BRIEF REPORT

The Performance of Fertility Awareness-based Method Apps Marketed to Avoid Pregnancy

Marguerite Duane, MD, MHA, FAAFP, Alison Contreras, PhD, FCP, Elizabeth T. Jensen, MPH, PhD, and Amina White, MD, MA

Introduction: **In recent years there has been an explosion in the development of medical apps, with more than 40,000 apps now available. Nearly 100 apps allow women to track their fertility and menstrual cycles and can be used to avoid or achieve pregnancy. Apps offer a convenient way to track fertility biomarkers. However, only some use evidence-based fertility awareness-based methods (FABMs), which with ideal use have rates of effectiveness similar to those of commonly used forms of hormonal birth control. Since having a baby or preventing a pregnancy are important responsibilities, it is critical that women and couples have access to reliable, evidence-based apps that allow them to accurately track their fertility.**

Methods: **We developed a tool to evaluate and rate fertility apps. This tool is specifically designed to help couples avoid pregnancy.**

Results: **Results showed that the majority of fertility apps are not based on evidence-based FABMs or include a disclaimer discouraging use for avoiding pregnancy. However, at least 1 app in each FABM category (except symptohormonal methods) had a perfect score on accuracy.**

Conclusion: **Relying solely on an app to use an FABM, without appropriate training in the method, may not be sufficient to prevent pregnancy. (J Am Board Fam Med 2016;29:508–511.)**

Keywords: **Biomarkers, Birth Rate, Contraception, Female, Fertility, Menstrual Cycle, Natural Family Planning, Pregnancy**

The field of women's health and fertility tracking applications (apps) has recently exploded, with nearly 100 apps available to help women track their cycle.[1] The most popular apps have been downloaded over 1 million times each, and up to 60% of women express interest in using natural or fertility awareness-based methods (FABMs) to prevent pregnancy.[2] These methods are attractive because they lack medical side effects, are effective, and can empower women with knowledge about their bodies. For each evidence-based method (Billings, Creighton, two-day, symptothermal, symptohormonal, standard days, and lactational amenorrhea methods), there are Strength of Recommendation Taxonomy level 1 studies that demonstrate that these methods, when used correctly, have rates of effectiveness similar to those of commonly used forms of hormonal birth control.[3–6]

The effectiveness of FABMs depends on women observing and recording fertility biomarkers and following evidence-based guidelines. Apps offer a convenient way to track fertility biomarkers, but only some use evidence-based FABMs.[2] Until now

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From the Fertility Appreciation Collaborative to Teach the Science (FACTS), Dayton, OH (MD, AC); the Department of Family Medicine, Georgetown University, Washington, DC (MD); the Department of Epidemiology and Prevention, Wake Forest School of Medicine, Winston-Salem, NC (ETJ); and the Department of Obstetrics & Gynecology, University of North Carolina at Chapel Hill, Chapel Hill (AW).
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Corresponding author: Marguerite Duane, MD, MHA, FAAFP, Department of Family Medicine, Georgetown University, 1020 Kearny St NE, Washington, DC 20017 (E-mail: MDuaneMD@gmail.com).

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Table 1. Criteria for Rating Apps

Very important criteria (weighted ×3)	
Authority	Source of rules app uses to determine fertile days
Accuracy (method)	Effectiveness of the method on which app is based
Accuracy (observations)	Accuracy of app in predicting fertile days
Support	Ways to have questions answered
Important criteria (weighted ×2)	
Adaptability	Ability to enter additional data, use with irregular cycles
Cost/pricing	Cost of app, transparency in pricing
Ease of use	Ease to learn and use the app and share data
Confidentiality	Presence of a user agreement detailing confidentiality
Helpful criteria (weighted ×1)	
Developer/sponsor	Associated with recognized FABM provider
Platforms available	Availability on multiple platforms

FABM, fertility awareness-based method.

there have been no objective assessments of the apps designed for use to avoid pregnancy.[1] In this study we developed a rating tool with specific criteria to quantify an app's response to real cycle data based on the clinical guidelines evaluated in level 1 studies.

Methods

We identified 95 apps for study via iTunes, Google, and Google Play searches. Of those, we excluded 55 apps because they either had a disclaimer prohibiting use for avoiding pregnancy or did not claim to use an evidence-based FABM as described in Manhart et al.[3]

The rating system was developed based on criteria used by *Family Practice Management* to evaluate medical apps.[7] We rated each app for 10 clearly defined criteria (each on a 5-point scale), which were weighted based on their level of importance for avoiding pregnancy (Table 1).

A standardized data set of 7 cycles of daily fertility observations, derived from real cycle data, was used to determine the apps' accuracy in identifying potential days of fertility. For each cycle, evidence-based fertile days (FDs) were determined by applying specific guidelines for each FABM, as evaluated in peer-reviewed studies.[3] The accuracy of each app was determined by comparing evidence-based FDs to the fertile days of each cycle as identified by the app, called the app-defined FDs (Figure 1).

Apps that did not predict fertile days scored high on accuracy only if they recommended prior FABM training apart from the app.

Results

Of those reviewed, 30 apps predicted days of fertility for the user and 10 did not. Table 2 ranks the apps based on the mean accuracy and authority

Figure 1. A comparison of evidence-based fertile days (FDs) and app-defined FDs.

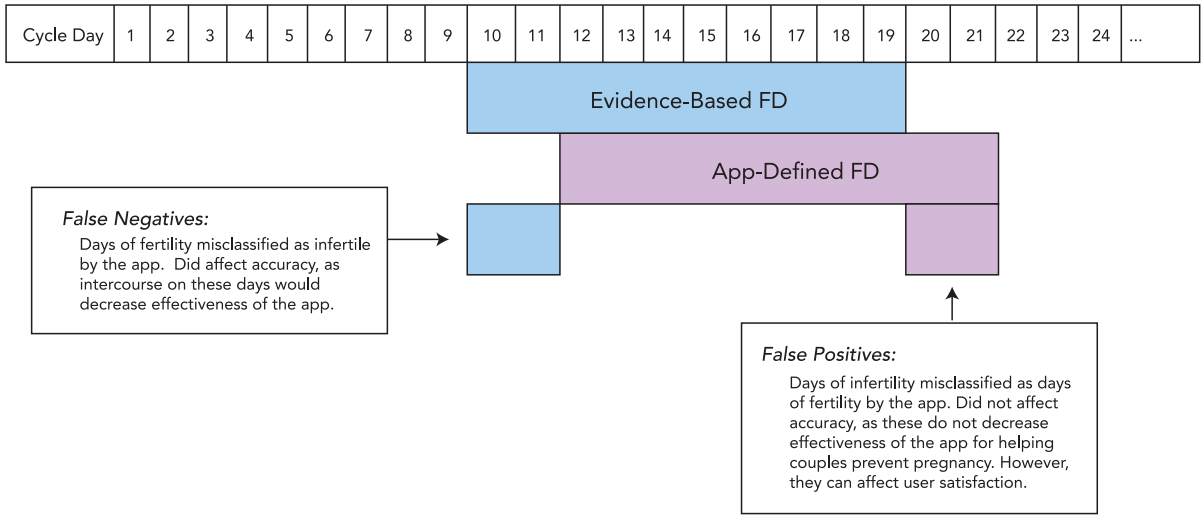

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Table 2. Ranking of Fertility Apps Based on Mean Accuracy and Authority Scores*

Ranking	Name of App	FABM	Platforms Available	Accuracy and Authority Score (Mean)	Total Score (Mean)
Apps that predict fertile days (n = 30)					
1	Ovulation Mentor†	Ovulation	Web	4.7	4.4
2	Sympto.org†	Symptothermal method	iOS/Android/Web	4.5	4.1
3	iCycleBeads†	Standard days method	iOS/Android	4.3	3.9
4	LilyPro†	Symptothermal method	iOS	4.3	3.8
5	Lady Cycle†	Symptothermal method	Android	4.3	4.1
6	mfNFP.net†	Symptothermal method	iOS/Android/Web	4.0	4.0
7	MyFertilityCharts.com	Symptothermal method	iOS/Android/Web	3.5	3.7
8	CycleProGo	Symptothermal method	iOS/Android/Web	3.4	3.9
9	2Day Method	Two day	iOS	3.3	3.2
10	Ova Ova	Symptothermal method	Web	3.3	3.3
11	OvaGraph	Symptothermal method	iOS/Android/Web	3.1	3.6
12	OvuView	Symptothermal method	Android	2.7	2.8
13	FemCal	Symptothermal method	iOS	2.5	2.2
14	Ovatemp	Symptothermal method	iOS	2.3	3.2
15	Natural Cycles	Proprietary	iOS/Android	2.3	3.1
16	Cyclendar	Symptothermal method	Web	2.1	2.2
17	My Fertility MD	Ovulation	iOS	2.1	3.2
18	Menstrual Cycle Woman Log	Rhythm‡	Android	2.1	1.9
19	Menstruation & Ovulation	Rhythm	iOS	2.1	1.2
20	Cycles	Standard days method	iOS	1.7	2.2
21	iCyclus	Rhythm	iOS	1.3	1.4
22	Period Log	Rhythm	iOS	1.1	1.8
23	Period Pace	Rhythm	iOS	1.0	1.7
24	Period & Ovulation Calendar	Rhythm	iOS	1.0	1.5
25	Pink Pad Pro	Rhythm	iOS/Android	1.0	2.3
26	Fertility Calendar	Rhythm	Android	1.0	1.4
27	Fertility Clock	Rhythm	iOS	0.7	1.4
28	Woman Calendar	Rhythm	iOS	0.7	1.2
29	Fertility & Ovulation	Rhythm	iOS	0.5	1.6
Apps that did *not* predict fertile days (n = 10)					
1	NFP Charting	Ovulation	iOS/Android/Web	4.3	4.5
2	Symptopro	Ovulation	Web	4.3	3.7
3	Fertility Pinpoint	Symptothermal method	iOS/Android	4.2	4.2
4	Kindara	Symptothermal method	Web	4.0	4.1
5	Groove Fertility Pro	Symptothermal method	iOS	2.7	3.2
6	FEMM	Symptohormonal method	iOS	2.7	3.2
7	NFP Project Caruso	Rhythm	Android	2.7	2.1
8	Charting App	Ovulation	Android	2.0	2.3
9	Lady Timer	Proprietary	iOS	1.3	2.5
10	Knowhen	Ovulation	Android	1.0	2.2

*The data is representative of the apps at the time they were reviewed (Spring of 2015). Current versions of the app may be different.
†This app had either a perfect score on accuracy (app-defined fertile days = evidence-based fertile days) or no false negatives (days of fertility classified as infertile).
‡Rhythm is not an evidence-based FABM.
Glow was originally included in the study because it did not appear to meet the exclusion criteria. However, the developers clarified that the app is not a substitute for an FABM. Therefore, it should not be used by women attempting to avoid pregnancy through the use of an FABM. FABM, fertility awareness-based method.

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scores, since the total scores include some reviewer subjectivity (such as ease of use) and users may be more concerned with accuracy. Only 6 apps (marked with * in Table 2) had either a perfect score on accuracy (app-defined FDs = evidence-based FDs) or no false negatives (days of fertility classified as infertile).

Discussion

The majority of fertility apps are neither designed for avoiding pregnancy nor founded on evidence-based FABMs. Several popular apps use their own algorithms, which are difficult to assess because they have not been evaluated in peer-reviewed literature. Attractive apps are not necessarily effective and vice versa. At least 1 app had a perfect score on accuracy in each FABM category except symptohormonal methods. Apps that do not predict days of fertility may be still useful for experienced FABM users to electronically record their data. Success using FABMs depends on many factors, including the ability to accurately make and classify daily observations. Relying solely on an FABM app may not be sufficient to prevent pregnancy.

For a list of the apps excluded and additional SORT Level 1 studies, please visit: www.FACTSaboutFertility.org.

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