Market-testing a smartphone application for family planning: assessing potential of the CycleBeads app in seven countries through digital monitoring

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Background: The advent of new technological approaches to family planning has the potential to address unmet need in low- and middle-income countries. Provision of fertility awareness-based apps have the ability to provide accessible, direct-to-user fertility information to help women achieve their reproductive goals. The CycleBeads app, a digital platform for the Standard Days Method (SDM), a modern method of family planning, helps women achieve or prevent pregnancy, or track their cycles using the only their period start dates.

Methods: Brief social marketing campaigns were launched by the app developer to monitor cost and distribution of the CycleBeads app, understand the user profile, and assess user experience. Monitoring and evaluation through in-app micro surveys occurred over a 6-cycle period in seven countries: Egypt, Ghana, India, Jordan, Kenya, Nigeria, and Rwanda. In-app micro-surveys were utilized to collect data around demographics, mode of use of the app, prior experiences with family planning, and satisfaction to better understand women's interactions with the apps, and the possibility for meeting unmet need. Analyzes focused on women who were using the app to prevent pregnancy or track their cycles.

Results: Social media campaigns proved to be an easy, low-cost approach to advertising the CycleBeads app. As a result, 356,520 women downloaded the app, and the cost to the advertiser per download ranged from $0.17–0.69. A majority of app users were between 20–29 years old, married or in exclusive relationships. Overall, 39.9% of users were using the app to prevent pregnancy, 38.5% to plan a pregnancy, and 21.6% were tracking their cycles. Among the users preventing pregnancy, 64.1% of women had not used a family planning method 3 months before downloading the CycleBeads app. One-third of users who were using the app to track their cycles, reported that they had not been using any form of family planning. In all seven countries, nearly 60% of women reported that they would definitely recommend the CycleBeads app to a friend, indicating their satisfaction with the app.

Conclusions: Our main findings indicate that a social media campaign is a low-cost approach to making the CycleBeads app accessible to women. The app addresses multiple reproductive intentions and attracts a diverse demographic of users across different life stages. For many women the app was the first modern method they used in the last 3 months, showing that fertility awareness-based apps have the potential to address an unmet need. Future studies should focus on changes in behavior during the fertile window, partner communication, and future family planning intentions.

Keywords: CycleBeads app monitoring; fertility app; market test of app

Introduction

Over 200 million women of reproductive age living in developing countries have unmet need for family planning, accounting for more than 80% of unintended pregnancies (1). The annual cost of maintaining modern contraceptive care for current users is $6.3 billion, while expanding to meet the needs of all women with unmet need would cost an additional $12.1 billion (2). Adequate funding alone, however, may not solve the problem. Reasons for non-use of currently-available contraceptives include concerns about side effects, perceived low risk of pregnancy, and lack of access to preferred methods (2). Creative approaches are needed to expand access to side-effect free, low-cost family planning methods.

Mobile applications that provide women with daily information about their fertility status and alert them to their risk of pregnancy on fertile days may address a portion of unmet need for family planning in low- and middle-income countries. They address some of the reasons women cite for not using contraception and circumvent many of the obstacles associated with procurement and distribution of contraceptive products. In addition, they can be used by women who want to achieve pregnancy and those who simply want to track their cycles, thus meeting women's needs as their reproductive intentions change over time. However, evidence is lacking about the distribution, cost, acceptability, and use of a fertility app.

In an assessment of smartphone apps as digital platforms for evidence-based fertility awareness methods of family planning, CycleBeads® was one of six apps out of 30 reviewed that provided users with accurate information about their fertility (3). The CycleBeads app, which incorporates a digital algorithm based on the Standard Days Method™ (SDM), provides direct-to-consumer access to fertility information. The app is currently available in English, French, Spanish, Arabic, Turkish and Hindi.

SDM is recognized as a modern method of family planning by the United States Agency for International Development (USAID) (4) and the World Health Organization (5), and has an efficacy rate of 95% with perfect use and 88% for typical use, similar to other user-initiated methods (6). Extensive studies have been conducted on the SDM with the physical CycleBeads product, and it has been found to be a low-cost, highly acceptable family planning method (6,7). Research on the initial use and acceptability of the CycleBeads app as a digital platform for using SDM in Kenya found that the app was understood and used correctly by women who downloaded it, and social media (specifically Facebook advertising) was found to be a low-cost way of reaching potential users (7).

This paper provides the results of brief market tests of the CycleBeads app in seven countries: Egypt, Ghana, India, Jordan, Kenya, Nigeria, and Rwanda. Market testing was conducted to assess whether women in a variety of settings were interested in and able to use a fertility app, learn the profile of women who chose to use an app and their purpose for using it, assess what their prior experience with family planning was, and determine how satisfied they were with the app. It also tested the feasibility of a low-cost approach to marketing and distribution.

Methods

To use the CycleBeads app, a woman enters her period start dates in the app and is provided with a daily overview of her current cycle and her fertile window (the days around ovulation when pregnancy is possible if she has unprotected intercourse) for the current cycle. The app provides push notifications to alert her to the beginning and end of her fertile window (days 8–19 of her cycle) and sends her a reminder to enter her next period start date around the time it is estimated that she will begin her next period.

Monitoring strategy

In all seven countries, the app developer Cycle Technologies incorporated questions into the app after the start-up process which asked about her age, purpose of use (to achieve pregnancy, avoid pregnancy, or track cycles) and previous method use during the 3 months before downloading. She was also asked if she was willing to answer questions about her experience with the app. Only those who said yes were asked further questions. These women then received a series of micro-surveys—three- or four-question surveys—that popped up in the app in English and Arabic immediately at the beginning of cycles two, four, and six. *Figure 1* is a timeline that shows in-app monitoring timeline in relation to the women's cycles. The content of the surveys differed slightly according to her fertility intention (i.e., achieving pregnancy, avoiding pregnancy, or tracking cycles). Four topics were emphasized in the surveys: user characteristics, prior family planning use, pregnancy intentions, and CycleBeads app use and satisfaction. Users could choose not to respond to any or all of the pop-up questions with no impact on their ability to use the app. Furthermore,
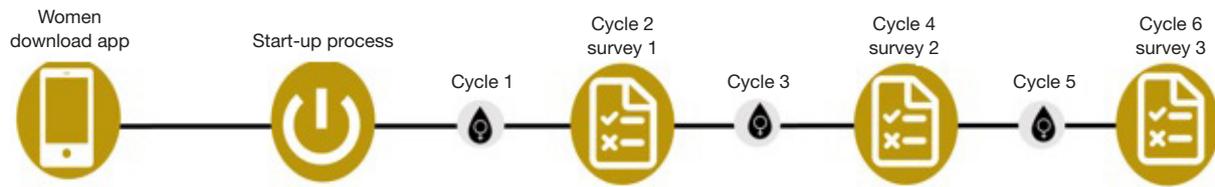
Figure 1 Data collection timeline.

every pop-up question was designed to be easily dismissed by users who did not want to answer it. Data was collected primarily on women using the CycleBeads app to prevent pregnancy or track their cycles. Thus, women using the app to plan a pregnancy were not included in this analysis. Cycle Technologies provided the anonymous data set to the Georgetown University Institute for Reproductive Health for review. Monitoring and evaluation of the CycleBeads app was exempt from review by Georgetown University's institutional review board because identifiable private information was not being collected and this work did not meet the definition of research.

Market testing the CycleBeads app

Egypt, Ghana, India, Jordan, Kenya, Nigeria, and Rwanda were selected for in-app monitoring based on smartphone penetration levels and unmet contraceptive need. To inform potential users about the CycleBeads app, Cycle Technologies created a series of culturally-appropriate Facebook campaigns for each country of interest. Campaigns featured women and/or couples successfully using the CycleBeads app. Ads were targeted to women ages 18–39 in the selected countries who were accessing Facebook through their Android smartphones. Market testing focused on Android users because the literature shows that Android smartphones are more prevalent in developing regions (8). Campaigns ran between August–October 2016 for Kenya, India and Ghana, June–August 2017 for Rwanda, and June–December 2017 for Nigeria, Jordan and Egypt. The length of the campaigns depended on market size and ability to reach users in each location. Using Google and Facebook analytics, Cycle Technologies monitored campaigns to maximize efficiency, and tracked the number and cost of downloads in each country.

Assessing efficiency

The cost data to digitally advertise the app was based on analytics provided by Facebook and Google to the app developer. To calculate the cost per download, the total amount Cycle Technologies spent on Facebook advertising directed to Kenya, India and Ghana from August to October 2016, to Nigeria, Jordan and Egypt from June to December 2017, and Rwanda June–August 2017, was divided by the total number of downloads in these countries during this time. It does not include downloads that occurred after the ad campaigns were completed, although in all countries there were many post-campaign downloads that likely were a result of the campaign.

Analyses

Descriptive statistics were derived from survey questions asked in preventing and tracking mode using STATA 14 software. Chi-square comparisons were conducted on categorical variables.

Results

Within 10-months after advertising there was a total of 356,520 app downloads. Nigeria had the most downloads with 110,582, followed by India with 83,303, Ghana with 56,574, Kenya with 38,208, Egypt with 36,531, Jordan with 29,261, and Rwanda with 2,061. The cost per download (paid by the advertiser) was lowest in Nigeria at $0.17, followed by Egypt ($0.26), Ghana ($0.27), India ($0.30), Jordan ($0.36), Kenya ($0.41), and Rwanda ($0.69). Overall, 96.8% of users completed the start-up questions after downloading the app. Users could choose which, if any, questions they responded to, and across all countries responses to these surveys decreased over time.

App purpose of use and user characteristics

How users chose to use the app differed significantly by country and age (P<0.001). A majority of users in Ghana (52.9%), Kenya (50.8%), Nigeria (42.0%), and Rwanda

Table 1 CycleBeads purpose of use, by age category and country

Country	Age category (%)						Total (n)
	15–19	20–24	25–29	30–34	35–39	>40	
Egypt	2.8	22.5	31.5	23.3	12.0	8.0	35,392
Prevent	1.3	16.6	30.9	27.1	15.0	9.1	10,512
Plan	3.2	25.7	32.5	21.5	10.1	7.0	20,381
Track	4.5	21.5	28.3	22.9	13.2	9.7	4,499
Ghana	4.7	28.5	27.6	17.0	6.4	15.7	54,321
Prevent	5.5	33.5	26.6	14.2	5.0	15.2	28,783
Plan	0.8	9.2	31.9	30.9	13.4	13.8	11,946
Track	6.5	34.8	25.9	10.9	3.5	18.5	13,662
India	0.9	15.3	48.4	24.7	4.7	6.1	81,024
Prevent	1.1	16.8	48.3	22.5	4.6	6.6	23,959
Plan	0.2	11.7	50.6	28.1	4.7	4.6	39,898
Track	2.2	21.3	43.2	19.6	4.8	8.9	17,167
Jordan	2.7	21.0	30.5	24.8	13.6	7.4	28,624
Prevent	1.9	21.2	32.3	24.6	13.0	7.0	9,502
Plan	3.0	20.9	29.8	25.3	14.1	6.9	15,853
Track	3.2	20.1	28.0	24.3	13.7	10.6	3,269
Kenya	4.7	27.6	24.6	17.0	9.1	17.0	37,241
Prevent	5.6	31.6	22.8	15.2	8.2	16.7	18,936
Plan	0.8	14.8	30.0	25.5	13.6	15.5	8,454
Track	6.5	30.9	23.3	13.1	7.3	18.9	9,851
Nigeria	3.1	20.2	24.9	20.5	12.2	18.4	106,002
Prevent	4.8	24.9	24.0	18.5	10.4	17.5	44,554
Plan	0.5	8.6	26.0	28.1	18.6	18.2	35,896
Track	7.0	28.3	25.0	13.2	6.4	20.2	25,552
Rwanda	3.7	23.6	28.2	20.2	11.6	12.6	1,926
Prevent	3.5	23.8	27.8	21.0	10.6	13.2	1,027
Plan	1.3	13.4	30.8	24.5	16.6	13.4	380
Track	6.0	30.8	27.0	15.4	10.0	10.8	519

(53.3%) used the app for pregnancy prevention, while users in India (49.2%), Jordan (55.4%), and Egypt (57.6%) used the app for achieving pregnancy. Age is the only demographic data that was collected during the start-up process after downloading the app. User age differed significantly across the seven countries (P<0.001). *Table 1* provides an overview of user age by country and reason for use. A higher proportion of CycleBeads users in all countries were between 20 and 34 years old. The lowest proportion of users were between 15 and 19, as women younger than 18 were not targeted in the advertising campaign. The majority of women above the age of 40 across all countries were using the app to track their cycles.

Table 2 Contraceptive use in the 3 months prior to download among preventers

Country	N	No method (%)	Recently pregnant (%)	Non-hormonal contraception (%)	Hormonal contraception (%)
Egypt	10,119	46.2	16.9	14.7	22.2
Ghana	26,638	60.8	11.4	6.4	21.3
India	22,935	71.8	12.3	7.5	8.4
Jordan	9,207	52.3	20.7	12.8	14.2
Kenya	18,132	55.7	8.8	7.3	28.2
Nigeria	42,326	72.1	15.0	4.3	8.6
Rwanda	951	74.0	10.1	7.3	8.6

P=0.001.

Table 3 Pregnancy intention of users using the CycleBeads app to prevent pregnancy by country

Survey responses	Ghana	Kenya	India	Nigeria	Jordan	Egypt	Rwanda
Definitely yes [n, (%)]	442 (20.6)	280 (19.0)	151 (14.5)	766 (26.0)	47 (15.6)	41 (12.5)	14 (15.7)
Probably yes [n, (%)]	271 (12.6)	240 (16.2)	179 (17.2)	513 (17.4)	49 (16.2)	47 (14.4)	14 (15.7)
Probably no [n, (%)]	421 (19.6)	234 (15.8)	186 (17.9)	415 (14.1)	78 (25.8)	71 (21.7)	9 (10.1)
Definitely no [n, (%)]	1,012 (47.2)	723 (49.0)	525 (50.4)	1,257 (42.6)	128 (42.4)	168 (51.4)	52 (58.4)
Total (N)	2,146	1,477	1,041	2,951	302	327	89

P=0.001.

In the first survey at the beginning of cycle two, users are asked about their relationship status (P<0.001). A majority of users in India (89.2%), Egypt (95.6%) and Jordan (97.8%) were married, whereas in Ghana (32.8%) and Kenya (36.8%), a third of users were married, with exclusive and dating relationships featuring more prominently among users. Nigeria and Rwanda were in the middle, with 53.5% and 43.9% of the women being married and 36.1% and 44.5% single and dating, respectively.

Previous contraceptive use and pregnancy intentions of app users who are preventing pregnancy

A majority of users in each country who were using the app to prevent pregnancy reported not using any method of family planning in the 3 months prior to downloading the app (*Table 2*). Overall, there was a statistical difference in previous method use among the seven countries (P<0.001). Prior hormonal contraceptive use in Ghana (21.3%), Kenya (28.2%), and Egypt (22.2%) was much higher than in India (8.4%) Nigeria (8.6%), Jordan

(14.2%), or Rwanda (8.6%).

Women who were using the app to prevent pregnancy in Ghana and Kenya were also asked what type(s) of family planning method(s) they had ever used. A substantial percentage (44.4% and 50.8% respectively) of women reported that they had previously used a hormonal method, while in India (15.7%) it was much lower. Many women also reported that their current use of the CycleBeads app was the first family planning method they had used (Ghana: 22.8%; Kenya: 16.6%; India: 34.3%).

Users were also asked why they were using the CycleBeads app to prevent pregnancy. Answers were relatively consistent across Ghana, Kenya, and India. The top reasons for use were: (I) it's simple and easy to use, (II) it's natural, and (III) I was worried about side effects (of other methods). While the order of these answers differed by country, their selection did not. This question was not asked in the other countries.

In the second survey (at the beginning of their fourth cycle), users were also asked about their intention to become pregnant in the next year. In all countries, over

Table 4 Reported family planning method currently used by users tracking their cycles with the CycleBeads app

Method [n (%)]	Egypt	Ghana	India	Jordan	Kenya	Nigeria	Rwanda
Withdrawal	26 (4.6)	875 (20.5)	243 (10.3)	38 (9.4)	456 (17.4)	1,689 (26.9)	11 (6.3)
Condoms (male/female)	28 (4.9)	626 (14.7)	788 (33.5)	76 (18.7)	589 (22.5)	1,323 (21.1)	38 (21.6)
Another FABM method	41 (7.2)	138 (3.2)	103 (4.4)	43 (10.6)	47 (1.8)	208 (3.3)	13 (7.4)
Hormonal pill	59 (10.4)	256 (6.0)	110 (4.7)	22 (5.4)	163 (6.2)	583 (9.3)	7 (4.0)
Injectable	3 (0.5)	23 (0.5)	6 (0.3)	0 (0.0)	16 (0.6)	33 (0.5)	3 (1.7)
LARC	195 (34.2)	481 (11.3)	101 (4.3)	89 (21.9)	427 (16.3)	110 (1.8)	21 (11.9)
Emergency contraception	12 (2.1)	358 (8.4)	160 (6.8)	4 (1.0)	123 (4.7)	285 (4.5)	8 (4.5)
Nothing	206 (36.1)	1515 (35.5)	840 (35.7)	134 (33.0)	802 (30.6)	2,047 (32.6)	75 (42.6)
Total	570	4,272	2,351	406	2,623	6,278	176

P<0.001. FABM, fertility awareness-based method; LARC, long-acting, reversible contraception (IUD/implant).

Table 5 Satisfaction with the CycleBeads app after cycle 3

Survey responses	3 months [n (%)]						
	Ghana	Kenya	India	Egypt	Jordan	Nigeria	Rwanda
Definitely yes	3,500 (72.7)	2,519 (81.0)	2,144 (60.1)	416 (60.9)	395 (62.2)	4,049 (72.1)	97 (59.5)
Probably yes	1,075 (22.3)	492 (15.8)	1,154 (32.3)	136 (19.9)	136 (21.4)	1,105 (19.7)	40 (24.5)
Probably no	153 (3.2)	53 (1.7)	189 (5.3)	70 (10.3)	56 (8.8)	249 (4.4)	11 (6.8)
Definitely no	88 (1.8)	46 (1.5)	82 (2.3)	61 (8.9)	48 (7.6)	212 (3.8)	15 (9.6)
Total	4,816	3,110	3,569	683	635	5,615	163

P=0.001.

40% of women who were using the app to prevent pregnancy reported that they were definitely not intending to become pregnant in the next year. In Nigeria and Ghana however, 26.0% and 20.6% respectively reported that they were definitely intending to become pregnant in the next year (*Table 3*).

App users who are tracking cycles

Over 33% of women in all seven countries who were using the app to track their cycles reported that they had not been using a method during the 3 months prior to download. *Table 4* provides a summary of the family planning method(s) women who were using the app to track their cycles were currently using. In Ghana (20.5%) and Nigeria (26.9%), withdrawal was frequently reported among users tracking their cycles, while reports of condom use were higher in Kenya (22.5%) and India (33.5%). More users tracking their cycles in Jordan (21.9%) and Egypt (34.2%) reported using long-acting reversible contraceptives (LARCs).

User satisfaction

Users were asked after cycles three and five about satisfaction with the app. *Table 5* provides an overview of reported user satisfaction by country at 3 months. In all seven countries, approximately 60% or more reported that they would "Definitely Recommend" the CycleBeads app to a friend, and 22% said they would "Probably Recommend".

Discussion

Scale-up and monitoring in seven countries revealed that; the CycleBeads app is easily distributed through social media at low cost, expands access to and choice of a modern method, addresses multiple reproductive intentions, and is

attractive to a diverse population of users.

Smart phone and social media environment

Market test findings indicate that digital marketing campaigns via social media are an easy and low-cost way of informing women about the availability of the CycleBeads app. After a relatively short social media campaign, 356,520 users in these countries downloaded the app over a 10-month period, with cost per download ranging from $0.17 to $0.69. During the evaluation period, Nigeria and India had the most downloads indicating that the market in these two countries is prime for the introduction of an app of this nature. This success is reflective of population size, smartphone penetration, and Facebook use in these countries, but from a per capita perspective, Nigeria had the largest market saturation and the lowest cost per download ($0.17). Of the seven countries, Kenya and Rwanda had the highest cost per download at $0.41 and $0.69 indicating a quick saturation of the market but still showing this to be an efficient way of reaching a large number of women at low cost. These findings suggest that fertility apps delivered by smartphones are a way to address the unmet need for family planning even in low-resource settings as the proliferation of smartphones increase globally.

Expanding access and choice to a modern method

In many countries, lack of access due to cost and distance to family planning methods are some of the reasons women have an unmet need (9,10). The CycleBeads app, which is currently available at no cost to the user in both the Apple and Google Play Store, has the potential to expand access as a free direct-to-user evidence-based fertility app. Accessible directly on a smartphone, the CycleBeads app circumvents traditional healthcare service delivery obstacles. In all seven countries, over 45% of users seeking to prevent pregnancy reported that this was their first modern method in the last 3 months. This suggests that the CycleBeads app can reduce unmet need. Also, expanding choice through evidence-based apps can address some of the near ubiquitous desires that women are reporting (simplicity, no side-effects, and natural) and obtain a method they are satisfied with. Women were asked whether they would recommend the CycleBeads app to a friend after 3 and 6 months of use, and user satisfaction was quite consistent over time.

Addresses multiple reproductive intentions

By utilizing the data provided by in-app monitoring we were able to better understand the reproductive goals of a subset of women. Of all the users, 39.9% were using the app to prevent pregnancy, 38.5% to plan, and 21.6% to track their menstrual cycle. A majority of users in Ghana, Kenya, and Nigeria were using the app to prevent pregnancy, while almost 50% were using the app to plan in India, Egypt, and Jordan. Often in India use of family planning among married women is low (11), which may have influenced CycleBeads user's mode of use. Of the married app users in Egypt and Jordan, over half were using the app to plan a pregnancy, 61.0% and 55.0%, respectively. This difference may reflect the reproductive goals of the CycleBeads users in the respective countries.

Although we did not extensively review the data from micro-surveys for women who were using the app to track their cycles, we found that over 30% of these women reported that they had not been using a method 3 months prior to download, as shown in *Table 5*. This may be attributed to women who were not sexually active and thus did not feel the need to use the app as a family planning method. It may also be that these women considered another method, such as condoms or withdrawal, during the fertile window to be their primary method and thus stated that they were using the app to track their cycles. *Table 5* provides a summary of the family planning method(s) women who were using the app to track their cycles were currently using.

The pregnancy intentions of users who were using the app to prevent pregnancy in Ghana, Kenya, and Nigeria were similar in that they intended to become pregnant in the next year. Users in Jordan, India, and Egypt were more ambivalent, as they indicated that they were probably not intending to become pregnant in the next year. The CycleBeads app and other FABMs have the ability to truly help women transition from preventing to planning a pregnancy or vice versa at their disclosure. Pregnancy spacing is important and our findings demonstrate that the CycleBeads app can be seen as important spacing tool.

Diverse demographics of users

There were statistical differences in age and relationship status among the countries, with India, Egypt, and Jordan differing from Ghana, Kenya, Nigeria, and Rwanda. A substantial majority of users were married in Egypt, India, Jordan, Kenya, Nigeria, and Rwanda, while a slight majority of women in Ghana were single and dating. This likely reflects cultural expectations and social norms related to

sexual activity in the respective settings.

There were interesting observations for all seven countries when looking at each end of the age category spectrums. Less than 3% of users in India, Egypt and Jordan were between 15–19 years old, which is in line since the app was only marketed to women 18 and older. Interestingly, in Ghana, Kenya, and India between 15–18% of users were over 40 years old, while in India, Jordan, and Egypt this age category had less than 8%. The CycleBeads app is attractive to women in different age categories, and is a method that can be used across life stages.

There is variation among the countries in the percent of women who were using the app to prevent pregnancy with regard to prior hormonal method use. Ghana, Kenya, and Egypt had over 20% of users report prior hormonal method use, whereas only 8.4% in India, 8.7% in Nigeria, and 14.3% in Jordan. These data align with recent reports that show use of hormonal methods in India is less prevalent than in most African countries (9).

While reported method use in the past 3 months in Kenya and Ghana align to the most current DHS data for each country for current use of contraception, India does not. Some 64.0% of married women in the DHS reported currently using any method of contraceptive use in India (12), whereas only 13.4% of women using the CycleBeads app reported using any contraception method in the past 3 months. This suggests that in India the app is reaching women who had an unmet need for family planning.

Limitations

While monitoring efforts answered our primary questions about the feasibility of expanding access to family planning via a mobile phone app used as a platform for a fertility awareness based method of family planning, there are several limitations to this approach. The first is that all data was self-reported. Secondly, although the CycleBeads app is available in Hindi, the surveys were not asked on the Hindi version. It is possible that the data in India may be skewed due to differences between the English and Hindi speaking populations. Third, the design of the market test did not assess changes over time, instead asking different questions in each survey. From a methodological perspective, it is difficult to follow people over time for longitudinal studies, particularly with mHealth approaches (13). This assessment is no exception, as survey response rates were lower over time across all countries. However, the proliferation of mobile apps in low- and middle-income countries and

the recognition that mHealth may offer unprecedented opportunities for transformative outcomes suggest that longitudinal research is needed.

Discontinuation

The main reasons women stopped using the CycleBeads app for pregnancy prevention were because their cycles were out of the recommended range or because they had technical difficulties with the app. The SDM supports women whose cycles are 26–32 days long. This is an intrinsic characteristic of the method that cannot be overcome with the app. The market for mobile applications in low- and middle-income countries is relatively new, so women may be unfamiliar with how to use them. It is likely that infrastructure and familiarity with apps will improve over time (8). This suggests the importance of linking the app to local health infrastructure or to another digital platform such as m4RH to facilitate transition to another method. Additional instructions within the app itself could mitigate some technical issues. After this assessment was complete, the app developer has added a message to the CycleBeads app that directs users who have cycles out of range to another app called Dynamic Optimal Timing™, or Dot™. Dot is designed to accommodate a wider range of cycle lengths and is currently undergoing a contraceptive efficacy evaluation.

The CycleBeads app is capable of meeting the different fertility needs of women across different cultural contexts at a low-cost. Digital marketing of an app is feasible and cost-effective in a variety of settings. Furthermore, the CycleBeads app largely appeals to women who desire a natural, effective, and easy to use method of family planning. Based on the successful marketing and monitoring of the CycleBeads app in diverse settings, the app should be tested in additional countries. Monitoring efforts could include additional pop-up questions around contraceptive use, partner communication, changes in behavior based on the information received in the app, discontinuation, and future family planning intentions.

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Footnote

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