MEASURING THE EFFECT OF DIFFERENT MODES OF MOBILE PHONE-BASED ANTENATAL FAMILY PLANNING COUNSELING ON THE INTENTION FOR EARLY POSTPARTUM FAMILY PLANNING UPTAKE IN WESTERN KENYA: A PRAGMATIC FACTORIAL RANDOMIZED CONTROL TRIAL

Morris Senghor Shisanya[1], Mary Kipmerewo[2], Everlyne Morema[2], Collins Ouma[3]

ABSTRACT

INTRODUCTION: The Maternal and Child Health care continuum offers a key opportunity to integrate postpartum family planning (PPFP) interventions, particularly through antenatal counseling. This study assessed the impact of mobile phone-based antenatal family planning counseling on the intention for early PPFP among postpartum mothers in Western Kenya.

METHODOLOGY: This pragmatic factorial randomized controlled trial assessed the effectiveness of family planning counseling delivered by nurses and community health workers using a mobile phone-based tool, compared to routine counseling, on the intention for early postpartum family planning among postpartum mothers in Kisumu County, Western Kenya. Ordinal regression identified predictors of intention, while ANOVA evaluated the effectiveness of counseling modalities, with significance set at $P < 0.05$. Tukey's post hoc test and partial eta^2 were used to determine differences between study arms and effect size, respectively.

RESULTS: The mean intention for early PPFP on a 7-point Likert scale was 6.59±0.87 for the nurses' arm, 6.05±0.86 for the community arm, and 6.03±0.69 for the control arm. ANOVA revealed a significant difference in mean intention scores between the arms ($F(2,243)=12.43$, $P<0.0001$). Tukey's post hoc test showed significantly higher mean intention in the nurses' arm compared to both the community ($P<0.0001$) and control arms ($P<0.0001$) with a medium effect size (partial eta^2 = 0.06 to <0.14). The combined mean intention for the two intervention arms (6.22±0.85) was significantly higher than the control arm ($P=0.012$) with a small effect size (partial eta^2 = 0.026). There was no significant difference between the community and control arms ($P=0.986$).

CONCLUSION: Mobile phone-based antenatal family planning counseling by nurses was more effective in increasing intention for early postpartum family planning for participants in Kisumu County compared to community-based and routine delivery of counseling. Therefore, more efforts should be directed toward empowering nurses with mobile phone-based antenatal family planning counseling tools to enhance intention for early postpartum family planning.

TRIAL REGISTRATION: The study was registered with the Pan African Clinical Trial Registry on 03 July 2021 under Trial Registration Number PACTR202107891858045. The trial was prospectively registered.

KEYWORDS: Intention for Early Postpartum Family Planning (PPFP), Nurses Intervention, Community Health Worker Intervention, Early Postpartum Family Planning, Mobile Phone-Based Family Planning Counseling Guide.

(The Ethiopian Journal of Reproductive Health; 2025; 17; 22-33)

1 Department of Community Health Nursing, School of Nursing, Kibabii University, Bungoma, Kenya

2 Department of Reproductive Health, Midwifery and Child Health, School of Nursing, Midwifery and Paramedical Sciences (SONMAPS), Masinde Muliro University of Science and Technology (MMUST), Kakamega, Kenya

3 Department of Biomedical Sciences and Technology, Maseno University, Maseno, Kenya

INTRODUCTION

International trends indicate varying intentions toward birth spacing and limiting, emphasizing the importance of understanding women's intentions regarding early PPFP. While regions such as Eastern and Southern Asia exhibit higher desires for birth spacing and limiting, Sub-Saharan Africa lags behind[1–3]. A study across five low-income countries revealed disparities between the desire to delay pregnancies and actual contraceptive usage, particularly among young mothers[4].

Determinants of intention for early PPFP vary. Studies have shown perceived norms, male partner support, and antenatal counseling as key predictors of family planning intention. For example, male partner approval in Ethiopia and antenatal counseling in Tanzania have significantly influenced intentions for early PPFP[5,6]. In countries like Ethiopia, Ghana, and Uganda, antenatal care visits, the gender composition of living children, and early decision-making through interventions such as appointment vouchers are pivotal for PPFP intentions[3, 7, 8]. In Kenya, societal and community influences, education, and marital status play major roles in shaping postpartum contraceptive intentions[9].

Mobile phone-based interventions have shown potential in improving family planning outcomes in low- and middle-income countries, including increased postpartum contraceptive uptake and care attendance[10]. These interventions typically use text messages, calls, or apps to deliver content, with interactive methods proving more effective[11]. However, gaps exist in tools designed to assist counselors in ensuring comprehensive coverage of the PPFP package and providing real-time feedback on process fidelity[12]. Existing interventions often lack mechanisms for guiding counseling sessions or ensuring adherence to the intended process[11]. Furthermore, there is a scarcity of research exploring the impact of mobile phone-based tools on intention for early PPFP compared to routine antenatal care, which typically lacks a structured guide for family planning counseling.

Despite these insights, there is a paucity of interventional research actively addressing and influencing women's antenatal intentions for early PPFP. According to the Theory of Planned Behavior, intention is a good predictor of behavior, making interventions that influence intention for early PPFP likely to improve its uptake. The current study addresses these gaps by employing a mobile phone-based tool that not only guides counselors through antenatal PPFP counseling but also enhances process fidelity through feedback to an independent observer[13]. This study aimed to determine the effect of antenatal counseling of mothers by nurses and community health workers using a mobile phone-based tool compared to routine counseling on the intention for early PPFP in Western Kenya.

METHODOLOGY

Study Population and Sample

This was a pragmatic factorial randomized control trial with three arms: the nurses' intervention arm, the community intervention arm, and a control (routine care) arm. The study was conducted between February 26 and August 30, 2022, among pregnant women in their second or third trimester attending ANC clinics in Kisumu County, Western Kenya. The study was carried out in community and primary health centers. The mothers were allocated to the study using simple random sampling.

The sample size was estimated using a sample size determination formula for differences in proportions, considering Type I and II errors and power[14–18]:

N1={z(1−α/2)p¯q¯(1+1k)+z(1−β)p1q1+p2q2k}2/Δ2N_1 = \left\{z_{(1-\alpha/2)} \cdot \sqrt{\bar{p} \cdot \bar{q} \cdot \left(1+\frac{1}{k}\right)} + z_{(1-\beta)} \cdot \sqrt{p_1 \cdot q_1 + \frac{p_2 \cdot q_2}{k}}\right\}^2 / \Delta^2

Where q1=1−p1q_1 = 1-p_1, q2=1−p2q_2 = 1-p_2, p¯=p1+kp21+K\bar{p} = \frac{p_1 + kp_2}{1+K}, p1,p2p_1, p_2 = proportions (incidence) of group 1 (27%, the KDHS-estimated current PPFP use) and group 2 (53%, the KDHS-estimated contraceptive

prevalence rate in the general population), Δ=p2−p1\Delta = |p_2 - p_1| (absolute difference, or desired clinical difference between intervention and control arms), n1=n_1 = sample size for group 1, n2=n_2 = sample size for group 2, α=\alpha = probability of Type I error (set at 0.05), β=\beta = probability of Type II error (set at 0.1, i.e., 90% power), zz = critical Z value for a given α\alpha or β\beta (1.96), and KK = ratio of sample sizes for group 2 to group 1[1].

Thus, for practical equal sample distribution with an assumed 10% loss to follow-up, the actual sample size was 246, with each study arm having 82 participants. Each facility per arm, based on the rural-urban dichotomy, had 41 participants[19]. The final sample size was 246, with 82 eligible pregnant women per study arm, as shown in **Figure 1**.

Cluster random sampling was used to select two facilities allocated to each arm, with one facility assigned to rural and peri-urban sites per arm. The facilities were matched based on their operational level. Each client meeting the criteria was randomly assigned to the study using simple random sampling by picking folded paper labeled "yes" or "no." The study was approved by Masinde Muliro University of Science and Technology (MMUST) School of Graduate Studies (SGS), with ethical clearance from the MMUST Institutional Ethics Review Committee (IERC), and preregistered with the Pan African Clinical Trials Registry.

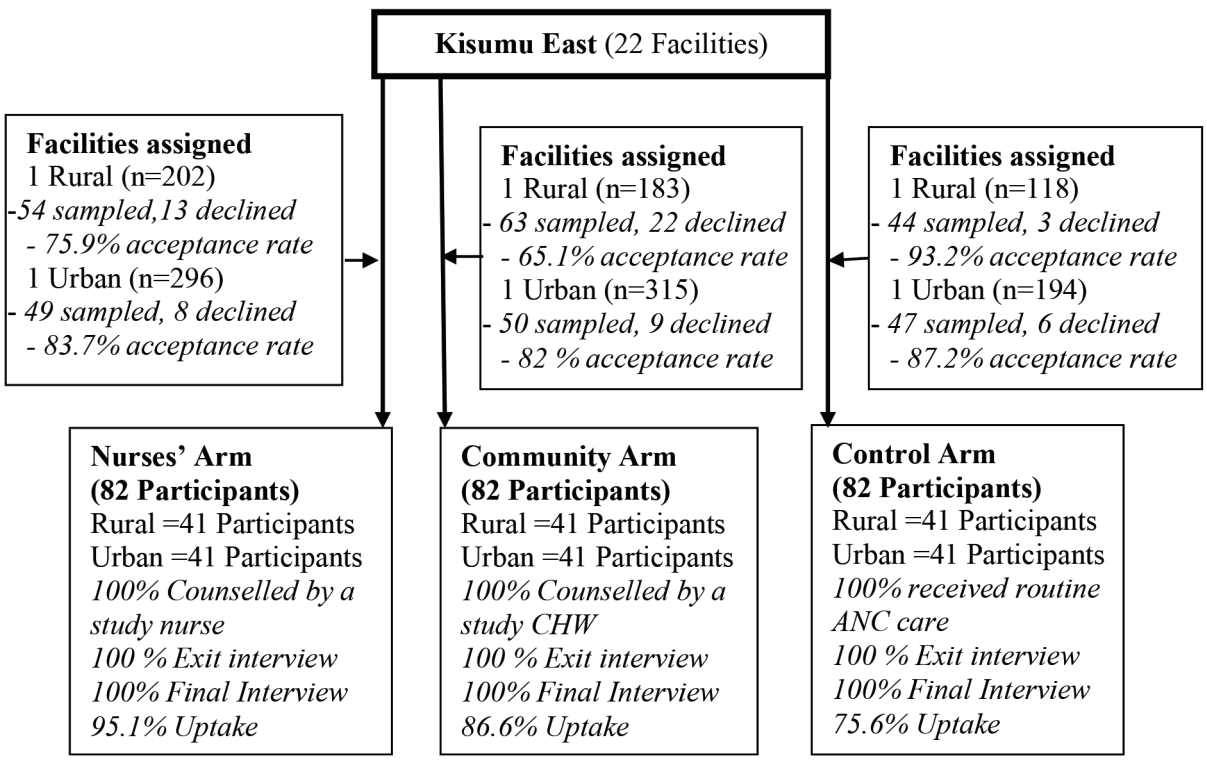

Figure 1: CONSORT diagram showing participant flow

Intervention and Measures

The intervention consisted of a single session of antenatal counseling by nurses (nurses' arm) or community health workers (CHWs) (community arm) on early PPFP using a phone-based WHO Medical Eligibility Criteria (MEC) for contraceptives on the Kobo Collect platform. This structured counseling guide ensured the counselor covered all aspects of the MEC for early PPFP[13]. The tool provided nurses or CHWs counseling antenatal clients with standardized and comprehensive information. This was ensured by refresher training of the implementers and orientation to the tool.

The tool, based on the Kobo Collect platform, required a "yes" or "no" submission for each key aspect covered, including eligibility criteria for each method during the early postpartum period. It was validated by master trainers for FP, animators for community health service training modules, and guidelines for CHWs, as well as by nurses and CHWs during FP refresher training, making it standard and practical for both groups.

The researchers aimed to evaluate the overall effect of the family planning counseling tool on intentions for early PPFP by comparing the intervention (combined nurse and community/CHW arms) to the control arm. They also assessed differences in intention between nurse-administered and CHW-administered counseling, as well as between each intervention arm (nurses and community/CHW) and the control arm.

Data Collection and Measures

Intimate partner relationships, including physical and sexual violence, were assessed using a 7-point Likert scale ranging from "strongly disagree" 1 to "strongly agree" 7. The questions evaluated physical violence, psychological violence, sexual violence, and partner engagement on FP issues. A summary rating of good intimate partner relationships was presented as an ordinal scale based on agreement levels. This rating was determined by averaging scores across all parameters, where "strongly agree" was 7, "agree" was ≥6 and <7, and so on, down to "strongly disagree" at <2.

Health education after birth was assessed through a yes/no question. Health status before, during, and after pregnancy was measured using a Likert scale ranging from "very poor" to "very good."

Process characteristics included staff post-test scores, client waiting time, counseling process turnaround time (from the beginning to the end of the counseling session), counseling process quality, self-assessed fidelity to the process, and clients setting a postnatal appointment date for PPFP. Staff post-test scores, client waiting times, counseling turnaround times, and client satisfaction were continuous variables. Fidelity was assessed through five Likert scale questions (strongly disagree to strongly agree), averaged to provide an ordinal score. Fidelity ratings ranged from "very high fidelity" 7 to "very low fidelity" (<2). Quality adherence to the counseling process was evaluated with a "yes" or "no."

Outcome Measurement

Intention to use early PPFP, one of the outcome variables, was assessed during an exit interview after the counseling session using three 7-point Likert scale questions (Cronbach's alpha = 0.850). These were summarized into a continuous variable by calculating the mean score, which was then scaled into ordinal categories: "very high intention"7, "high intention" (≥6, <7), and so on, down to "very low intention" (<2). The questionnaire followed recommendations by Francis et al. (2004) and Ajzen and Klobas (2013)[20, 21].

Data Analysis

Intention to use early PPFP was summarized with descriptive statistics to show distribution across participant characteristics. Ordinal logistic regression was used to examine the influence of client-related characteristics and intervention process factors on intention to use early PPFP. Model diagnostic statistics evaluated overall model fit and explanatory power. The goodness-of-fit was assessed using Pearson's chi-square test (P>0.05 indicating a good fit), while the likelihood ratio chi-square test assessed predictor significance (P<0.05 indicating meaningful predictors). Nagelkerke's Pseudo R^2 quantified variance explained.

One-way ANOVA with post hoc testing evaluated the intervention's impact on intention for early PPFP use. Shapiro-Wilk and Levene's tests assessed normality and homogeneity of variance, with P>0.05 indicating acceptable thresholds. Partial eta-squared (η2\eta^2) determined effect size: ≥0.01–<0.06 (small), ≥0.06–<0.14 (medium), and ≥0.14 (large). Statistical significance was set at P<0.05.

RESULTS

Participant characteristics

A total of 246 participants were enrolled in the study. The mean age of the participants in years was 25.2±4.9 with a minimum age of 16 years and a maximum of 42 years. The modal age group was 15-24 years. Most, 207 (84.1%) of the participants were married. More than half of the participants 155 (63%) had attained high school or tertiary education. A large proportion, 211 (85.77%) of the participants earned less than 5000 KES. In a cross-tabulation of sociodemographic aspects and intention **(Table 1)**,

Table 1: Distribution of intention across the sociodemographic characteristics of women in a Western Kenya

Sociodemographic characteristics	Neither high nor low Intention	Moderately high Intention	High Intention	Very high Intention	Total
Age group					
15-24	4 (3.08)	17 (13.08)	66 (50.77)	43 (33.08)	130 (52.85)
25-34	4 (4.00)	16 (16.00)	39 (39.00)	41 (41.00)	100 (40.65)
35-44	0 (0.00)	0 (0.00)	8 (50.00)	8 (50.00)	16 (6.5)
ANC Visits					
<4	1 (1.14)	13 (14.77)	40 (45.45)	34 (38.64)	88 (35.77)
>=4	7 (4.43)	20 (12.66)	73 (46.20)	58 (36.71)	158 (64.23)
Marital Status					
Never Married	0 (0.00)	4 (11.43)	21 (60.00)	10 (28.57)	35 (14.23)
Separated	0 (0.00)	0 (0.00)	1 (25.00)	3 (75.00)	4 (1.63)
Married	8 (3.86)	29 (14.01)	91 (43.96)	79 (38.16)	207 (84.15)
Level of education					
No formal education	0 (0.00)	0 (0.00)	0 (0.00)	1 (100.00)	1 (0.41)
Primary	2 (2.22)	10 (11.11)	38 (42.22)	40 (44.44)	90 (36.59)
Secondary	2 (1.69)	16 (13.56)	61 (51.69)	39 (33.05)	118 (47.97)
Tertiary	4 (10.81)	7 (18.92)	14 (37.84)	12 (32.43)	37 (15.04)
Employment status					
Not employed	1 (1.30)	5 (6.49)	41 (53.25)	30 (38.96)	77 (31.3)
House wife	4 (4.30)	15 (16.13)	48 (51.61)	26 (27.96)	93 (37.8)
Self employed	1 (1.64)	7 (11.48)	21 (34.43)	32 (52.46)	61 (24.8)
Formal	2 (13.33)	6 (40.00)	3 (20.00)	4 (26.67)	15 (6.1)
Monthly income					
<5000	5 (2.35)	26 (12.21)	103 (48.36)	79 (37.09)	213 (86.59)
≥5000-≤10000	2 (10.53)	2 (10.53)	7 (36.84)	8 (42.11)	19 (7.72)
>10000	1 (7.14)	5 (35.71)	3 (21.43)	5 (35.71)	14 (5.69)
Overall Intention	8 (3.25)	33 (13.42)	113 (45.93)	92 (37.40	246 (100)

Intention to use early PPFP was assessed using three Likert scale questions, the means were summed into scale; very high intention (=7), high intention (≥6, <7), moderately high intention (≥5, <6), neither high nor low intention (≥4, <5), moderately low intention (≥3, <4), low intention (≥2, <3), and very low intention (≥1, <2). Bivariate analysis was done by cross-tabulation of sociodemographic aspects and level of intention for early PPFP. The figures N are counts and (%) percentages. The denominators for intention proportions per variable were row totals for each variable group.

out of the 130 participants aged 15-24 years, 109 (83.85%) exhibited high to very high intentions for early postpartum family planning (PPFP) uptake, while[16] 100% of those aged between 35-44 reported high to very high intentions. Additionally, out of the 88 individuals with less than four ANC visits 74 (84.09%) had high to very high intentions, compared to 131 (82.91%) among those with four or more visits (N=158). Distribution of intention across marital status also showed that never married women (N=35) had predominantly high intentions category 21 (60.00%), while all separated respondents fell exclusively within the high 1 (25%) or very high 3 (75%) intention categories. Education level had distribution of intention, with primary (n=90) and secondary (N=118) educated participants exhibiting predominantly high and very high intentions 78 (86.66%) and 100 (84.74%), respectively, while tertiary educated participants showed a more balanced distribution. Unemployed individuals (N=77) reported predominantly high and very high intentions 71 (92.21%), while formally employed individuals (N=15) were more skewed towards moderately high intentions 6 (40%). Distribution of intention across income levels also had an impact, with those earning below KES 5000 (N=213) displaying 182 (85.45%) within high and very high intentions, and a more balanced distribution observed in participants earning between KES 5000-10000 and those earning above KES 10000. Overall, 96.74% of participants rated their intention between moderately high and very high intention.

Intention to use early PPFP was assessed using three Likert scale questions, the means were summed into scale; very high intention (=7), high intention (≥6, <7), moderately high intention (≥5, <6), neither high nor low intention (≥4, <5), moderately low intention (≥3, <4), low intention (≥2, <3), and very low intention (≥1, <2). Bivariate analysis was done by cross-tabulation of sociodemographic aspects and level of intention for early PPFP. The figures N are counts and (%) percentages. The denominators for intention proportions per variable were row totals for each variable group.

3.2 Predictors of intention for early PPFP among pregnant women attending ANC in Western Kenya

In an ordinal logistic regression analysis, we examined how various client-related characteristics and intervention process factors influence the intention to use early postpartum family planning (PPFP) (**Table 2**).

Table 2: Predictors of intention for early PPFP among pregnant women attending ANC in Western Kenya

Parameter	OR	95% CI	P-value
Sociodemographic aspects			
Client's age	1.06	1.01 - 1.12	0.022
Marital status	0.94	0.64 - 1.38	0.750
Level of education	0.72	0.49 - 1.04	0.084
Employment status	0.85	0.61 - 1.19	0.342
Monthly income	0.86	0.50 - 1.48	0.580
Pregnancy related aspects			
ANC visits number	0.96	0.81 - 1.14	0.647
Gestation when PPFP counseling was done	1.03	0.98 - 1.09	0.255
Existing illness	1.28	0.44 - 3.79	0.650
Number of children	1.33	1.10 - 1.62	0.004
Complication in pregnancy	0.97	0.54 - 1.74	0.914
Labour, delivery and postpartum aspects			
Labour complications	0.72	0.34 - 1.51	0.384
Postpartum complication	1.17	0.47 - 2.87	0.736
Health education afterbirth	0.89	0.44 - 1.78	0.742
Health status after pregnancy	0.91	0.32 - 2.60	0.861
Health status in 3 months postpartum	0.50	0.20 - 1.28	0.151
Rating previous experience with FP	1.36	-0.19 - 1.36	0.504
Intimate partner relationship	1.47	1.18 - 1.84	<0.0001
Process related aspects			
FP counseling waiting time	0.98	0.96 - 1.00	0.097
FP counselling turnaround time	0.93	0.90 - 0.97	<0.0001
Mode of counseling	1.25	0.71 - 2.20	0.449
Counseling quality	1.03	0.99 - 1.06	0.105
Fidelity to process	2.62	1.91 - 3.59	<0.0001
Accepting to set postnatal appointment	2.44	1.28 - 4.64	0.007

Ordinal regression analysis of predictors of intentions for early PPFP use. OR- Odds Ratio, 95% CI – 95% confidence interval, Significance set at P≤0.05

The model diagnostics statistics were as follows: Goodness of fit Pearson X2 (403)=327.921, P=0.997, Model fit to data X2(5)=11.516, P=0.042, Nagelkerke's Pseudo R2=0.610, which demonstrates a good fit to the data with significant predictors explaining 61% of the variance. Among client-related factors, age (OR: 1.06; 95% CI: 1.01-1.12; P=0.022), number of children (OR: 1.33; 95% CI: 1.10-1.62; P=0.004), and the quality of intimate partner relationship (OR: 1.47; 95% CI: 1.18-1.84; P<0.0001) showed significant associations with increased odds of higher intention to use early PPFP. This indicates that as age, number of children, and the quality of the intimate partner relationship increase, the likelihood of being in a higher category of intention for early PPFP increases. Additionally, certain intervention process factors, such as fidelity to process (OR: 2.62; 95% CI: 1.91-3.59; P<0.0001) and acceptance of postnatal appointments for early PPFP (OR: 2.44; 95% CI: 1.28-4.64; P=0.007), significantly increased the cumulative odds of reporting higher intention to use early PPFP. Suggesting that higher adherence to the intervention process and acceptance of setting postnatal appointments increase the likelihood of a stronger intention to use early PPFP. Conversely, FP counselling turnaround time exhibited an inverse relationship with intention (OR: 0.93; 95% CI: 0.90-0.97; P<0.0001), indicating that longer counseling turnaround times decrease the cumulative odds of being in a higher category of intention to use early PPFP. The remaining client-related and process-related factors assessed did not

show significant effects on the intention for early PPFP.

Effect of antenatal family planning counseling on the intention for early postpartum family planning among postpartum mothers in Western Kenya

The normality of the intention scale was assessed using the Shapiro-Wilk test. The results indicated that the data was approximately normally distributed, W(246) = 0.990, P = 0.080. Therefore, the assumption of normality was met. A one way ANOVA for intentions for early PPFP was done with Levene's test showing that homogeneity of variance was met F(2,243)=0.715, P=.490 thus Tukey's post hoc test used to estimate which arms had significant difference in intention, and effect size between arms. The mean intention out of a 7-point Likert score was 6.59±0.87 for the nurses' arm, 6.05±0.86 for the community arm and 6.03±0.69 for the control arm. The ANOVA showed that there was a significant difference in the mean client intention for early PPFP scores between arms F(2,243)=12.43, P<0.0001. Tukey's post hoc test showed a significantly higher mean intention for early PPFP between nurses' and community arm (P<0.0001) and nurses' arm and control arms (P<0.0001) with a medium effect size (partial eta2 0.06 to <0.14) (**Table 3**).

The combined mean intention for early PPFP for the two intervention arms (6.22±0.85) portrayed a significant difference compared with that of control arm (P=0.012) albeit with a small effect size (partial eta2 =0.026). There was no difference in intention between the community and control arm (P=0.986).

Table 3: ANOVA for difference in intentions for early PPFP between study arms in a study in Western Kenya

Study Arms being compared	Mean difference	95% CI	P-value	Effect Size
Nurses vs Community	0.54	0.24-0.84	<0.0001	0.089
Nurses vs Control	0.56	0.26-0.86	<0.0001	0.113
Community vs Control	0.02	-0.28-0.32	0.986	0.000
Intervention arms vs Control	0.29	0.07-0.51	0.012	0.026

Mean difference is for the study arms being compared; 95% CI is the Confidence Interval for the Mean Difference (MD); Effect size was estimated by Partial eta2 (0.01 to <0.06 - Small, 0.06 to <0.14 medium, ≥0.14 Large); Levene's test F(2,243)=0.715, P=0.490, thus, Tukey's post hoc test was applied because homogeneity of variance was met; Significance set at P<0.05

DISCUSSION

In this study, we found a high intention to use early PPFP, which was predicted by the client's age, number of children, and positive intimate partner relationship rating. The study also showed that counseling turnaround time, fidelity to the process, and accepting to set a postnatal appointment for early PPFP had a significant effect on the intention to use early PPFP. The intervention had an overall significant effect on client intention for early PPFP, with higher intention scores in the nurses' arm compared to the community and control arms.

A study on patterns and correlates of intention to use contraceptives shows that intention to use FP increases with age, averagely peaking between 29–34 years, and then dropping thereafter[22]. Another study showed that older women have stronger intentions to use early PPFP due to their increased pregnancy and childbirth experience, leading to a heightened desire to space or limit future pregnancies for their well-being and their children's welfare. Furthermore, older women may be more in control of the decision to limit the number of children[23]. The current study demonstrated that older participants had significantly higher intentions to use early PPFP. While Navodani et al. (2017) highlighted similar trends in postpartum FP utilization among older women with more children in Sri Lanka, conflicting findings were reported by Daba et al. (2021) and Ooko et al. (2022), indicating that younger clients expressed higher intentions for PPFP compared to older individuals[9, 24, 25].

The current study found that having more children was associated with higher odds of intention to use PPFP, aligning with previous research suggesting that women with more children are often more motivated to limit future pregnancies to prioritize their well-being and that of their existing children[26]. Equally, having a partner can be a key determinant of intention for early PPFP. Supportive partners facilitate open communication and collaborative decision-making regarding FP, fostering shared responsibility and motivation to prevent unintended pregnancies[27, 28]. The current findings demonstrate the importance of a good intimate partner relationship in positively influencing intention to use early PPFP.

Process-related factors, such as the FP counseling process, postnatal appointment setting, and counseling turnaround time, significantly influenced intentions for early PPFP in this study. Similar findings by Kabue et al. (2018) and Grenier et al. (2017) highlight the importance of efficient counseling and timely appointments in fostering positive intentions[29, 30]. Jones et al. (2020) also noted that high-fidelity PPFP services increase intention by ensuring women receive accurate information and personalized guidance[31]. In line with this, our study found that setting postnatal appointments for early PPFP increased intention, consistent with a Gambian study that showed FP counseling boosted both appointment setting and intention for postpartum FP services[32]. Counseling turnaround time had an inverse relationship with the intention to use early PPFP, meaning longer sessions reduced the odds of intention. This suggests that optimizing the time spent in counseling can strengthen FP intentions, as shown in a quasi-experimental study by Befkene et al. (2020). Similarly, Befkene et al. (2020) emphasized the importance of process fidelity in PPFP interventions, which increases the likelihood of women receiving accurate, comprehensive FP information. This aligns with our findings, where fidelity to the counseling process increased the intention to use early PPFP[33].

Antenatal family planning (FP) counseling has shown mixed effects on intention for PPFP uptake, with some studies reporting increased intention to use postpartum FP[32, 34] and others showing no significant impact[35]. In this study, antenatal counseling on early PPFP positively influenced intention. The quality of counseling in prior studies varied, with many women reporting dissatisfaction due to limited provider interaction[36]. Our findings revealed that participants in the nurse-administered arm had significantly higher intentions to use early PPFP compared to both the community and

control arms, with no significant difference between the community and control arms. While prior studies comparing nurse versus CHW effectiveness in similar populations are limited, a previous study found that antenatal counseling by highly skilled health workers leads to higher postpartum contraceptive uptake[37]. Although this study showed no significant difference in intention between the CHW and control arms, a systematic review has suggested that CHW-provided information can be more effective than standard care in influencing PPFP intentions[38].

This study fills a key gap by comparing nurse- and community health worker-led mobile phone-aided ANC interventions to boost early PPFP intention. The findings highlight the need for policies that integrate mobile phone-based tools and enhance counseling quality, particularly empowering nurses with such technologies. It also lays the groundwork for future research on the scalability of these interventions.

Strengths and Limitations of the Study

This study, grounded in the Theory of Planned Behavior, provides a solid foundation for future comparable research. A key strength is its comparison of outcomes between nurse- and community health worker-led interventions, offering evidence to refocus resources on empowering nurses to enhance intention for early PPFP. Additionally, as a pragmatic RCT, the study's scalability is supported by its near-real-world setting, aside from randomization and control.

However, the study's limitations include selection bias, as it focused solely on ANC attendees, limiting generalizability to the broader pregnant population. The recruitment of participants primarily in the third trimester further restricts insights into family planning decisions made earlier in pregnancy. Expanding the sample and recruiting earlier in pregnancy could improve external validity.

CONCLUSION AND RECOMMENDATION

In conclusion, the significant differences in intention for early PPFP between the intervention and control arms, particularly between the nurses' arm and others, indicate that antenatal FP counseling via a mobile phone-based tool, especially when delivered by nurses, is more effective in increasing intention for early PPFP. Therefore, more efforts should be directed toward empowering nurses with mobile phone-based antenatal family planning counseling tools to enhance intention for early postpartum family planning.

CORRESPONDING AUTHOR:
Morris Senghor Shisanya
Department of Community Health Nursing, School of Nursing, Kibabii University, Bungoma, Kenya
Email: senghormorris@gmail.com

REFERENCES

1. Lori JR, Chuey M, Munro-Kramer ML, Ofosu-Darkwah H, Adanu RMK (2018) Increasing postpartum family planning uptake through group antenatal care: A longitudinal prospective cohort design. Reprod Health 15:208
2. Sedgh G, Asford L, Hussain R (2016) Unmet Need for Contraception in Developing Countries: Examining Women's Reasons for Not Using a Method. In: Guttmacher Institute. https://www.guttmacher.org/report/unmet-need-for-contraception-in-developing-countries. Accessed 9 Dec 2018
3. Abraha TH, Belay HS, Welay GM (2018) Intentions on contraception use and its associated factors among postpartum women in Aksum town, Tigray region, northern Ethiopia: a community-based cross- sectional study. Reprod Health 15:188
4. Pasha O, Goudar SS, Patel A, et al (2015) Postpartum contraceptive use and unmet need for family planning in five low-income countries. Reprod Health 12 Suppl 2:S11
5. Gage AJ, Wood FE, Akilimali PZ (2021) Perceived norms, personal agency, and postpartum family planning intentions among first-time mothers age 15–24 years in Kinshasa: A cross-sectional analysis. PLoS One. https://doi.org/10.1371/JOURNAL.PONE.0254085
6. Gebeyehu NA, Lake EA, Gelaw KA, Azeze GA (2020) The Intention on Modern Contraceptive Use and Associated Factors among Postpartum Women in Public Health Institutions of Sodo Town, Southern Ethiopia 2019: An Institutional-Based Cross-Sectional Study. Biomed Res Int. https://doi.org/10.1155/2020/9815465
7. Kofi ES, Bockarie AS, Eliason C (2018) Postpartum fertility behaviours and contraceptive use among women in rural Ghana. Contracept Reprod Med 3:13
8. Atukunda EC, Mugyenyi GR, Obua C, Atuhumuza EB, Lukyamuzi EJ, Kaida A, Agaba AG, Matthews LT (2019) Provision of family planning vouchers and early initiation of postpartum contraceptive use among women living with HIV in southwestern Uganda: A randomized controlled trial. PLoS Med 16:e1002832
9. Ooko LFA, Ngure K, Nzioki JM (2022) Factors associated with uptake of postpartum family planning methods among postpartum women in Muhoroni sub-County , Kisumu County. Jomo Kenyatta University of Agriculture and Technology Repository
10. Mruts KB, Tessema GA, Gebremedhin AT, Scott J, Pereira G (2022) The effect of family planning counselling on postpartum modern contraceptive uptake in sub-Saharan Africa: a systematic review. Public Health. https://doi.org/10.1016/j.puhe.2022.02.017
11. Perinpanathan T, Maiya S, van Velthoven MHH, Nguyen AT, Free C, Smith C (2023) Mobile phone-based interventions for improving contraception use. Cochrane Database of Systematic Reviews. https://doi.org/10.1002/14651858.CD011159.pub3
12. Chandrasekar A, Warren E, Free C, Mbogua J, Curtin E, Gazeley U, Wong G, Church K, McCarthy O (2024) mHealth interventions for postpartum family planning in LMICs: A realist review. PLOS Global Public Health 4:e0003432
13. Shisanya MS, Ouma C, Kipmerewo M (2022) Effectiveness of targeted antenatal family planning information provision on early postpartum family planning uptake in Kisumu County: Protocol for a simple randomized control trial (I DECIDE Study). PLoS One 17:e0264807
14. Rosner B (2015) Fundamentals of Biostatistics, Eighth Edition.
15. Suresh K, Chandrashekara S (2012) Sample size estimation and power analysis for clinical research studies. Journal for Human Reproductive Health. https://doi.org/10.4103/0974-1208.97779
16. Fleiss J, Levin B, Paik M (2004) Statistical Methods for Rates and Proportions, Third Edition. Statistical Methods for Rates and Proportions. https://doi.org/10.1002/0471445428.ch18
17. Freidlin B, Korn E, Gray R, Martin A (2008) Multi-arm clinical trials of new agents: some design considerations. Clin Cancer Res 14:
18. Kane S (2018) Sample Size Calculator. https://clincalc.com/stats/samplesize.aspx. Accessed 28 Dec 2018
19. KNBS (2015) Kenya Demographic and Health Survey 2014.
20. Ajzen I, Klobas J (2013) Fertility intentions: An approach based on the theory of planned behavior. https://doi.org/10.4054/DemRes.2013.29.8
21. Francis JJ, Eccles MP, Johnston M, et al (2004) Constructing questionnaires based upon the Theory of Planned Behaviour: A Manual for Researchers. City University of London
22. Odimegwu C, Phiri M, Tapera T, Simona S (2023) Patterns and correlates of intention to use contraceptives among fecund sexually active women in developing countries. Glob Health Action. https://doi.org/10.1080/16549716.2023.2255043
23. Negash WD, Eshetu HB, Asmamaw DB (2023) Intention to use contraceptives and its correlates among reproductive age women in selected high fertility sub-saharan Africa countries: a multilevel mixed effects analysis. BMC Public Health. https://doi.org/10.1186/s12889-023-15187-9
24. Navodani KT, Fonseka P, Goonewardena CS (2017) Postpartum Family Planning: Missed Opportunities across the Continuum of Care. Ceylon Medical Journal 62:87

25. Daba G, Deressa JT, Sinishaw W (2021) Assessment of intention to use postpartum intrauterine contraceptive device and associated factors among pregnant women attending antenatal clinics in ambo town public health institutions, Ethiopia, 2018. Contraception and Reproductive Medicine 2021 6:1 6:1–9
26. Tekelab T, Sufa A, Wirtu D (2015) Factors Affecting Intention to Use Long Acting and Permanent Contraceptive Methods among Married Women of Reproductive Age Groups in Western Ethiopia: A Community Based Cross Sectional Study. Science Research ISSN: 2327-4972 Family Medicine & Medical Science Research 4:1
27. Idowu A, Deji SA, Ogunlaja O, Olajide SO (2015) Determinants of Intention to Use Post Partum Family Planning among Women Attending Immunization Clinic of a Tertiary Hospital in Nigeria "Determinants of Intention to Use Post Partum Family Planning among Women Attending Immunization Clinic of a Tertiary Hospital in Nigeria. Am J Public Health Res 3:122–127
28. Ngwenya N, Nkosi B, Mchunu LS, Ferguson J, Seeley J, Doyle AM (2020) Behavioural and socio-ecological factors that influence access and utilisation of health services by young people living in rural KwaZulu-Natal, South Africa: Implications for intervention. PLoS One 15:e0231080
29. Kabue MM, Grenier L, Suhowatsky S, et al (2018) Group versus individual antenatal and first year postpartum care: Study protocol for a multi-country cluster randomized controlled trial in Kenya and Nigeria. Gates Open Res 2:56
30. Grenier L, Suhowatsky S, Kabue MM, et al (2019) Impact of group antenatal care (G-ANC) versus individual antenatal care (ANC) on quality of care, ANC attendance and facility-based delivery: A pragmatic cluster-randomized controlled trial in Kenya and Nigeria. PLoS One 14:e0222177
31. Jones RM, Kimenju G, Subbiah S, Styles A, Pearson N, Rajasekharan S (2020) A Short Message Service (SMS) increases postpartum care-seeking behavior and uptake of family planning of mothers in peri-urban public facilities in Kenya. PLoS One. https://doi.org/10.1371/journal.pone.0239213
32. Sey-Sawo J, Adeyemo FO, Okojie OH (2023) Effects of Postpartum Family Planning Counselling on Contraceptives Knowledge, Attitude and Intention Among Women Attending a General Hospital in The Gambia: A Randomized Controlled Trial. Open Access J Contracept. https://doi.org/10.2147/oajc.s388882
33. Befkene Wayessa M, Workineh Abebe T, Mannekulih Habtewold E, Megerso Adilo A, Teklu Meressa A, Garoma Abaya S, Olijira Negero W (2020) Focused Family Planning Counseling Increases Immediate Postpartum Intrauterine Contraceptive Device Uptake: A Quasi-Experimental Study. Open Access J Contracept. https://doi.org/10.2147/oajc.s246341
34. Kumar A, Jain AK, Ram F, Acharya R, Shukla A, Mozumdar A, Saggurti N (2020) Health workers' outreach and intention to use contraceptives among married women in India. BMC Public Health 20:1–9
35. Puri MC, Moroni M, Pearson E, Pradhan E, Shah IH (2020) Investigating the quality of family planning counselling as part of routine antenatal care and its effect on intended postpartum contraceptive method choice among women in Nepal. BMC Womens Health 20:1–11
36. Asrat W, Mekonnen T, Bedimo M (2018) Assessment of women's satisfaction with family planning service at public health facilities in Northwest Region of Ethiopia: a cross sectional study. Contraception and Reproductive Medicine 2018 3:1 3:1–8
37. Tessema GA, Mekonnen TT, Mengesha ZB, Tumlinson K (2018) Association between skilled maternal healthcare and postpartum contraceptive use in Ethiopia. BMC Pregnancy Childbirth. https://doi.org/10.1186/s12884-018-1790-5
38. Sharma AE, Frederiksen BN, Malcolm NM, Rollison JM, Carter MW (2018) Community Education and Engagement in Family Planning: Updated Systematic Review. Am J Prev Med 55:747–758