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by Lia Nurcahyani

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Effects of Using an Application for Postpartum Contraceptive Use in Family Planning Counseling During Pregnancy

Lia Nurcahyani^{1,4*}, Dyah Widiyastuti^{1,4}, Arief Tarmansyah Iman^{2,4}, Yanti Cahyati^{3,4},
Yeni Fitrianiingsih¹

¹ Department of Midwifery, Poltekkes Kemenkes Tasikmalaya, West Java, Indonesia

² Department of Medical Record & Health Information Management, Poltekkes Kemenkes Tasikmalaya, West Java, Indonesia

³ Department of Nursing, Poltekkes Kemenkes Tasikmalaya, West Java, Indonesia

⁴ Health and Disaster Emergency (HADE) Center, Center of Excellence Poltekkes Kemenkes Tasikmalaya, Tasikmalaya, Indonesia

* Corresponding Author: Lia Nurcahyani, Department of Midwifery, Poltekkes Kemenkes Tasikmalaya, West Java Province, 45132, Indonesia, email lianurcahyani17@gmail.com, phone: +62 813-2070-9565

Abstract

A decision-making tool for family planning flipchart is used for contraceptive counseling, but the use of this flipchart is suboptimal. In this study, primary research resulted in innovative decision-making tools for family planning application. “Si KB Pintar” was also developed, a tool that women can use to discuss contraceptives with their husbands after family planning counseling. This study analyzed the effectiveness of family planning counseling during pregnancy with the application of postpartum contraceptive use. Analytical quantitative quasi-experimental methods were used with a control group design. The sampling method was two-stage sampling. In the first stage, from all primary health care (PHCs) in Cirebon City, Indonesia (22), 11 intervention and 11 control groups were selected using random allocation. Five respondents were taken from each PHC in the second stage using simple random sampling. The findings indicate that respondents given family planning counseling using an application had a 2.4 times higher likelihood of using postpartum contraception compared to flipcharts after controlling for age and parity variables. Because these applications are only for Android users, applications should be produced that all users can utilize in further research.

Keywords: family planning, counseling, application, postpartum contraceptive

Introduction

Approximately 800 women die daily from avoidable conditions associated with pregnancy and childbirth, and 99% of all maternal mortality occurs in developing countries.¹ One factor causing high maternal mortality in Indonesia and other developing countries is being too young or old to give birth. If the family planning program is adequately implemented, 33% of maternal mortality may be prevented through contraception.² This aligns with the population control problem, which remains a largely unaddressed issue. In the last 10 years, a downward trend in unmet needs in Indonesia was stagnant at 11%, while the target in 2024 is 7.4%.³ The percentage of unmet need in Cirebon City exceeds the national figure at 23.02%.⁴

A causative factor of unmet needs is a lack of communication of information on family planning education and suboptimal counseling.⁵ Based on the Indonesian Method Information Index in Family Planning Report 2020, the quality of family planning counseling is 30.4%,⁶ indicating that it has not been carried out adequately. Hence, efforts must be made to strengthen the implementation of counseling, including technical implementation, which can be done more efficiently by officers.

The tool used for contraceptive counseling is the decision-making tool for family planning flipchart.⁷ Information was obtained about this tool from the literature. Previous studies have concluded that counseling using family planning decision-making flipcharts for pregnant women has a significant effect on postpartum contraceptive use.^{8,9,10}

The problem is that the use of these flipcharts is relatively low. In one study of 117 midwives in Surakarta City, Indonesia, they were used by only 17.9%.¹¹ In Cirebon City, midwives' mastery of the structure and ability to use this flipchart remains lacking, so the quality of family planning counseling is suboptimal.¹² Decision-making tools for family planning flipcharts are rarely used because they are complex and take a long time. Hence, midwives are not confident in conducting family planning to counsel.¹³ This tool has the disadvantage of being impractical, large, and heavy, especially when providing counseling at the client's home.¹⁴

Technological innovation is required to make it easier for midwives to use decision-making tools for family planning. The use of technology-based contraceptive decision aids has a positive effect on contraceptive use.¹⁵ A previous study conducted primary research that resulted in Android-based digital decision-making tools for family

planning innovations that met requirements for system quality, information quality, and user satisfaction.¹³

Based on expert input, the decision-making tools for family planning digitally changed their name to “decision-making tools for family planning applications,” and a feasibility test was carried out.¹⁶ Based on input from midwives who were respondents in previous studies,¹³ this research also developed “Si KB Pintar,” an Android-based application that contains information about various contraceptives, including criteria for medical requirements, side effects, how to use them, when to revisit, and things to remember, which can be used at home if the client does not decide immediately during counseling.

Family planning counseling should be started during pregnancy so that mothers have time to choose contraceptive methods. This study analyzed the effectiveness of family planning counseling during pregnancy using a decision-making tools for family planning application and Si KB Pintar for postpartum contraceptive use. This research will provide references on family planning counseling media that can address unmet needs.

Methods

Study Design

The design of this study was quasi-experimental with a control group. The effect of family planning counseling during pregnancy was measured using decision-making tools for family planning applications and Si KB Pintar on postpartum contraceptive use. This research was conducted in Cirebon City because the rate of unmet need in Cirebon City exceeds the national figure, and midwives’ mastery of the structure and ability to use decision-making tools for family planning flipcharts is still lacking.

Variables

The primary independent variable in this study was family planning counseling, and the dependent variable was postpartum contraceptive use. Potential confounders, including age, parity, and knowledge (before intervention), controlled for the association between family planning counseling and postpartum contraceptive use.

Participants in This Study

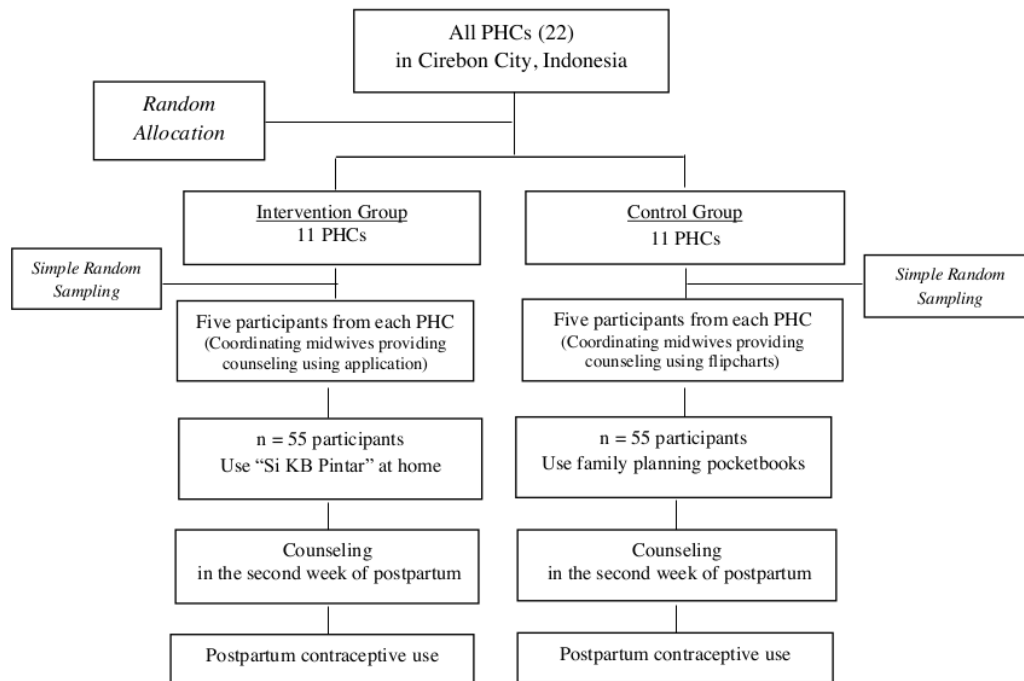
The study population was pregnant women in Cirebon City, Indonesia. The inclusion criteria for participants were gestational age ≥ 37 weeks, access to an Android device, and registration in the cohort. The exclusion criterion was unwillingness to be a respondent. The estimated sample size for each group was determined according to the formula by Lwanga and Lemeshow,¹⁷ resulting in a minimum sample size of 41 respondents. To account for the potential loss to follow-up, 35% was added, resulting in 55 participants for each group. The sampling method was two-stage sampling. In the first stage, from all primary health care (PHCs) in Cirebon City (22 PHCs), 11 intervention and 11 control groups were determined using random allocation. Five respondents were taken from each PHC in the second stage using simple random sampling. This study's enumerators are all coordinating midwives from 22 PHCs in Cirebon.

The intervention in this study was family planning counseling using an application for postpartum contraceptive use. In the preparatory stage, enumerators in the intervention group were trained to use decision-making tools for family planning applications. Enumerators in the control group were given refresher training in using decision-making tools for family planning flipcharts. Each midwife then counseled five respondents. Respondents in the intervention group installed Si KB Pintar to discuss family planning with their husbands, while respondents in the control group were given family planning pocketbooks. This is important because decision making for contraceptive use among all respondents was based on mutual agreement between the wife and husband. During the second-week postpartum visit, they were asked whether they had chosen the contraception to be used. The second counseling was carried out to explain what was not understood. Data collection on postpartum contraceptive use was carried out 42 days after delivery.

Figure 1. Sampling Framework

Research Instrument

The study instruments included ³ decision-making tools for family planning applications and Si KB Pintar for the intervention group, ³ decision-making tools for family planning flipcharts and family planning pocketbooks for the control group, and questionnaires.



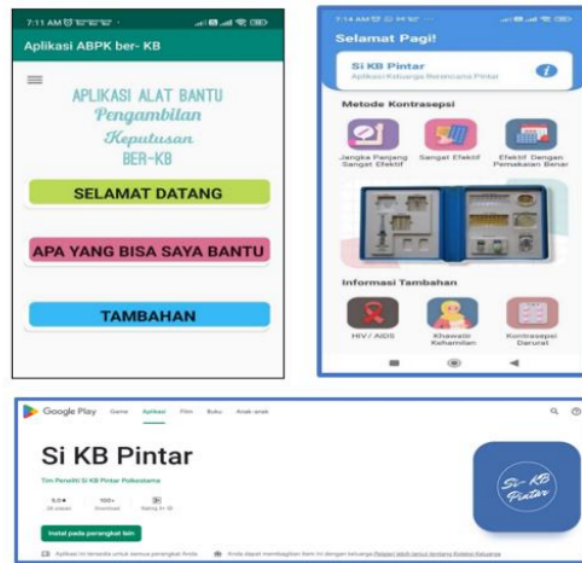


Figure 2. Main Menu in Decision-Making Tools for Family Planning Application and Si KB Pintar

Statistical Analysis

The analysis began with data completion by editing, coding, and entering. Data were analyzed by univariate, bivariate, and multivariate analyses. Univariate analysis was conducted to describe each group's characteristics and distribution frequency of age, parity, and knowledge. Bivariate analysis was conducted using the chi-square test to analyze the relationship between the independent and dependent variables. Multivariate analysis with logistic regression was conducted to control for potential confounders, including age, parity, and knowledge. The variables to be included in the logistic regression had a p-value < 0.25.

Results

Table 1 shows that most pregnant women were 20–34 years old, but some were <20 years in the intervention group, and there were women ≥ 35 years in both groups. Most pregnant women had a parity of 2–3, but some had a parity ≥ 4 , 21.8% for each group. Most pregnant women had insufficient knowledge about contraception.

Based on $p > 0.05$, there were no statistically significant differences in age, parity, or knowledge between the two groups, thus indicating homogeneity.

Table 1. Frequency Distribution of Participant's Characteristics

Variable	Intervention Group		Control Group		p-value
	f	(%)	f	(%)	
Age					
≥35	10	18.1	8	14.5	0.174
20–34	42	76.4	47	85.5	
<20	3	5.5	0	0	
Parity					
≥4	12	21.8	12	21.8	0.797
2–3	29	52.7	26	47.3	
1	14	25.5	17	30.9	
Knowledge					
Good	0	0	4	7.3	0.079
Enough	24	43.6	27	49.1	
Insufficient	31	56.4	24	43.6	

As shown in Table 2, family planning counseling using the application and age were significantly related to postpartum contraceptive use ($p = 0.021$ and 0.039 , respectively), but parity and knowledge were not significantly associated with postpartum contraceptive use.

Table 2. Association of Family Planning Counseling and Characteristic Factors with Postpartum Contraceptive Use

Variable	Category	Postpartum Contraceptive Use				p-value
		Yes		No		
		n	%	n	%	
Family Planning Counseling	Using application	38	69.1	17	30.9	0.021
	Using Flipchart	25	45.5	30	54.5	
Age	≥35	14	77.8	4	22.2	0.039
	20–34	46	51.7	43	48.3	
	<20	3	100	0	0	
Parity	≥4	17	70.8	7	29.2	0.244
	2–3	31	56.4	24	43.6	
	1	15	48.4	16	51.6	
Knowledge	Good	1	25	3	75	0.372
	Enough	31	60.8	20	39.2	
	Insufficient	31	56.4	24	43.6	

The variables to be included in logistic regression had a p-value < 0.25 (age and parity). The model was developed, and the confounding variables were evaluated by comparing the OR of the primary variable (family planning counseling) before and after a confounding variable was excluded. Then, the variable with the most significant p-value was excluded. Because the difference in the OR of the family planning counseling variable was higher than 10%, age and parity were included in the model. Table 3 shows that respondents given family planning counseling using an application had a 2.4 times higher likelihood of using postpartum contraception compared to flipcharts after controlling for age and parity variables.

Table 3. Multivariate Analysis of the Effectiveness of Family Planning Counseling Using Applications on Postpartum Contraceptive Use Controlling for Age and Parity

Variable	Category	Postpartum Contraceptive Use	
		OR	95% CI
Family Planning Counseling	Using Application	2.421 *	1.080–5.428
	Using Flipchart	1	
Age	≥35	2.439	0.673–8.840
	20–34	0.000	0.000
	<20	1	
Parity	≥4	1.645	0.545–4.966
	2–3	2.084	0.594–7.308
	1	1	

Notes : OR = Odds ratio, CI = Confidence interval, * = Significant (p < 0.05)

Discussion

Maternal age can be a risk factor for maternal and infant mortality. Based on data from 144 countries and territories, there is a higher risk of maternal death for adolescents compared to mothers aged 20–24 years, and the highest risk is in women older than 30.¹⁸ The higher risk of maternal adolescent death relates to biological maturity and social conditions.⁸ There are many compelling reasons for adolescents to avoid early childbearing, including adverse social, educational, and economic consequences for young mothers.¹⁹ The higher risk of maternal mortality when pregnant or giving birth at a young or old age is due to characteristics. Based on data from Indonesian Basic Health Research, pregnancy complications are the most common in women aged 10–14 years, as high as 38.5%.¹⁷ The highest rate of birth complications occurs for women aged <15 years at 35.8% and at ≥35 years at 27%. The highest rate of postpartum complications occurs in women aged 15–19 years at 13.1%.²⁰ Characteristics related to the mother's age

also affect infant mortality. In Indonesia, the chance of infant mortality is higher for children born to mothers who are too young or too old. The highest risk ratio is for births to mothers aged 35 years and over.²¹

Some pregnant women in this study had a parity ≥ 4 . A previous study using data from the Indonesian Demographic and Health Survey, which included 14,827 live births in the 2012–2017 period, showed that women with a parity ≥ 4 had 1.9 times the risk of experiencing neonatal death compared to multiparas after controlling for the mother's age, birth attendant, and place of delivery.²² Another study using Demographic and Health Survey data in 10 countries in Africa, Asia, and Latin America concluded that maternal and child mortality rates were higher at high parity and associated with lower access to health interventions.²³ Pregnancy among women aged ≥ 35 years and those with high parity is associated with a higher risk of maternal and infant mortality. These pregnancies often occur because family planning and reproductive health programs are neglected. Efforts to reduce teenage pregnancies, geriatric pregnancies, and pregnancies with high parity involve using contraception. Maternal mortality can be prevented by increasing access to contraception.¹⁹ When associated with unmet needs, women of childbearing age ≥ 35 have a 1.8 times higher risk of unmet needs for family planning than women under 35 because the demand for contraception increases with age.²⁴

Based on the findings of this study, age influences contraceptive use, with the highest use observed at age < 20 followed by > 35 . This indicates that after receiving the intervention, respondents in these age groups understood the importance of contraceptive use. The results of this study align with research conducted in Bangladesh that found that age influenced contraceptive use.²⁵

One cause of unmet needs is suboptimal family planning counseling. This can be caused by service providers' low competence in counseling, insufficient time for counseling clients, and suboptimal collaboration between service providers and clients in the counseling activities carried out. Clients' shared understanding of family planning can also cause them to leave decisions to their service providers. This certainly impacts the effectiveness of family planning counseling in improving family planning behavior. Based on the findings of this study, most pregnant women had insufficient knowledge about contraception. This indicates that family planning counseling has not been optimal.

The goal of family planning counseling is to assist clients in identifying their contraceptive needs, selecting the optimal method, and making decisions that can be implemented as needed. Counseling is carried out to provide input on contraceptive methods and factors necessary to consider in the choice based on their reproductive goals. This counseling focuses on the client's interests in selecting the contraceptive method they want. Service providers are obliged to respect the decisions made by clients.²⁶ Family planning counseling can help clients choose the desired method, manage side effects, and support method changes, and high-quality counseling can reduce unmet needs for contraception.²⁷

Family planning counseling should be provided from the time of pregnancy, even though in reality, family planning counseling that begins during pregnancy is still suboptimal. Research in Nepal showed that one-third of 24 pregnant women did not receive family planning counseling services during antenatal care. The quality of antenatal family planning counseling was considered unsatisfactory based on client expectations and interactions with providers. Reasons given included a crowded environment, short time with providers, unavailability of providers, long waiting times, a limited number of days for antenatal care services, and clients feeling they did not receive complete information about family planning.²⁸

In Indonesia, information about family planning must be provided to pregnant women. Various studies have shown the effectiveness of family planning counseling on contraceptive use during pregnancy. Family planning counseling begins during the prenatal period because women who have entered the postpartum period usually focus on recovering from labor and caring for their newborn.²⁹ One systematic research review concluded that contraceptive counseling during pregnancy and postpartum could increase contraceptive use.²⁷ Service providers should start contraception counseling from prenatal care and arrange several visits.³⁰ Contraceptive counseling is crucial for antenatal and postnatal periods.³¹

In this study, the respondents' midwives agreed to provide family planning counseling during pregnancy because the mothers were still focused and there was still time to choose a contraceptive method. If they had already given birth, they may have been more focused on caring for their babies. In this study, the intervention for family planning counseling was provided at ≥ 37 weeks of pregnancy using decision-making

tools for family planning applications and Si KB Pintar, and was re-evaluated at the second-week postpartum visit to determine whether the respondent had chosen a contraception method. The second counseling session was carried out to explain anything that was not understood with the decision-making tools for family planning. Postpartum contraceptive use commenced 42 days after delivery.

As shown in Table 3, respondents given family planning counseling using the application had 2.4 times the likelihood of using postpartum contraception compared to flipcharts after controlling for age and parity variables. Clients need information provided so that when the counseling process is carried out, they are focused and enthusiastic about asking the midwife. This is in line with a study conducted in Spain to compare the effectiveness of perinatal contraceptive counseling with standard postpartum contraceptive counseling.³² The media used in that research consisted of leaflets and blogs with practical information on all contraceptive options, plus short reminder messages on cell phones to consult information on contraceptive methods on the blog during the third trimester of pregnancy. This study's strength is that the intervention impacted postpartum contraceptive use (42 days after delivery). In the Spanish study, the intervention had the largest impact 12 months after delivery.

Easy-to-use counseling tools are important for increasing their use by service providers. In this study, midwives found it easier to use decision-making tools for family planning applications than flipcharts. This has been supported by previous research.¹³ One study evaluated the acceptance of an application in African-Latin America, showing that the application was acceptable, easy to use, informative, and effective in providing health information.³³ Another study produced iContraception®, an application that provides easy access for service providers based on medical eligibility criteria for contraceptive options.³⁴ In subsequent research, the application "MyContraception" was shown to help clients make contraceptive decisions.³⁵ Applications for contraceptive use have also been developed and researched in Jordan.³⁶

The strength of this study is that apart from the decision-making tools for family planning applications used by midwives in counseling, clients also installed Si KB Pintar. This Android-based application is already available in the Play Store to reinforce what the midwife has explained during counseling. It can be used by women for discussions with their husbands if they have not made a decision at the time of counseling. The

difference between the two applications is in the menu and application structure, where the decision-making tools for family planning applications, menu, and usage structure refer to the design of the decision-making tools for family planning flipcharts, whereas in Si KB Pintar, it directly focuses on contraceptive methods, including medical criteria for eligibility, side effects, methods of use, time for repeat visits, and things to remember, as well as additional information about HIV/AIDS, pregnancy screening, and emergency contraception.

Si KB Pintar should be provided to clients because the husband or family plays a role in making decisions about contraceptive use. Husbands rarely participate in family planning counseling for various reasons, including feelings of embarrassment, busyness, and a lack of awareness about the importance of family planning programs.³⁷ In this study, all participants said that the decision to use contraception was based on agreement with their husband. This aligns with the 2017 Indonesian Demographic and Health Survey, whose data showed that 57% of family planning decisions are made by the husband, indicating the husband's prominent role in family planning decisions.²¹ Involving the husband is important in family planning counseling.³⁸

Research in Jordan concluded that husbands have an influential role in deciding whether to use family planning services and the type of contraception method used; cultural and social norms related to family planning and decision making continue to pressure women. The involvement of men and digital technology in family planning counseling can potentially enhance joint family planning decision-making processes among couples.³⁹ Si KB Pintar was instrumental for respondents and their husbands in increasing their knowledge about family planning and making decisions.

The limitation of this study is that the application used for intervention was only available for Android users. Technology in family planning services is valuable in increasing women's awareness of family planning methods to empower women in collaborative decision-making processes (with their husbands and families), so digital technology is recommended to improve the coverage and quality of family planning services.⁴⁰

Conclusion

Tools that are easy for midwives and clients to use are important in family planning counseling because they can make the counseling process effective and

enjoyable so that clients can absorb the information provided and use it in decisions on postpartum contraceptive use. Providing family planning counseling during pregnancy using the **decision-making tools for family planning application and Si KB Pintar** is more effective than flipcharts in increasing the use of postpartum contraception. Because this application is only for Android users, in further research, applications that all users can utilize should be developed.

Abbreviations

PHC: Primary health care

Ethical Approval and Consent to Participate

The Ethics Commission Board approved this study: Poltekkes Kemenkes Tasikmalaya No. KP-KEPK/0066/2022. Permission to collect data was obtained from official authorities. Respondents who agreed to participate in this study were asked to sign an informed consent form.

Competing Interests

The authors have no conflicts of interest to declare, including financial, professional, or personal interests that might have affected performance.

Availability of Data and Materials

The data presented in this study are available in this article.

Authors' Contributions

Conceptualization: LN; **Application development:** ATI; **data curation:** LN, DW, and ATI; **Formal analysis:** LN and DW; **Data collection:** LN, DW, and ATI; **Validation:** LN, YC, and YF; **Writing—original draft:** LN; **Writing—review and editing:** LN, DW, ATI, YC, and YF. All authors have reviewed and approved the manuscript.

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