

[PC]²: Feasibility, Usability, and Acceptability Testing of a Mobile Application to Increase Birth Spacing and Contraceptive Knowledge in Young Black Women

Authors: Ailea Stites; Ellen McCammon, MPH; Tina Schuh, MPH; Jessica Law; Ashlyn Sparrow, MET; Crystal Tyler PhD, MPH; Michael Quinn, PhD; Melissa Gilliam MD, MPH

BACKGROUND

Interpregnancy intervals of less than 18 months are associated with poor health outcomes for both mothers and infants.¹ The initiation of postpartum contraception is a safe and effective way to reduce rapid repeat pregnancies, however, to date, clinical interventions to promote the initiation of postpartum contraception and reduce repeat pregnancies have been largely ineffective.⁴⁻⁷

Significant research shows the benefits of “patient activation” and “engagement”. Actively engaged patients have lower healthcare utilization, greater satisfaction, and better health outcomes. Patient-centered approaches have been advocated for within contraception counseling and delivery, and positively influence patient activation and contraceptive use. However, Latinx and African Americans report worse patient-provider relationships and communication. These patients also receive less information regarding treatment and are less likely to be asked about their preferences.

There is a need for patient-centered interventions that incorporate individual behavioral theory and the real-life experiences of patients to encourage patient activation and engagement.⁷ Interactive, computer-based interventions provide a novel opportunity to deliver theory-based, patient centered health information to educate patients about healthy interpregnancy intervals and postpartum contraceptive use.

PURPOSE

This study describes the design, development and evaluation of the Patient-Centered Postpartum Contraceptive Toolkit ([PC]²), a theory-based waiting room app developed in concert with providers and patients to activate patients around asking questions about interpregnancy intervals and postpartum contraception.

METHODS

Intervention Design:

We iteratively developed [PC]² using the principles of user-centered design in collaboration with clinicians, and African American young women. It features a young African American main character who describes the importance of postpartum contraception use and who demonstrates ways to initiate conversations about contraception with providers. The video content incorporated the *Information-Motivation-Behavior* (IMB) theory of health behavior change, and best practices for patient activation and empowerment.

Study Design:

We evaluated [PC]² in the waiting rooms of four urban obstetrics and gynecology clinics that primarily serve African American women with low-risk pregnancies. Eligible women were self-identified African American or black women between 15 and 25 years old who were at least 24 weeks pregnant. Pre-and post-survey instruments included questions modeled on the IMB framework. We also assessed the feasibility, usability, and acceptability of the app. Paired Wilcoxon tests were used to analyze pre and post survey results.

RESULTS

20 patients participated in the intervention (Table 1).

Patient activation was high at baseline and remained high post-intervention (results not shown). Participants who used the app reported significantly higher scores on information measures on birth spacing. At post-test, participants were significantly less likely to agree that they worried that their healthcare provider did not have time to answer their questions, and significantly more likely to agree that spacing pregnancies would be good for their health and the health of their families (Table 2).

The app scored high on feasibility, usability, and acceptability (Figure).

- 90% of participants reported that the content of the app was easy to understand.
- 94.8% agreed that the information was helpful in learning what questions to ask their provider.
- 74% of users rated the quality of the app as very good or excellent.
- 75% said they were likely or extremely likely to recommend to a friend.
- 100% of patients agreed that engaging with the app was a good use of time while waiting to see their provider.

In open-ended questions about what they learned from the app:

- 94.8% cited birth spacing, with 47.4% specifically mentioning waiting 18 months, which was directly highlighted in the video script.



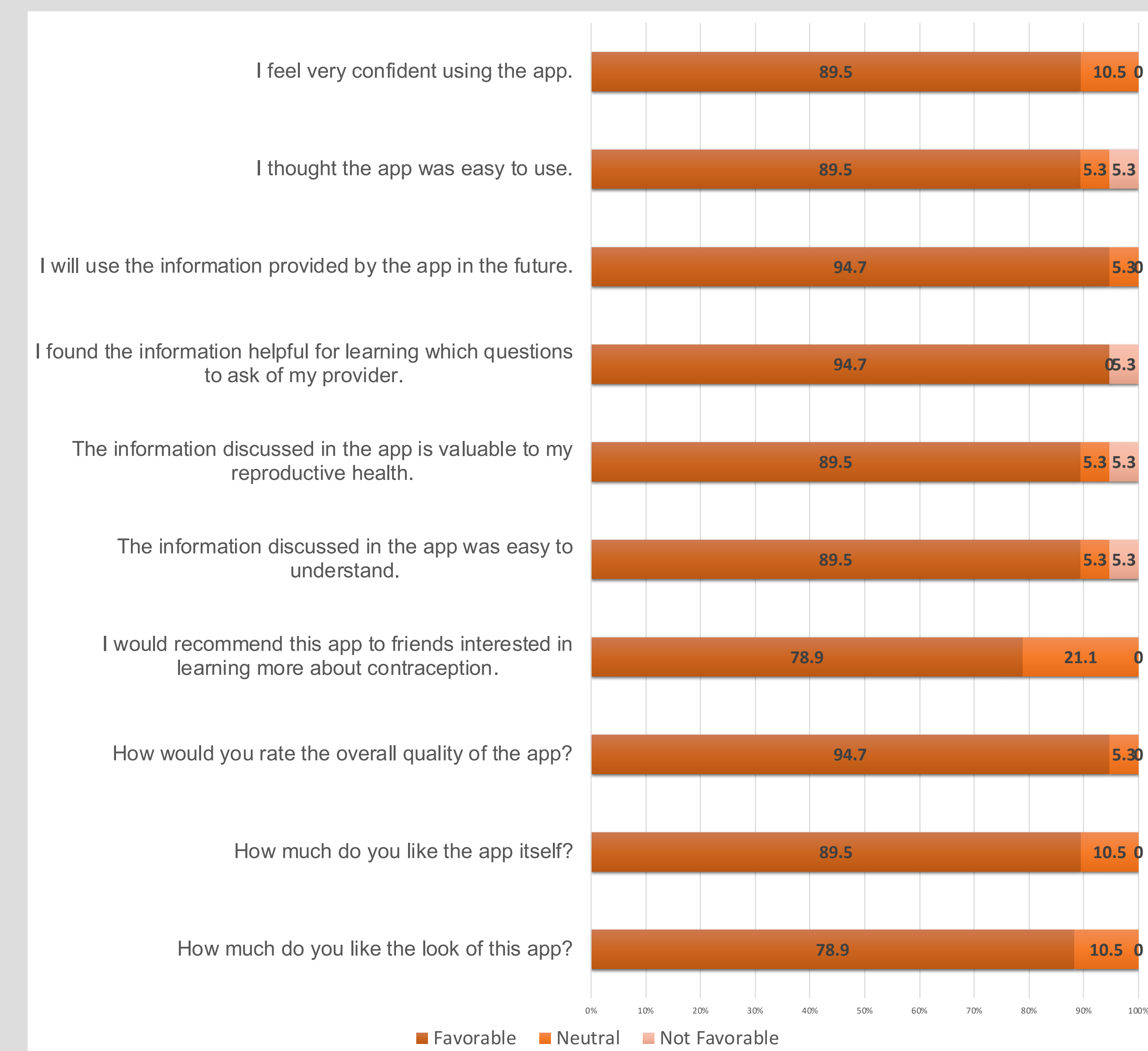
Table 1. Participant Demographic Characteristics (n=20)

Characteristic	n (%)
Age	
15-18	3 (15%)
19-22	9 (45%)
23-25	8 (40%)
How many children do you have?	
No response	7 (35%)
0	1 (5%)
1	6 (30%)
2 or more	6 (30%)

Table 2. Participant Information Measures Before and After Engaging with [PC]² App

Question	Pre-test n (%)	Post-test n (%)	P-value
Getting pregnant again less than 18 months after giving birth is risky for my baby.			.004
False	11 (55%)	3 (15.8%)	
True	9 (45%)	16 (84.2%)	
Waiting at least 18 months before my next pregnancy can reduce my risk of having complications during the next pregnancy.			.219
False	7 (35%)	2 (10.5%)	
True	13 (65%)	17 (89.5%)	
Using a type of contraception or birth control is the best way to prevent having another pregnancy less than 18 months after giving birth.			.625
False	4 (20%)	2 (10.5%)	
True	16 (80%)	17 (89.5%)	
After my pregnancy, if I don't take my chosen birth control method as prescribed, the method may not work for me.			.375
False	6 (30%)	3 (15.8%)	
True	14 (70%)	16 (84.2%)	
Spacing out my pregnancies will improve the health of my entire family.			.065
False	10 (50%)	3 (15.8%)	
True	10 (50%)	16 (84.2%)	
A short length of time between pregnancies can decrease the risk of preterm birth in my next pregnancy.			1.0
False	10 (50%)	11 (57.9%)	
True	10 (50%)	8 (42.1%)	
A short length of time between pregnancies can increase the risk of a low birth weight for my next baby.			.0005
False	14 (70%)	1 (5.3%)	
True	6 (30%)	18 (94.7%)	

Figure. Feasibility, Usability, and Acceptability Measures



KEY FINDINGS

- The [PC]² app successfully delivered patient information about birth spacing and contraceptive options.
- Patient activation was high at baseline and remained high at post-intervention.
- Participants found the [PC]² app to be highly usable, feasible, and acceptable.

LIMITATIONS

- Because this was an initial evaluation of a prototype app, we had a small sample size.
- The homogenous study sample may mean that conclusions will not be generalizable to other populations.

CONCLUSIONS

- The [PC]² app was a successful vehicle for informing patients about birth spacing and encouraging patients to ask questions about postpartum contraception.
- The feasibility, usability, and acceptability findings support ongoing design and development of the app.
- Future work should build on this model and include a multi-pronged approach that takes further advantage of clinic workflows and encourages patients to initiate conversations about contraception with their providers.

REFERENCES

1. US Department of Health and Human Services, Office of Disease Prevention and Health Promotion, US Department of Health and Human Services, & Office of Disease Prevention and Health Promotion. (2010). Healthy people 2020.
2. Khoshnood, B., Lee, K. S., Wall, S., Hsieh, H. L., & Mittendorf, R. (1998). Short interpregnancy intervals and the risk of adverse birth outcomes among five racial/ethnic groups in the United States. *American Journal of Epidemiology*, 148(8), 798-805.
3. Nerlander, L.M., et al., Short Interpregnancy Interval Associated with Preterm Birth in US Adolescents. *Maternal and Child Health Journal*, 2014; p. 1-9.
4. Mignini, L.E., et al., Interpregnancy interval and perinatal outcomes across Latin America from 1990 to 2009: a large multi-country study. *BJOG*, 2015.
5. Damle, L.F., et al., Early initiation of postpartum contraception: Does it decrease rapid repeat pregnancy in adolescents? *Journal of Pediatric and Adolescent Gynecology*, 2014(0).
6. Aslam, R.W. et al. "Intervention Now to Eliminate Repeat Unintended Pregnancy in Teenagers (INTERUPT): a systematic review of intervention effectiveness and cost-effectiveness, and qualitative and realist synthesis of implementation factors and user engagement." *BMC medicine* 15.1 (2017): 155.
7. Frederiksen, Brittni N., et al. "Clinic-based programs to prevent repeat teen pregnancy: a systematic review." *American journal of preventive medicine* 55.5 (2018): 736-746.