



www.drstevihilgers.com

August 30, 2023 · Steve Hilgers, MD

Accurately Identifying Fertility

For couples desiring to achieve or avoid pregnancy the accurate and confident identification of the fertility window is fundamentally important. Widely available fertility applications are significantly variable in application and highly inaccurate.

On the other hand, monitoring standardized cycle observations is proven accurate in identifying the days of fertility.

The Importance of the Fertility Window

For couples desiring pregnancy, and also for those actively avoiding, the accurate identification of the days of fertility are paramount.

The window of human fertility is the period of the female menstrual cycle during which intercourse can result in conception.

It is estimated that there are only 6 days during a given menstrual cycle in which a couple can expect to achieve pregnancy via intercourse - the five days leading up to and the day of ovulation, which are collectively referred to as the “fertile window.” The likelihood of pregnancy has been shown to be highest when intercourse occurs the day prior to ovulation.

These days of fertility are driven by three prerequisite factors required for conception - the presence of sperm, egg, and fertile, well-estrogenized, cervical mucus.

Most couples understand the important role of both the sperm and egg when it comes to successfully conceiving, but many are less knowledgeable regarding the critical role fertile-cervical mucus plays as the “biological valve” of human fertility.

Research into human fertility shows quite clearly that the presence of estrogen-dominant, fertile-type cervical mucus during the fertile window is necessary for conception to occur.

For example, a 2006 study revealed that, regardless of the timing of intercourse within the menstrual cycle, the probability of conception is essentially zero on days without cervical mucus.

Studies have also revealed that couples with limited mucus patterns have more difficulty conceiving.

Similarly, it has been shown that couples with a longer fertility window have a higher chance of conceiving pregnancy in a given cycle.

Fertility Applications are Widely Available

So where do couples go for assistance in identifying their fertility window?

Quite simply, couples go where nearly everyone else goes with a question - to their phones and related applications for answers.

When it comes to fertility tracking technology, the vast majority of these programs predict the individual “fertile window” by analyzing user-submitted information, such as the date of the individual’s last menstrual period and the usual cycle length.

And there has been a massive acceleration in the sheer number and availability of fertility websites and applications (“apps”) over the past several years. For example, in 2017 alone there were over 150,000 health-related apps available on the Apple App Store.

In fact, it has never been easier to access “assistance” in identifying menstrual cycle and fertility-related data than it is now - given the near universal access to smartphone technology.

So, it is not surprising when the vast majority of couples that present for a fertility evaluation are heavily utilizing a fertility app as their primary means of identifying their days of fertility.

Fertility Apps Proven Inaccurate

Given the popularity and large-scale acceptance of fertility apps, the accuracy of these informational platforms has been the subject of recent research.

A 2016 study by Setton et al. evaluated the top 20 websites and 33 applications downloadable to a cellular phone providing fertility and ovulation-related calculations. The authors found the apps were highly inaccurate in identifying the expected fertility window with only one web site and three apps predicting the precise fertile time period. To put this into some perspective, the results reveal an astounding 94% of the apps studied failed to correctly identify the fertility window.

Based on their results, the authors found that “[w]eb sites and electronic apps used by the general public to predict the fertile windows are generally inaccurate . . . [and those] trying to conceive with the assistance of calendars generated from web sites and electronic apps should be counseled on the inaccuracy of these modalities.” [10]

Setton et al. further concluded -

Because there is no rigorous screening process in effect to vet these web sites and apps, we recommend caution in their use to assist with fertility. Practitioners should be aware that most of these [apps] give patients inaccurate information, and patients should be counseled accordingly. [10]

It is important to note that the study performed by Setton et al. compared the fertility web sites and apps against a “perfect” 28 day cycle length and a luteinizing hormone surge on cycle day 14.

It is certainly well established that a woman’s individual cycle can vary quite significantly from one cycle to another, and that the expectation of a universally “perfect” cycle is uncommon.

Accordingly, the authors concluded that “[a]lthough for this study we assumed a ‘perfect cycle,’ it can be implied that with the inherent variation in actual cycles, the predicted fertile windows may be even more inaccurate.”

In a similar 2020 study, Ali et al. evaluated 90 mobile fertility tracking apps to determine their usefulness in identifying the fertility window. The authors found that unreliable calendar apps remained the most commonly available type of app on the market (54.4% of available apps) - providing women with highly inaccurate information regarding their fertility window given it is impossible to predict the day of ovulation by simply looking at a menstrual calendar.

Ali et al. further concluded that couples trying to conceive using these apps may waste precious time if instructed to have intercourse at the wrong time, and also warned that those trying to avoid pregnancy may conceive based on app-related inaccuracies.

Finally, a 2020 study by Zwingerman et al. evaluated 140 fertility and menstrual tracking apps available on the Apple App Store. Of the 140 apps evaluated the authors found an extremely high degree of variability among the apps, and noted the overall quality of the apps was quite low.

Nearly all apps assumed individuals were having ovulatory cycles regardless of cycle length or variability resulting in potentially misleading information for those with irregular cycles who would likely benefit from an earlier medical evaluation.

In addition, Zwingerman et al. found 22% of the apps contained incorrect information or inadequacies placing users at risk of inadvertent pregnancy or unnecessary delays for those desiring pregnancy.

Thus, it is highly likely, and reasonable to assume, that the wide availability and the over-utilization of inaccurate fertility apps may result in a larger number of couples failing to conceive primarily based on the mistiming of intercourse.

So, where can couples turn for accurate information on how best to identify their days of fertility to either achieve or avoid pregnancy?

Menstrual Cycle Biomarkers Accurately Identify the Fertile Window

The fertility window is uniquely composed of the three essential elements necessary for fertility - sperm, egg, and the presence of well-estrogenized, fertile-cervical mucus, or peak-type mucus.

Peak-type mucus is considered the “biological valve” of human fertility given it is necessary for sperm transport, survival, and storage around the time of ovulation.

Conception is only possible if intercourse occurs during the window of fertility, which begins the 5 days prior to ovulation continuing through the day of ovulation itself. In fact, conception the day after ovulation has never been documented.

In terms of the fertile window, it is well established that tracking the unique biomarkers of a woman’s cycle, specifically fertile, peak-type mucus observations, effectively identifies the days when intercourse is most likely to result in pregnancy; as well as accurately approximating the time of ovulation.

Accurately Tracking Fertility Improves the Probability of Conception

If a couple is accurately tracking their fertility window the probability of conceiving is significantly increased.

In a study published by Hilgers et al., 50 couples utilized fertility-focused intercourse in conjunction with their fertile time period based on - what is now known as - the Creighton Model FertilityCare System’s objective cervical-mucus biomarker observations. The fertile period was defined as the first day of cervical mucus discharge through 3 full days past the peak mucus day - given ovulation is considered possible within plus or minus 2 days of the peak day in 95.4% of cycles.

The results of the study revealed a remarkably higher chance of conception with 76% of couples achieving pregnancy within the first cycle of fertility-focused intercourse; 90% achieving pregnancy by the third cycle; and 98% conceiving by cycle six.

These conception rates are significantly higher than studies evaluating conception rates with couples utilizing random acts of intercourse during the menstrual cycle, and certainly highlight the importance and utility of accurately tracking the biomarkers of fertility to achieve or avoid pregnancy with confidence.

In a more recent study, Stanford et al. analyzed 1681 cycles with 81 pregnancies from 309 normal fertile couples and 373 cycles with 30 conceptions from 117 subfertile couples charting the Creighton Model FertilityCare System in concluding the highest probability of pregnancy occurred on the peak day of mucus observation for both normal and subfertile couples.

Stanford et al. concluded that standardized mucus observations, as utilized by the Creighton Model FertilityCare System, identified the days with the greatest likelihood of conception in couples with both normal fertility and subfertility and that these observations provided an indicator of the overall potential for conception in a given menstrual cycle in those with normal fertility.

The Importance of Fertility-Appreciation Education

It is well documented that accurate fertility-appreciation related information is significantly lacking in the general education curricula.

Yet, the benefits of fertility-appreciation education is fundamental to human reproduction and empowering to individuals and couples.

As a way of highlighting the importance of fertility-appreciation education, a 2017 study revealed the cumulative pregnancy rate in couples experiencing subfertility was significantly higher (38% after 8 months) following education in this area leading the authors to conclude that training women to identify their fertile window was a reasonable first-line instruction in the management of subfertility.

True Health Matters Summary

For couples desiring to achieve or avoid pregnancy the accurate and confident identification of the fertility window is fundamentally important.

Widely available and heavily utilized fertility applications have, unfortunately, been proven to be both significantly variable in application and highly inaccurate.

On the other hand, tracking the objective and standardized biomarkers related to the female cycle, specifically peak-type mucus, has been shown to accurately identify the fertility window with great benefit.

Fertility-appreciation education has been proven beneficial and should be encouraged for all interested in monitoring or learning about their fertility.

References:

- [1] Ali R, Gürtin ZB, Harper JC. Do fertility tracking applications offer women useful information about their fertile window? *Reprod Biomed Online*. 2020 Sep 11:S1472-6483(20)30509-5. doi: 10.1016/j.rbmo.2020.09.005. Epub ahead of print. PMID: 34756400.
- [2] Ecochard R, Duterque O, Leiva R, Bouchard T, Vigil P. Self-identification of the clinical fertile window and the ovulation period. *Fertil Steril*. 2015 May;103(5):1319-25.e3. doi: 10.1016/j.fertnstert.2015.01.031. Epub 2015 Feb 24. PMID: 25724738.
- [3] Frank-Herrmann P, Jacobs C, Jenetzky E, Gnoth C, Pyper C, Baur S, Freundl G, Goeckenjan M, Strowitzki T. Natural conception rates in subfertile couples following fertility awareness training. *Arch Gynecol Obstet*. 2017 Apr;295(4):1015-1024. doi: 10.1007/s00404-017-4294-z. Epub 2017 Feb 9. PMID: 28185073.
- [4] Harper J, Boivin J, O'Neill HC, Brian K, Dhingra J, Dugdale G, Edwards G, Emmerson L, Grace B, Hadley A, Hamzic L, Heathcote J, Hepburn J, Hoggart L, Kisby F, Mann S, Norcross S, Regan L, Seenan S, Stephenson J, Walker H, Balen A. The need to improve fertility awareness. *Reprod Biomed Soc Online*. 2017 Apr 8;4:18-20. doi: 10.1016/j.rbms.2017.03.002. PMID: 29774262; PMCID: PMC5952813.
- [5] Hilgers TW, Daly KD, Prebil AM, Hilgers SK. Cumulative pregnancy rates in patients with apparently normal fertility and fertility-focused intercourse. *J Reprod Med*. 1992 Oct;37(10):864-6. PMID: 1479570.
- [6] Keulers MJ, Hamilton CJ, Franx A, Evers JL, Bots RS. The length of the fertile window is associated with the chance of spontaneously conceiving an ongoing pregnancy in subfertile couples. *Hum Reprod*. 2007 Jun;22(6):1652-6. doi: 10.1093/humrep/dem051. Epub 2007 Apr 20. PMID: 17449509.
- [7] Practice Committee of the American Society for Reproductive Medicine in collaboration with the Society for Reproductive Endocrinology and Infertility. Electronic address: ASRM@asrm.org; Practice Committee of the American Society for Reproductive Medicine in collaboration with the Society for Reproductive Endocrinology and Infertility. Optimizing natural fertility: a committee opinion. *Fertil Steril*. 2017 Jan;107(1):52-58. doi: 10.1016/j.fertnstert.2016.09.029. Epub 2016 Oct 26. PMID: 28228319.
- [8] Robinson JE, Ellis JE. Mistiming of intercourse as a primary cause of failure to conceive: results of a survey on use of a home-use fertility monitor. *Curr Med Res Opin*. 2007 Feb;23(2):301-6. doi: 10.1185/030079906X162863. PMID: 17288684.
- [9] Scarpa B, Dunson DB, Colombo B. Cervical mucus secretions on the day of intercourse: an accurate marker of highly fertile days. *Eur J Obstet Gynecol Reprod Biol*. 2006 Mar 1;125(1):72-8. doi: 10.1016/j.ejogrb.2005.07.024. Epub 2005 Sep 8. PMID: 16154254.

[10] Setton R, Tierney C, Tsai T. The Accuracy of Web Sites and Cellular Phone Applications in Predicting the Fertile Window. *Obstet Gynecol.* 2016 Jul;128(1):58-63. doi: 10.1097/AOG.0000000000001341. PMID: 27275788.

[11] Stanford JB, Smith KR, Dunson DB. Vulvar mucus observations and the probability of pregnancy. *Obstet Gynecol.* 2003 Jun;101(6):1285-93. doi: 10.1016/s0029-7844(03)00358-2. PMID: 12798538.

[12] Stanford JB, White GL, Hatasaka H. Timing intercourse to achieve pregnancy: current evidence. *Obstet Gynecol.* 2002 Dec;100(6):1333-41. doi: 10.1016/s0029-7844(02)02382-7. PMID: 12468181.

[13] Zwingerman R, Chaikof M, Jones C. A Critical Appraisal of Fertility and Menstrual Tracking Apps for the iPhone. *J Obstet Gynaecol Can.* 2020 May;42(5):583-590. doi: 10.1016/j.jogc.2019.09.023. Epub 2019 Dec 25. PMID: 31882289.