengan kekuatan 0,80. Variabel independen adalah intervensi kesehatan keliling. Variabel dependen adalah tingkat pengetahuan dan partisipasi dalam program keluarga berencana, yang diperoleh dengan daftar periksa instrumen penelitian melalui wawancara. Analisis data termasuk statistik deskriptif, bivariat (chi-square) dan analisis multivariat (regresi logistik).
Hasil: Analisis McNemar untuk perbedaan tingkat pengetahuan pra dan posttest menunjukkan perbedaan yang signifikan (p = 0,0002). Analisis chi-square tidak menunjukkan korelasi yang signifikan antara intervensi mHealth dan tingkat pengetahuan (p = 0,1287) tetapi korelasi intervensi mHealth dan partisipasi keluarga berencana menunjukkan nilai yang signifikan (p = 0,030). Analisis regresi logistik untuk proporsi tingkat pengetahuan dalam dua kelompok tidak memiliki perbedaan yang signifikan sedangkan partisipasi keluarga berencana menunjukkan perbedaan yang signifikan antara intervensi dan kelompok kontrol dengan OR 1,85 (95% CI = 1,06-3,25)
Kesimpulan: Pemanfaatan kesehatan kurang efektif dalam meningkatkan tingkat pengetahuan tetapi menunjukkan bukti yang efektif dalam meningkatkan partisipasi keluarga berencana pada wanita unmet need. Usia menunjukkan bukti yang memengaruhi partisipasi keluarga berencana di antara wanita unmet need.

Kata kunci: mHealth; intervensi; keluarga Berencana; RCT

ABSTRACT

Background: Low achievement of family planning program in Indonesia during these years need comprehensive approaches but purposeful. One of exposures of information targeting married woman of reproductive age has been established previously as piloting project in several areas in Indonesia by Skata application. Sleman District as the biggest and densest population in DIY Province became a challenge and opportunity while the unmet need woman is highest as the concern about side-effect of contraceptive method. Received wrong information and lacked of human resources / family planning counselors that was ideally available in each village being the reasons to explore the effectivity of Skata in achieving family planning indicators in the field.
Objective: To measure the effectiveness of mHealth intervention to the knowledge level and participation in family planning program among unmet need woman in Sleman District.
Methods: An experimental study with randomized controlled trial (RCT) design. The study population was unmet need woman in Sleman District, samples were obtained randomly which meet the inclusion and exclusion criteria. Sample size is 207 participants used Lemeshow formulas with power 0,80. Independent variable was mobile health intervention. Dependent variables are

knowledge level and participation in family planning program, obtained by checklist research instrument through interview. Data analysis included descriptive statistics, bivariate (chi-Square) and multivariate analysis (logistic regression).

Results: *McNemar analysis for the difference of pre and posttest knowledge level indicated significant difference (p=0.0002). Chi-square analysis showed no significant correlation between mHealth intervention and level of knowledge (p=0.1287) but the correlation of mHealth intervention and family planning participation indicated significant value (p=0.030). Logistic regression analysis for the proportion of knowledge level in two groups has no significant difference while family planning participation indicated a significant difference between the intervention and the control group with OR 1.85 (95% CI= 1.06-3.25)*

Conclusion: *MHealth utilization less effective in increase the knowledge level but showed effective evidence in increase the family planning participation in unmet need women. Age showed evidence that influence family planning participation among unmet need women.*

Keywords: *mHealth; intervention; family planning; RCT*

INTRODUCTION

In developing countries, 74 million of unwanted pregnancies occured each year, 30 % of it caused by failure of contraceptive use by women (traditional and modern). This failure is due to the factors of the contraceptive method itself or failure due to inappropriate or inconsistent use by clients (Polis, et al., 2016). Unwanted pregnancy has serious impact on health, social and economic fields. Based on a report from The Gates Foundation in 2012, about a quarter of the 80 million unwanted pregnancies in developing countries, carried out unsafe abortions (The Gates Foundation, 2015).

The result of Performance Monitoring & Accountability 2020 (PMA2020) survey in 2015 showed that 5 out of 8 indicators of family planning program in Indonesia were still not fulfilled. Unmet need can be reduced by ensuring the availability of family planning methods and services and increasing acceptor knowledge through informed choice. This informed choice consists of 3 main information: contraceptive methods, side effects, and what to do if a case of side effects occurs (Pinandari & Wilopo, 2016). Lack of information and misinformation about modern contraception influences the selection of modern contraceptives. Factors that influence a person's knowledge about contraceptive use are education, mass media or information, age, socio-cultural and economic (Pasrah, 2014).

Widespread use of mobile phones recently has increased the provision of mobile-based health services that often termed mobile health. Mobile health has been offered as a solution to the many challenges faced by developing countries, including shortages in health workers, lack of health information, limited training for health workers, and difficulties in serving patients. The potential of mHealth in reaching people in developing countries is proven to be higher than other health technologies and infrastructure. In other studies showed that mHealth is a promising method for increasing knowledge about family planning and promoting positive attitudes about contraceptive use (Johnson, Juras, Riley, Chatterji, & Sloane, 2017)

Yogyakarta is one of the provinces in Indonesia that has high number of unmet need, this is a province with the highest rate of unmet need because of concern with the side effects (26%). Meanwhile, the largest population and the highest population density of all districts in DIY are in Sleman Regency. Sleman Regency has a population of 1,180,479 people, with a population density of 2,054

people per km2. The couples of productive age who were one of the family planning program targets in 2016 were 159,366 couples. The number of active family planning participants in Sleman Regency in 2016 was 121,606 couples (BPS, 2017).

In December 2017, all family planning field officers in Sleman Regency have been distributed smartphones as a tool used to support mobile-based activities in the field called E-Visum and other applications. The ideal number of field officer per 1 village is 1 officer, but currently there are only 50 officers available. In order to fulfill the lack access of family planning services in Sleman Regency, Skata application is being introduced to women as effort to increase the knowledge level and family planning participation.

LITERATURE REVIEW

1. Digital Intervention

Digital interventions in health behavior change are various interventions that use digital technology to support and encourage behavioral changes that will improve and maintain health status, through monitoring, prevention and management of various health problems (Hekler, et al., 2016 ; Yardley, Patrick, Choudhury, Michie, 2016). The WHO Global Observatory for eHealth states that mHealth is an effort in the field of medicine and public health supported by mobile devices, such as cellular phones, patient monitor devices, personal digital assistants (PDAs), and other wireless devices.

Many evidences of mHealth programs are successful in public health, but challenges still need to be faced. The latest review of mHealth in maternal and child health programs emphasizes the challenges of mHealth which include infrastructure policies, funding sustainability, and the ability of the system to be developed (scalability) as well as adjusting to the socio-cultural context. Many mHealth and telemedicine initiation programs begin with a fund-based or academic-based project, and may not be extended after the pilot project assistance period or research has ended (Irawan, et al., 2016)

2. Mobile Application in Family Planning Program in Indonesia

Skata is one of several mobile application that being implemented to support the increasing of knowledge level an innovation from the collaboration of the Johns Hopkins Center for Communication Program (CCP) Indonesia with BKKBN that has been launched at the end of 2015 in 4 provinces in Indonesia. Complete information that is clear and easy to be obtained, additional features that are interesting to share with friends, and reduce concerns about contraceptive side effects are some of the benefits respondents received immediately after the Skata installation (Rajan, 2017).

RESEARCH METHOD

This study is an experimental study with a randomized controlled trial (RCT) design that randomly assigned participants into two groups. The study conducted from January to April 2019 in 17 sub-districts in Sleman, precisely in 51 villages. Sample size was obtained based on the sample size formula for two proportions in each intervention group and the control

group was 94 people. To avoid problems prior to drop out, the number of sample is increased by approximately 10% so that each group becomes 103 people. Subjects taken with consecutive sampling, all subjects included in the kaders' report of unmet need women from December 2018 until January 2019 and the inclusion criteria will be chosen until the required number of samples is fulfilled. Then from a number of these samples, simple random sampling will be conducted to determine whether respondents included in the intervention group or in the control group. Intervention in this study is utilized of family planning education and self-management in Skata application. Participants in intervention group socialized and monitored using mHealth in 8 weeks follow-up.

Variables in this study is mHealth utilization as independent variable, while knowledge level and family planning participation as dependent variables. Moderator variables including characteristics of respondents: age, education, occupation, parity status and counselling from field counsellors/ kaders within 6 months. STATA 13.1 to analyze the difference, correlation and influence between the level of knowledge and participation in family planning in the intervention group and the control group with the use of mHealth.

RESULT

Excluded 3 potential participants because of they are not own a mobile phone and infecund. A total of 207 were enrolled in this study, 103 were assigned to the intervention group and 104 to the control group.

1. Baseline Characteristics and Homogenity

Mostly participants are in the same characteristics (homogenous) of variables, ie: age, education, occupation, parity and counselling in last 6 months. It is showed by Chi-square analysis that is significantly no evidence of difference among variables ($p>0.05$, CI 95%)

2. Knowledge Level Difference of Pre and Post-Test

Variables tested in McNemar analysis is knowledge level, which is significantly difference showed in p-value 0.0002 (CI 95%, X^2 13.00).

3. Correlation of mHealth Utilization to Knowledge Level and Family Planning Participation

The subgroup analysis found no evidence that either education, occupation, parity or counselling from field counsellors/ kaders influenced the effect of intervention on increasing knowledge level and family planning participation. Besides, age is significantly associated with family planning participation.

There was no significant direct association between the groups in the proportion of unmet need women in knowledge level ($p=0.129$), but there were reported that the intervention had been associated with the increase level of family planning participation ($p=0.030$).

4. mHealth Utilization to Family Planning Participation by Considering Age Variable

In Logistic regression analysis, the variables analyzed in order to measure the of mHealth utilization to family planning participation by considering age of participants since the variable has significantly direct association with

the family planning participation from the previous analysis. Significantly more women in the intervention group than the control group reported using long-acting contraceptive method. mHealth utilization showed significant result OR=1.84 or means 2 times could influence the family planning participation, while it is showed 1.85 and R^2 0.033 with considering age of participants that considered as mHealth predicted family planning participation as much as 3.3%.

DISCUSSION

1. **Baseline Characteristics and Homogenity**

   Characteristics of participants showed no difference among women in intervention and control group. This results are in line with previous study stated that unmet need women are mostly in the age 35 and above (Listiyaningsih, et al.,2016), higher education background (Sariyati, et.al., 2015), un-occupied women or housewife (Panutun, et al., 2009), have at least 2 kids alive (Sariyati, et.al., 2015), and had exposed by counselling/ family planning information in last 6 months (Shintiana, 2016).

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   4. Knowledge Level Difference of Pre and Post-Test

   This result is in line with the previous study which stated that there was significantly difference among kaders' knowledge of family planning before and after a training

about iPosyandu application (Widarti, et al.,2018) The difference of knowledge level showed trials or tools were effectively change participants' attitude or behavior.

5. **Correlation of mHealth Utilization to Knowledge Level and Family Planning Participation**

The subgroup analysis found no evidence that either education, occupation, parity or counselling from field counsellors/ kaders influenced the effect of intervention on increasing knowledge level and family planning participation. Besides, age is significantly associated with family planning participation.

Proportion of unmet need women in knowledge level showed no significant evidence of correlation with mHealth intervention, but there were reported that the mobile health intervention had been associated with the increase level of family planning participation. This result is contradict with previous study by Braun, et.al. (2016) which is stated that mHealth use by kaders in the field has associated with the knowledge level to practice health and service quality. Also contradict with the study conducted by Johnson, et.al. (2017) that indicated no evidence of family planning application "m4RH" in Kenya that associated with the use of contraception. However, more participants in the intervention than the control group reported long-acting contraceptive method use (implant and IUD).

Theoretically, knowledge has bigger contribution in behavior change, but during the study found that some participants used contraceptive methods not because of they have enough information about the method and side-

effect, but they decided because of their friends or family use the same method, or because of the free-service available.

6. mHealth Utilization to Family Planning Participation by Considering Age Variable

This result in line with previous study by Smith et.al.,(2017) that analyzed family planning application use in lost to follow up respondents, stated that participants under 25 years old are mostly drop-out or had no plan to use any contraceptive methods. Unmet need women above 35 years that having more experience of using contraceptives than other women preferred to practice abstinent than experience the uncomfortable side-effects. Fear of one or multiple side-effects of the contraceptive methods being discussed amongst friend and counsellors whenever they accessed the information from mHealth. Result of this study showed that by considering the age of unmet need women in using mobile health application, misinformation and fearness of side-effects should be prevented among this group, they have the chance two times to participate in family planning program rather than women in control group. Unmet need women are urgent to use contraceptive method, any applications or program that established the shared decision making model hopefully would change their attitude and behavior faster. Results also showed that the proportion of women above 35 years old is higher than younger women that chosen long-lasting method of contraception (41.5%).

CONCLUSIONS AND RECOMMENDATIONS

MHealth utilization less effective in increase the knowledge level but showed effective evidence in increase the family planning participation in unmet need women. Age showed evidence that influence family planning participation among unmet need women.

The sustainability of mHealth utilization among counsellors and field officers in motivating women to use contraception is highly recommended. Further study related to feasibility and effectiveness in mHealth should conducted in different method of study (qualitative).

REFERENCES
1. BKKBN DIY (2012) *KB Pasca Persalinan dan Pasca Keguguran,* Yogyakarta: BKKBN DIY.
2. BPS, BKKBN, Kementerian Kesehatan & ICF International (2013) *Survei Demografi dan Kesehatan Indonesia 2012,* Jakarta: BPS.
3. Badan Pusat Statistik. (2017). Kabupaten Sleman dalam Angka, Yogyakarta. http://slemankab.bps.go.id
4. Braun, R., Lasway, C., Agarwal, S., L'Engle, K., Layer, E., Silas, L., Mwakibete, A., Kudrati, M. (2016) An evaluation of a family planning mobile job aid for community health workers in Tanzania. Contraception, 94, 27-33. http:/dx/doi.org/10.1016/j.contraception.2016.03.016
5. Dhiedhiou, A., Gilroy, K.E., Cox, C.M., Duncan, L., Koumtingue, D., Pacque-Margolis, S., Fort, A., Settle, D., Bailey, R. (2015) Successful mLearning pilot in Senegal: Delivering family planning refresher training using interactive voice response and SMS. Journal of Global Health: Science and Practice. Vol.3, No.2. http://dx.doi.org/10.9745/GHSP-D-14-00220.
6. Hekler, E.B., Michie, S., Pavel, M., Rivera, D.E., Collins, L.M., Jimison, H.B., Garnett, C., Parral, S., and Spruijt-Metz, D. (2016). Advancing models and theories for digital behavior change interventions. *American Journal of Preventive Medicine* (51:5), pp. 825-832.

7. Irawan, Y. S., Soegijokol, S., Koesoema, A. P., Utama, Q., A, A. R. A., Isdiningrat, I. I. S., & Husin, F. (2016). Towards Sustainable mHealth Applications for Maternal and Child health, 3270–3274.

8. Johnson, D., Juras, R., Riley, P., Chatterji, M., & Sloane, P. (2017). A randomized controlled trial of the impact of a family planning mHealth service on knowledge and use of contraception. *Contraception*, *95*(1), 90–97. https://doi.org/10.1016/j.contraception.2016.07.009

9. Lee, S., Chib, A., Kim, JN. (2011) Midwives' cell phone use and health knowledge in rural communities. *J Health commun* 2011; 16:1006-23.

10. Listiyaningsih, U., Sumini, Satiti, S. (2016) *Unmet Need*: Konsep Yang Masih Perlu Diperdebatkan. Jurnal Populasi. Volume 24 No.1, Hal:72-90.

11. Li Y, Wang W, van Velthoven MH, Chen L, Car J, Rudan I, Zhang Y, Wu Q, Du X, Scherpbier RW. (2013) Text messaging data collection for monitoring an infant feeding intervention program in rural China: feasibility study. *J Med Internet Res*. Dec 04; 15(12):e269. doi:10.2196/jmir.2906.

12. Manurung, Suryani (2013), Model pengambilan keputusan meningkatkan akseptor keluarga berencana metode kontrasepsi jangka panjang, Jurnal Kesehatan Masyarakat Nasional Vol.7, No.11, Juni 2013.

13. Medhanyie, A.A., Desta, A., Alemayehu, M., Gebrehiwot, T., Abraha, T.A., Godefay, H. (2017) Factors associated with contraceptive use in Tigray, North Ethiopia. Reproductive Health, 14:27, doi:10.1186/s12978-017-0281-x

14. Notoatmodjo, S. (2014) *Metodologi Penelitian Kesehatan.* Rineka Cipta, Jakarta.

15. Nurchasanah, S. (2011) *Pengaruh Alat Bantu Pengambilan Keputusan Ber-KB (ABPK) Terhadap Keikutsertaan KB Pada Ibu Pasca Abortus Randomized Controlled Trials (RCT) di Kota Yogyakarta.* Tesis Universitas Gadjah Mada.

16. Panutun, S., Wilopo, S.A., Kurniawati, L. (2009). Hubungan antara akses KB dengan pemilihan kontrasepsi hormonal dan non hormonal di Kabupaten Purworejo. Berita Kedokteran Masyarakat. 25 (2): 88-95.

17. Pasrah, R. Tri, S.P., Toti, I. (2014). Efektivitas program keluarga berencana dalam menekan laju pertumbuhan penduduk di Kota Pekanbaru. *Jom Fekom.* 1(2): 318-344.

18. Pinandari, A. W., & Wilopo, S. (2016). Putting the results of the 2015 PMA 2020 survey in Indonesia into context, (August). https://doi.org/10.13140/RG.2.2.29270.86084

19. Polis, C. B., Bradley, S. E. K., Bankole, A., Onda, T., Croft, T., & Singh, S. (2016). Contraceptive Failure Rates in the Developing World : An Analysis of Demographic and Health Survey Data in 43 Countries, (March).

20. Rajan, R. (2017) Digital Engagement: It's a process, not just an outcome. Findings from Testing the Skata mobile app for family planning Indonesia. GDHF. Johns Hopkins University.

21. Rotie, N.M.M., Tombokan, S., Adam, S.K. (2015) Hubungan Pengetahuan dan Tingkat Pendidikan Ibu dengan Penggunaan Metode Kontrasepsi Efektif Terpilih. Jurnal Ilmiah Bidan, Vol.3 No.1, Januari - Juni 2015.

22. R. Perry, B. Lunde, K.T.Chen, (2016), An evaluation of contraception mobile applications for providers of family planning services*, Contraception* 93, 539-544. http://dx.doi.org/10.1016/j.contraception.2016.01.005

23. Ryu, Seewon. (2012) mHealth: New Horizons for Health through Mobile Technologies: Based on the Findings of the Second Global Survey on eHealth (Global Observatory for eHealth Series, Volume 3), *Healthcare Informatics Research*: 2012 September 18(3), 231-233. http://dx.doi.org/10.4258/hir.2012.18.3.231.

24. Sariyati, S., Mulyaningsih, S., Sugiharti, S. (2015). Faktor yang berhubungan dengan terjadinya unmet need KB pada pasangan usia subur (PUS) di Kota Yogyakarta. Journal Nurse and Midwifery Indonesia. Vol.3, No.3: 123-128

25. Shintiana, L. (2016) Penggunaan Konseling Individu dan Berpasangan pada Utilisasi Kontrasepsi Pasca Persalinan: Randomized Controlled Trials (RCT). *Dokumen Karya Ilmiah | Tesis | Minat Kesehatan Ibu dan Anak – Kesehatan Reproduksi | Fakultas Kedokteran, Kesehatan Masyarakat dan Keperawatan | Universitas Gadjah Mada, 5-6.* Retrieved from http://ugm.ac.id/

26. Smith, C., Ngo, T. D., Gold, J., Edwards, P., Vannak, U., Sokhey, L., … Free, C. (2015). Effect of a mobile phone-based intervention on post-abortion contraception : a randomized controlled trial in Cambodia, (October), 842–850.

27. Smith, C., Ly, S., Uk, V., Warnock, R., & Free, C. (2017). Women ' s views and experiences of a mobile phone-based intervention to support post-abortion contraception in Cambodia, 1–10. https://doi.org/10.1186/s12978-017-0329-y

28. Turner T. Prevention treatment of pediatric obesity using mobile and wireless technologies: a systematic review. (2015) *Pediatr Obes*. 2015;10(6):403-9. https://doi:10.1111/ijpo.12002.

29. Widarti, W., Rinawan, F.R., Susanti, A.I., Fitri, H.N. (2018) Perbedaan pengetahuan kader posyandu sebelum dan sesudah dilakukan pelatihan penggunaan aplikasi iPosyandu. Jurnal Pengabdian dan Pengembangan Masyarakat 1 (2), 143-150.

30. Wilopo, S. A., Setyawan, A., Pinandari, A. W., Prihyugiarto, T., Juliaan, F., & Magnani, R. J. (2017). Levels , trends and correlates of unmet need for family planning among postpartum women in Indonesia : 2007 – 2015, 1–14. https://doi.org/10.1186/s12905-017-0476-x

31. World Health Organization (2006). Decision-making tool for family planning clients and providers

technical adaptation guide. Johns Hopkins Bloomberg School of Public Health/ Center for Communication Programs

32. World Health Organization (2011), mHealth: New Horizons for Health through Mobile Technologies: Second Global Survey on eHealth. WHO, Geneva, Switzerland, v2011, http://www.who.int/goe/publications/goe_mhealth_web.pdf

33. Zuhriyah, A., Indarjo, S., Raharjo, B.B. (2017) Kampung Keluarga Berencana dalam peningkatan efektivitas program keluarga berencana. *Higeia Journal of Public Health Research and Development*, 1: 4, 2017.