



The Use and Efficacy of Mobile Fertility-tracking Applications as a Method of Contraception: a Survey

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Accepted: 24 March 2021 / Published online: 31 March 2021

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Abstract

Purpose of Review The purpose of this review is to investigate the use and efficacy of fertility tracking applications as a natural contraceptive method since there has been a worldwide increase in the development and use of applications that monitor the menstrual cycle and fertility window. An anonymous online survey had been conducted in order to achieve this goal, and a total of 375 married women from Jordan responded to our survey.

Recent Findings Topics discussed include fertility awareness-based methods (FAM) of contraception in which mobile applications fall into, and their efficacy and failure rates, comparing them with other methods of contraception while taking into account the typical and perfect use of each method. Motivation has also been looked at as a factor affecting the efficacy of FAM and advantages/disadvantages of this method were discussed. The prevalence of mobile applications that monitor fertility signs and their expected increased use over the next years was also discussed.

Summary The use of fertility tracking applications is not uncommon amongst sexually active women in reproductive age, and the majority of users rely on them to track their fertility window. However, the efficacy of such applications as a method of contraception is not high and there is a significant failure rate especially if used alone. It is worth noting that 50% of women who reported failure relied solely on mobile applications and fertility window assessment without using other methods of contraception, and thus we advise women to use more reliable methods of contraception and not rely solely on such applications.

Keywords Fertility tracking apps · Fertility window · Contraception · Fertility awareness method

Background

There has been a worldwide increase in the development and use of mobile health applications that monitor the menstrual cycle and fertility window. Such apps help women keep track of their cycles by tracking the changes that occur during the month and can give women insight as to when they might reach their peak fertility window, which helps women who

are planning on getting pregnant but also help women who wish to avoid this period, thus acting as a contraceptive method that is similar to the Fertility Awareness Method (FAM) of contraception.

The FAM is a form of contraception that involves the avoidance of intercourse during the fertile period of the cycle. For the calendar or rhythm method, the woman calculates the fertile period according to the length of her menstrual cycle. The first day of the fertile period is calculated as the length of the shortest cycle minus 20 days, and the last day of the fertile period as the longest cycle minus 10 days. Therefore, if cycle length varies from 25 to 30 days, the potentially fertile period (where the couple should avoid intercourse) is day 5 to day 20 [1].

To make the calculation easier, the increasing number of fertility mobile applications come into play. The user inputs cycle length, the first day of the cycle, and/or ovulation related symptoms, and the application calculates the fertility window. These applications are being adapted for contraceptive purposes. However, many couples find it difficult to abstain from

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intercourse during the fertility period, which is why the failure rates of this method are high.

In this study, we investigated the efficacy of fertility tracking mobile applications used by Jordanian women as a natural contraceptive method where they avoid intercourse during their fertile period (the ovulatory period).

Methods

An anonymous online survey had been conducted over the period of one month. A total of 375 married women were given the survey to fill after reading a detailed description of the study and its purpose, as well as giving consent to participating. An effort was made to choose women of different socioeconomic backgrounds in order to fully represent women in the Hashemite Kingdom of Jordan.

All responses were recorded on Microsoft Excel[®], and SPSS v.16[®] was later used to analyze the data.

Results

The mean age of the study group was 31.61. The minimum age was 18 years, and the maximum age was 58 years.

The mean bodyweight of the study group was 65.7 kg. The minimum weight was 39 kg and the maximum weight was 157 kg.

Out of the entire study group, 316 (84.3%) had regular menstrual cycles and 59 (15.7%) had irregular menstrual cycles.

Two hundred twenty participants (58.7%) mentioned using contraceptive methods during their marital life, most of them used combinations of contraceptive methods at the same time, and the most commonly used contraceptive method was the use of Intrauterine Contraceptive Devices (IUCDs); this was followed by the use of Oral Contraceptive Pills (OCPs). The least commonly used contraceptive method was the use of Contraceptive Implants (Fig. 1).

Out of the entire study group, 173 participants (46.1%) mentioned using mobile applications to track their menstrual period. From these 173 participants, 119 (68.7%) mentioned using the application as a contraceptive method to track their fertility window and avoid having intercourse during that period (Table 1), with only 38 participants (31.9%) experiencing failure of contraception and pregnancy while the rest reported no failure and were satisfied with the use of the application as a contraceptive method. 19 out of the 38 women (50%) who reported failure relied solely on mobile applications and fertility window assessment with no use of any other method of contraception (Table 2). 95% of women who used mobile applications to track their cycle and track their fertility window fell between the ages of 20 and 40 years.

It is worth mentioning that about half of the participants who used mobile applications to track their fertility period relied solely on this method and did not use any other forms of contraception. Out of 119 participants using the mobile application as a method of contraception, 54 participants (45.3%) relied solely on this method, and 65 participants (54.7%) used this method in combination with another method (most commonly OCPs).

When asked whether they recommend using mobile applications to track the fertility window and rely on it as a method of contraception, the majority of the study group answered “Yes” and recommended the use of applications as a contraceptive method. 224 participants recommended the use of fertility window tracking apps as a method of contraception, and 151 participants (40.3%) did not recommend the use of such apps to prevent pregnancy (Fig. 2).

Discussion

FAMs of contraception, including the digital ones, are a viable alternative for women who do not prefer to use other methods of contraception (especially hormonal methods) [2]. Although fertility apps are gaining popularity and their use is growing, research on the development and use of such apps is still limited, and questions surrounding their efficacy, particularly in relation to the risk of unintended pregnancy, have also been raised.

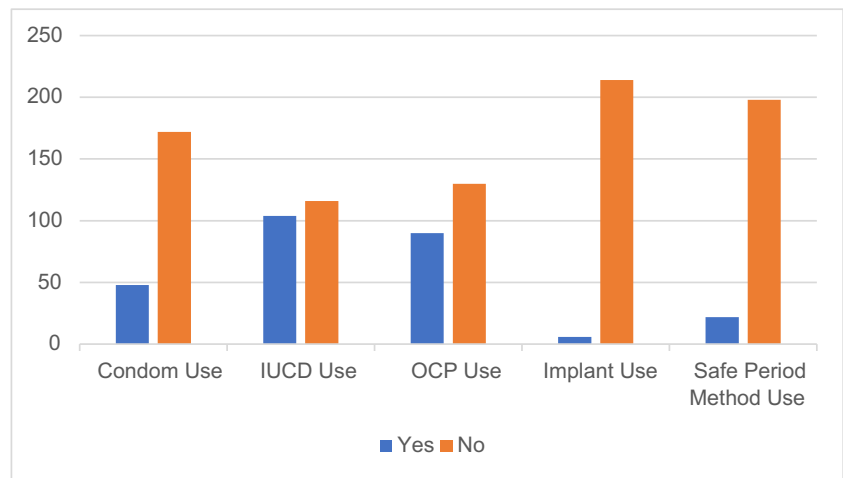
There is limited good-quality evidence investigating the efficacy of the FAM. Most of the reported studies have utilized an observational design. A Cochrane Review of Randomized Controlled Trials (RCTs) was unable to determine pregnancy rates associated with FAM. Therefore, the efficacy of FAM is very difficult to ascertain [3].

Women who choose to use FAM should be made aware of the different fertility indicators and the failure rates of different combinations to decide on the most appropriate methods. In a study of women using either a combination of fertility indicators or cervical secretions alone, higher motivation resulted in higher efficacy [4••]. However, since the level of motivation in women and/or their partners may change with time and circumstances, some women implement applications that track the fertility days in the menstrual cycle, and which can be combined with other methods to decrease the failure rate.

Changes that can be monitored in combination with fertility tracking applications to decrease the failure rate:

- Temperature
- Cervical secretions
- Changes to the cervix
- Calendar calculations
- Urinary hormone monitoring

Fig. 1 Contraception methods used by Jordanian women



The length of the menstrual cycle can be highly variable with ovulation usually occurring between 12 and 16 days before menstruation. By plotting menstrual cycles over a time period, women can establish the earliest and latest time they are at risk of conception. But the use of single fertility indicators is not recommended since the pregnancy rate at 1 year of typical use is approximately 24%, which is less effective than the use of male condoms (typical use failure rate is 18%). Therefore, the use of the symptothermal method, which is a double-check method based on evaluation of cervical mucus to determine the first fertile day and evaluation of cervical mucus and temperature to determine the last fertile day, is highly recommended. The one-year pregnancy rate for perfect use of the symptothermal method is noted to be 0.4%, which is comparable to those for perfect use of oral contraceptives (0.3%) [5••].

Advantages of using the fertility awareness method:

- As this method relies on “natural” indicators, there are no potential hormone-related side effects or health risks associated with use.
- FAM does not alter women’s menstrual cycles. Therefore, potential problems presenting with amenorrhoea or

irregular bleeding may be more readily identified. Additionally, the lack of interference with a woman’s natural cycle may be more acceptable and preferable to some women.

- Having a better understanding of fertility awareness indicators may also assist women to conceive/plan a pregnancy in the future.

Disadvantages of using fertility awareness for contraception:

- These methods are less effective with typical use than long-acting reversible methods of contraception. There is more reliance on the user and her partner to check the basal body temperature or cervical secretions each day and avoid intercourse or use barrier methods during the fertile period.
- Hormonal contraceptives can offer a number of non-contraceptive benefits such as a reduction in ovarian/endometrial cancer risk; menstrual bleeding; dysmenorrhoea and acne. Such benefits are not conferred by the use of FA indicators [6, 7].

Table 1 Crosstabulation showing the number of mobile app users and the number of users who used these apps to track their fertility window

Cycle tracking app use * app used to track fertility period? Crosstabulation					
Count	App used to track fertility period?			Total	
	No	Yes			
Cycle tracking app use	No	202	0	0	202
	Yes	0	54	119	173
Total		202	54	119	375

Table 2 Crosstabulation showing the number of mobile app users who reported failure and pregnancy with the number of users who reported not using contraception methods. The table shows that 38 users reported failure of contraception while using mobile apps to track their fertility window, 19 of whom reported not using any other form of contraception during the time

Failure during use? * Contraception use crosstabulation				
Count	Contraception use		Total	
	No	Yes		
Failure during use?	No	101	155	256
	Yes	35	46	81
	Yes	19	19	38
Total		155	220	375

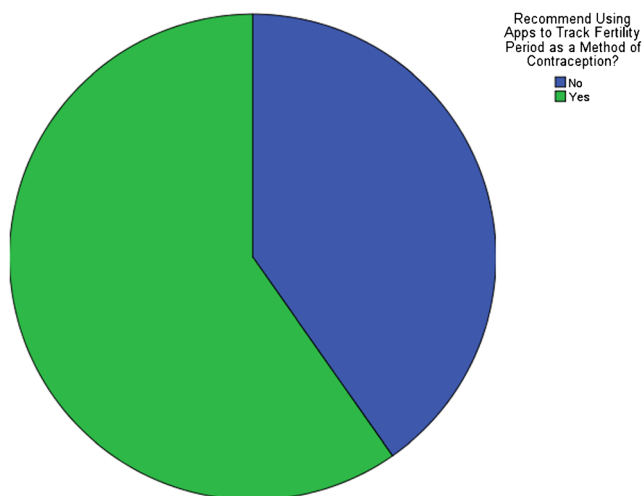


Fig. 2 Pie chart visualizing the overall recommendation of women regarding the use of fertility tracking applications as a method of contraception

- While FA indicators can be used to avoid pregnancy, they offer no protection from human immunodeficiency virus (HIV) and other STIs. The most efficient means of protecting against HIV and other STIs is the consistent and correct use of condoms.

Despite the ongoing talk about the disadvantages of FAM and the high failure rate with typical use, and the inability of many apps to accurately predict the fertile window, many doctors recommend the use of mobile tracking applications to track the menstrual cycle.

We looked at the use of mobile applications as a method of contraception amongst Jordanian women to assess the prevalence of such apps and the total awareness of Jordanian women to the presence and the use of them, and to assess their overall use as a contraceptive method and their efficacy. Our study is one of a few to draw on data from Jordanian women, and it highlights that app use differed significantly with age. As mentioned previously in the results section, nearly half of the women who took the survey were using apps to track their period, and most app users were aged between 20 and 40 years. 68.7% of users used the app to prevent pregnancy, and 45.3% of the women who used the app to track their cycles were not using any other form of contraception during that period. 31.9% of users who relied on mobile applications as a method of contraception reported failure and pregnancy, 50% of whom relied solely on mobile applications and the FAM with no use of other methods of contraception.

These numbers conclude that the use of such mobile applications amongst Jordanian women is fairly common, but the failure rate with the typical use of such applications by Jordanian women is also high, especially if women do not use other methods in combination with the FAM and apps. Thus, while the use of such apps can be helpful and gives

women knowledge about their periods, it is not advised to rely on them given the numbers shown in this study. We suspect that changes in motivation might have a role in this high failure rate, but more studies regarding this area need to be done.

Other studies show that the rate of fertility tracking applications use is expected to raise even more; one survey that was conducted on 1000 women showed that approximately 80% of women plan on using a fertility tracker app in the future [8••]. But although the use of fertility apps is expected to grow exponentially; research on the role of fertility tracker apps in developing countries, such as Jordan, is still limited, and their efficacy with typical use and in cases of negligence and low motivation is not well studied.

Conclusion

The use of fertility tracking applications is not uncommon amongst sexually active women in reproductive age, and the majority of users rely on them to track their fertility window. However, the efficacy of such applications as a method of contraception is not high, and there is a significant failure rate especially if used alone, so we advise such group of women to use a reliable method of contraception.

We suspect the demand and use of such applications to grow over the next years. Thus, we recommend the comparison between different applications to assess their individual efficacies and that a larger study should be conducted in the future while taking into account the use of such applications alone or with other methods of contraception.

Since the user is considered to be the greatest ‘risk factor’ in the efficacy of such apps, we recommend the collaboration between app developers, women’s health experts, and consumer groups to ensure that women have access to fertility apps that meet their specific needs and minimize the risk of failure as much as possible.

Acknowledgements We want to greet all the health-care workers in every country in the world for their work during the COVID-19 pandemic.

Author’s contribution FR: Research question, manuscript writing, final editing and supervised the research team work, AQ: Conducted the survey, Results section, data analysis and statistics, FW,BA, and AG: Data collection, Manuscript writing and Editing the final draft. All authors read and approved the final manuscript.

Data availability Not applicable

Declarations

Competing interests The authors declare that they have no conflict of interest.

Human and animal rights and informed consent This article does not contain any studies with human or animal subjects performed by any of the authors.

Ethics approval and consent to participate Not applicable

Consent for publication Not applicable

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