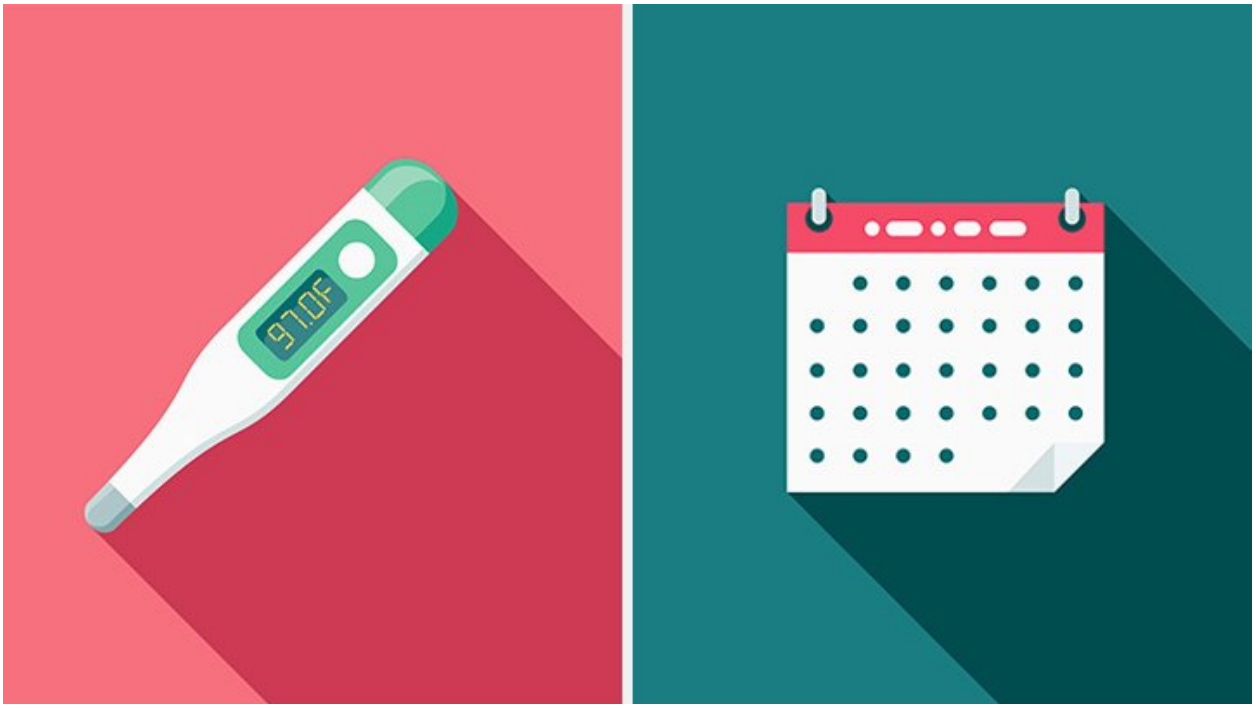
EXPERIENCES AND PRACTICES OF WOMEN USING FERTILITY AWARENESS-BASED METHODS OF CONTRACEPTION



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Abstract

Fertility awareness-based methods of contraception (FABMs) are growing in popularity. Using a combination of social practice theory and a contraceptive decision-making framework, this research sought to understand the priorities, contexts, and influences that motivate women to turn to these methods and how they turn this choice into a practice over time. It also sought to understand how female health-focused smartphone applications and devices known as Femtech have contributed to the practice. Seven women were interviewed about their experiences using FABMs to avoid pregnancy. This research found that major motives for using FABMs as contraceptives were dissatisfaction with other available contraceptive options, feminist, women's liberation, and "hippie" values, and a desire for increased body literacy. The respondents discovered FABMs largely through the internet and sometimes word-of-mouth. Social media, online communities, and FABM specialists were found to play substantial roles in providing FABM-related education and support. In-person communities including friends, family, and mainstream healthcare professionals were found to play minimal roles though partners often played important roles in the research and implementation processes and "alternative" healthcare providers were more supportive. Users were also found to have ambivalent attitudes towards pregnancy intention. They utilized Femtech for convivence but were skeptical about the effectiveness of these tools and felt strongly about having a deep knowledge of FABM practices before integrating Femtech into one's practice. They had high confidence in their abilities to learn and apply the principles of a FABM. FABM-users were found to be passionate about the methods and engaged in them as meaningful social practices.
Key words: fertility awareness, contraception, body literacy, social practice, pregnancy intention

Table of Contents

Introduction

Fertility awareness-based methods (FABMs) of birth control are growing in popularity with increased scientific understanding of the methods (Malarcher et al., 2016) and the accessibility of smartphone applications and devices to assist with the practices (Alptraum, 2019). FABM is an umbrella term that refers to all types of birth control and family planning practices that work by tracking women's cycles and identifying their fertile window. These practices vary widely in what indicators they use to identify the fertile window and the reliability of those indicators. These practices can be used to both avoid and plan for pregnancy (Frank-Herrmann et al, 2007) as well as for general health knowledge (Urrutia, 2019). After long being viewed as "traditional" rather than "modern" contraceptive practices and disregarded by governments, donors, policy makers, and providers who deemed them inferior to hormonal and barrier methods, FABMs are starting to be viewed as legitimate contraceptive options in some circles. By identifying the fertile window, couples can abstain from intercourse or use barrier methods of birth control during those days to prevent pregnancy. These methods have for decades been largely confined to devout Christian groups and women's health activists, but these methods of avoiding pregnancy have become more popular among other social groups with growing interest in more "natural" lifestyles (Sifferlin, 2018) as well as with concerns about the side effects and risks of other forms of birth control including oral contraceptives and intrauterine devices (IUDs) (Oddens, 1999).

FABMs have been formally used since at least the 1930s when they were recommended by the Birth Control Research Bureau in the United States, a precursor to Planned Parenthood. Books like *Our Bodies, Ourselves* and *Taking Charge of Your Fertility* are among early ways that women got information on these practices. Now, there are courses in FABM methods both in person and online, coaches and specialists that work one-on-one with users, and robust online communities sharing information on these practices.

This introduction will outline the scientific basics of how FABMs can be used as contraceptive methods, the different types of FABMs and their distinctions, the appeal of these methods, the role of FABM-related technology known as Femtech, and risks and critiques associated with these methods.

The Science of Fertility Awareness-Based Methods

In recent years, FABMs have received in increasing amount of support from the scientific community. The United States Agency for International Development (USAID) now supports FABMs because they have now been shown to meet the criteria for a "modern" contraceptive (Malarcher et al, 2016). According to their guidelines, modern contraceptives must:

- be effective at preventing pregnancy
- be safe
- be rooted in an understanding of reproductive biology
- include a defined protocol for correct use
- be tested to assess effectiveness under various conditions

The reproductive biology piece requires an understanding of female hormonal cycles. The cycles are made up of two distinct phases, the follicular phase, that includes menstruation and the days leading up to ovulation, and the luteal phase, that includes ovulation and continues until the start of the next menstrual bleed (Fig. 1). These cycles are regulated through hormones, chemical signals sent through the blood from one part of the body to another. Day one of the cycle is the first day of the menstrual bleed period. While it is commonly taught that a cycle lasts 28 days, this number is actually an average and a healthy cycle can last anywhere from 21 to 35 days (Weschler, 2015). Cycle length can also fluctuate over an individual's lifetime (Ray, 2018).

Following from this understanding of the cycle, it is understood that a woman is only fertile from between 12 and 24 hours per month, on the day she ovulates. Estrogen and progesterone are the two main hormones that affect the cycle and lead to the changes that take place. Increased estrogen is produced as ovulation approaches. After ovulation, progesterone production increases and remains elevated for the rest of the cycle. These shifts trigger the physical markers outlined below (Kumar et al, 1998; Hilgers, 2010). FABMs rely on these physical markers to identify this window and different FABM practices will emphasize either one or a combination of these signs (Fig. 1). Modern FABMs often require the use of more than one marker to first identify that ovulation is approaching and then confirm that it has in fact occurred. The signs are outlined below.

Cervical Fluid

The fertile window can be up to a week per cycle because of the presence of cervical fluid around ovulation that can allow sperm to survive up in the body in the days before the 12 to 24-hour window on ovulation day where pregnancy can occur (Wilcox, Weinberg, & Baird, 1995). The number of days a woman can expect the presence of cervical fluid also varies among women and decreases with age. Up until the age of 22, women can expect 7.5 days of noticeable cervical fluid while women 23 to 37 can expect 6. Women 38 to 47 will have roughly 3.5 days of fluid present (Odeblad, 1994).

Basal Body Temperature

Basal body temperature (BBT) is the body's lowest resting temperature. The lowest point is typically in the early hours of the morning, between 2:00 and 4:00. However, FABMs require that women take their temperature upon waking, before moving or doing anything else to keep their temperature as close to this lowest point as possible. The temperature should be taken at about the same time every day. This temperature is important because after ovulation, BBT spikes and stays elevated for a few days, known as a sustained thermal shift (Hendrickson-Jack, 2019). BBT can, however, be

affected by a number of external factors including drinking alcohol, illness, sleeping with a heating pad, and getting up in the middle of the night.

Cervical Position/Feeling

The cervix is located at the base of the uterus at the end of the vaginal canal. As ovulation approaches, estrogen causes the cervix to soften, open, and move to a higher position in the vaginal canal. After ovulation, progesterone then causes the cervix to sit lower and feel firm and closed to the touch (Hendrickson-Jack, 2019).

By correctly checking these signs and identifying this fertile window and either abstaining from intercourse or using a barrier method during that period, a woman and her partner(s) can use FABMs to avoid pregnancy.

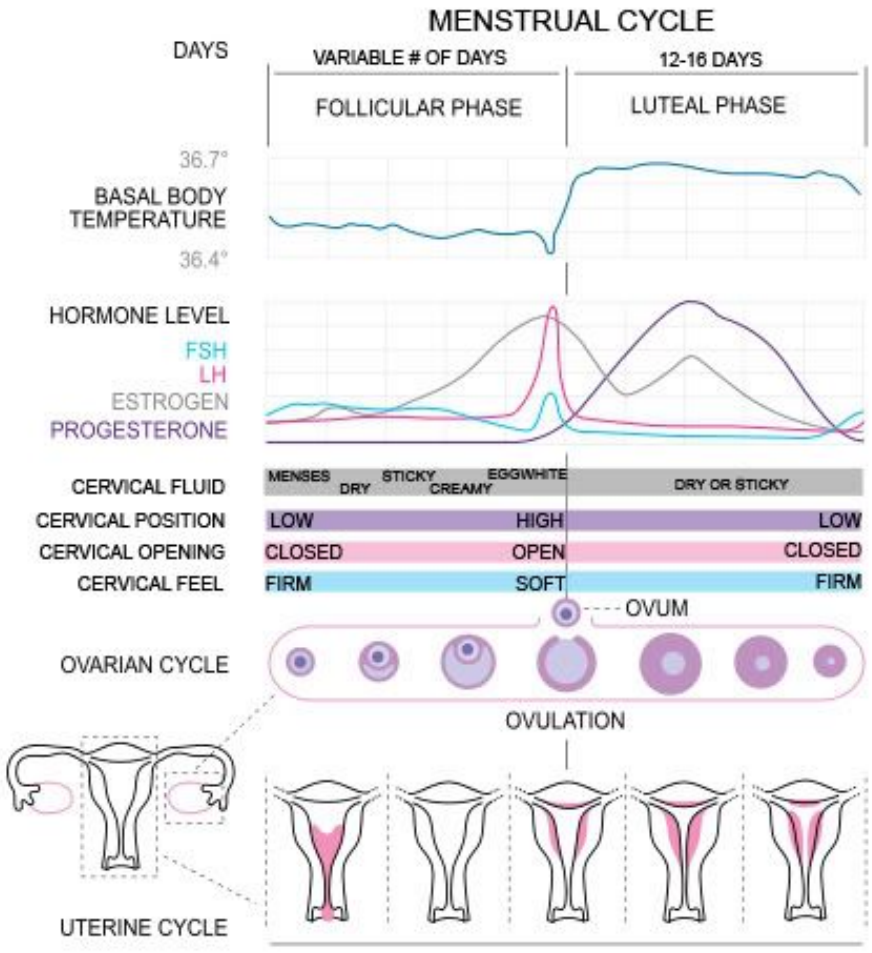


Fig. 1 An illustration of how different signs of fertility can be used to identify the fertile window

Types of Fertility Awareness-Based Contraceptive Methods

This understanding of fertility is applied to several different types of FABMs. The most common are outlined below with the basics of their protocols for correct use.

The Calendar or Rhythm Method is the simplest form of fertility awareness. Users of this method track the start and end dates of their menstrual periods and use that information to estimate when their next periods will be. Using this knowledge, users can also estimate when they will ovulate and buffer days before it for their fertile window. This method is also a riskier method than more involved FABMs because it assumes that monthly cycles are consistent and regular and therefore assumes that ovulation occurs at the same time each month. It relies on knowledge of past cycles to predict future cycles. This method also does not look for confirmation that ovulation is approaching or has occurred in real time (Kambic & Lamprecht, 1996). It is referred to as the Rhythm Method in the rest of the paper.

The Lactational Amenorrhea Method is based on the fertility-suppressing impact of breastfeeding in the first few months after birth. To practice, a woman must be within 6 months postpartum, exclusively or nearly exclusively breastfeeding, and amenorrhoeic (not menstruating). Once a woman begins menstruating again, another contraceptive method must be used (Vekemans, 1997).

The Basal Body Temperature (BBT) Method relies on tracking BBT and the menstrual period. This method relies on past cycles to predict future ones and does not confirm that ovulation is approaching though, after a few cycles, it can be used to estimate future ovulations. The change in BBT can be used to confirm ovulation after the fact. Relying on BBT and past menstruation dates alone can also be risky as data from past cycles is used to predict future ones without accounting for changes in the body (Bauman, 1981).

The Cervical Mucus Method, The Billings Ovulation Method, and the 2-Day Method rely on tracking cervical fluid changes throughout the month. Because menstrual blood can make mucus difficult to identify and interpret, days with bleeding are considered fertile as an extra precaution (Odeblad, 1994).

The Fertility Awareness Method (FAM), Natural Family Planning (NFP), Sensiplan, and The Symptothermal Method are all similar practices that rely on multiple signs including BBT, cervical mucus, and cervical positioning/feeling to confirm that ovulation is approaching and then confirm that it has happened in real time. These methods are considered the most effective because they do not rely on past cycles to predict future ones and use multiple measures. They account for cycle variation caused by stress, illness, travel, diet, or other factors (Weschler, 2015; Hendrickson-Jack, 2019). For simplicity, these practices will be collectively referred to as The Symptothermal Method in the rest of the paper.

Though these practices all fall under the umbrella of FABMs, they are distinct. However, when the effectiveness of different contraceptive options is reported, all of these methods are often lumped together and FABMs-users who use condoms during the fertile window are sometimes excluded contributing to misleading failure rate statistics (Polis, 2017). Currently, there are not enough studies on typical use of these practices to make accurate typical use failure rate estimates.

The Appeal of Fertility Awareness-Based Methods

The first part of the appeal of FABMs is their "naturalness." This naturalness has been shown to appeal to a wide range of users including users in developing countries, the environmentally and health-conscious, highly-educated women, and particular religious groups (Picavet, Van der Leest, & Wijsen, 2011; Lundgrem, Karra, & Yam, 2012; Barron, 2017; Jardim & Kringoudis, 2017; Clowes, n.d.). Unlike oral contraceptives, the hormonal IUD, the contraceptive patch, copper IUD, or the birth

control implant, the use of FABMs does not involve any manipulation of hormone cycles and bodily processes or the implantation of any objects or devices in the body. Unlike with male condoms, female condoms, cervical caps, and diaphragms, physical barriers do not need to be used to prevent pregnancy if intercourse is occurring outside the fertile window. Users may, however, choose to use barriers at all times for extra insurance while still charting their cycles.

Another natural aspect is that users of FABMs have natural menstrual cycles instead of "pill bleeds." While menstrual periods are the shedding of the uterus lining as a result of an egg not being fertilized after ovulation (Druet, 2017), pill bleeds are pharmaceutically induced bleeds that are usually coordinated into a 28-day pattern or even less frequently using either placebo sugar pills or a down week in which users do not take any pills (Briden, 2015). This pill bleed is a reaction to the sudden drop in hormones but is not medically necessary nor a true menstrual period (Galan, 2018). These "pill bleeds" were introduced as placebos both for users of oral contraceptives and the general public. In the early days of the pill, advocates believed that women and opponents of oral contraceptives, namely the Catholic Church, would be more accepting of oral contraceptives if they felt that their bodies were still menstruating and behaving "naturally" and that the pill was therefore just an extension of the more socially-acceptable Rhythm Method (Gladwell, 2000).

Users can have many reasons for wanting to experience natural periods. They might wish to avoid potential post-pill amenorrhea[1] to better enable them to get pregnant quickly when they want to. They may adhere to religious doctrines that prohibit the use of synthetic hormones or barriers for contraception. They might also be interested in the growing movement to celebrate menstruation and use it as a sign of body awareness and empowerment (Cain, 2019). They may be concerned about the

[1] Amenorrhea is the absence of menstruation. Post-pill amenorrhea specifically refers to the absence of menstruation in the months after ending the use of the contraceptive pill.

potential risks of the repression of ovulation and menstruation including osteoporosis, heart attacks strokes, and cancer (Rako, 2003). [2]

However, some researchers argue there are also health risks to the frequent ovulation and menstruation of modern women. Historically, women ovulated and menstruated less because they had fewer fertile years and spent a greater proportion of them either pregnant or breastfeeding. Now, girls on average have their first menses at younger ages than ever (Sole-Smith, 2019b) and women, especially in industrialized nations, are having fewer children (Nargund, 2009). Going through more menstrual and ovulation cycles throughout life has been linked to increased risks of breast cancer, endometriosis, fibroids, anemia, abdominal pain, mood shifts, and migraines (Gladwell, 2000). With conflicting evidence, there has not been agreement on whether frequent ovulation and menstruation is better or worse than less frequent in the scientific community.

Another appeal of FABMs is the avoidance of side effects associated with other forms of birth control including blood clots, mood swings, stroke, breast cancer, irregular spotting, severe pelvic inflammatory disease, cervical inflammation, cancer, lowered sex drive, depression, hair loss, nutrient depletion, weight gain, and allergic reactions that FABM users may have experienced or are concerned about (Briden, 2015; Weschler, 2015).

FABMs also allow women to develop a deep understanding of not just their menstrual cycles and fertility but their overall health by allowing them to experience their cycles in full. This was part of the feminist healthcare movement against the medicalization

[2] It should be noted that with the prevalence of oral contraceptives, no longer having a real menstrual period has become normalized despite periods being a normal bodily process. This is due to oral contraceptives becoming viewed as a standard of care for girls and women. Though oral contraceptives are said to "regulate" the menstrual cycle, they actually suspend the cycles (Wershler, 2013). Girls can start taking oral contraceptives soon after their first menses, at ages as young as 11 (Eddo-Lodge, 2011), even before ovulation and menstruation is regular, and they can remain on them until if and when they decide they would like to become pregnant or until menopause begins.

of women's health. Cycle tracking was a key part of the groundbreaking feminist women's health book, *Our Bodies, Ourselves* when it was first published in 1971. This knowledge is known as body literacy, the development of a broad base of knowledge about the body from which women can make fully informed reproductive choices (Justisse International, n.d.). This knowledge was seen as key to dispelling women's shame about their bodies as well as freeing themselves from blind trust in male doctors (Weigel, 2016). It has been described as a "new feminism," one that includes being so well-informed about one's body that one is able to be 100 percent confident in making the absolute best contraceptive decision for oneself (Brighten, 2019). Practices of body literacy can establish a distance from medical surveillance and doctor visits liberating patients in some ways (Andreassen et al., 2006). Tracking one's cycle can aid in the diagnosis of anovulation (lack of ovulation), late ovulation, a short luteal phase, hormonal imbalances, and insufficient progesterone levels as well as provide general health information (Weschler, 2015; Hendrickson-Jack, 2019). Additionally, the knowledge gained from tracking ones' cycle can give insight into the causes of miscarriages, irregular or unusual bleeding, vaginal infections, urinary tract infections, breast lumps, premenstrual syndrome, and miscalculated dates of conception. Much of this health information is unavailable when using other forms of contraceptives as hormonal methods can mask symptoms of cycle irregularities and issues. While using hormonal methods, women may not be aware of underlying issues for years or even decades as symptoms are suppressed (Briden, 2015). This information can help users make informed decisions about their fertility and overall health as well as give insight into their health status to their healthcare providers. Currently, there is a lack of body literacy among women. In a study of Australian women seeking fertility assistance, 68.2 percent of the respondents believed that they were timing intercourse during their fertile period while in reality, only 12.7 percent were actually identifying the window correctly (Hampton, Mazza, & Newton, 2013).

Another cited benefit of practicing FABMs is the ability to include male partners. While the freedom and flexibility that other forms of contraceptives have provided women with regards to their sexuality and family planning cannot be understated, most birth control methods available require heavy involvement and responsibility on the part of the female partner and little on the male. There are also more options overall that put the burden of use exclusively on women (Fig. 2). FABMs allow birth control to be a shared responsibility between partners and couples have reported that sharing the responsibility and creating a dialogue about fertility has brought them closer (Weschler, 2015). This however assumes certain aspects of the relationships. Male partners in these situations need to be informed of the choice to practice FABMs and be trusting of both the practice and their and their female partner's competencies to use it effectively. FABM practice as contraceptive also requires a partner who is willing to abstain from intercourse or use barriers or withdrawal during the fertile period.

Fig. 2 Types of Birth Control Available from *Taking Charge of Your Fertility*

Women	Men
Tubal Ligation	Vasectomy
Essure	Condom
IUD	Withdrawal
Implanon	FABMs
Depo-Provera Injection	
Oral Contraceptives	
Nuvaring	
The Patch	
Diaphragm	
Female Condom	
Cervical Cap	

Sponge	
Suppositories	
Spermicides	
Films, Foams, & Jellies	
FABMs	

With proper use, FABMs have shown promise and suggestions of success rates similar to that of oral contraceptives though studies have been critiqued as, with FAMBs, the gap between perfect use and imperfect use can be quite large in comparison to with other methods like oral contraceptives and condoms (Frank-Herrman et al. 2007).

Practicing FABMs is also affordable. Traditionally, individuals have invested in either a course, a book, or a manual to learn and a notebook and pen to record (Fig. 3). They were then able to continue using the practice for little costs. In fact, some of the lowest pregnancy rates found when using this method have been in poverty-stricken areas. Researchers believe this may be because users in these areas face greater financial risks with unplanned pregnancies and are highly motivated to follow the guidelines (Pallone & Bergus, 2009). This low cost is a noteworthy way FABMs differ from many other forms of contraception.

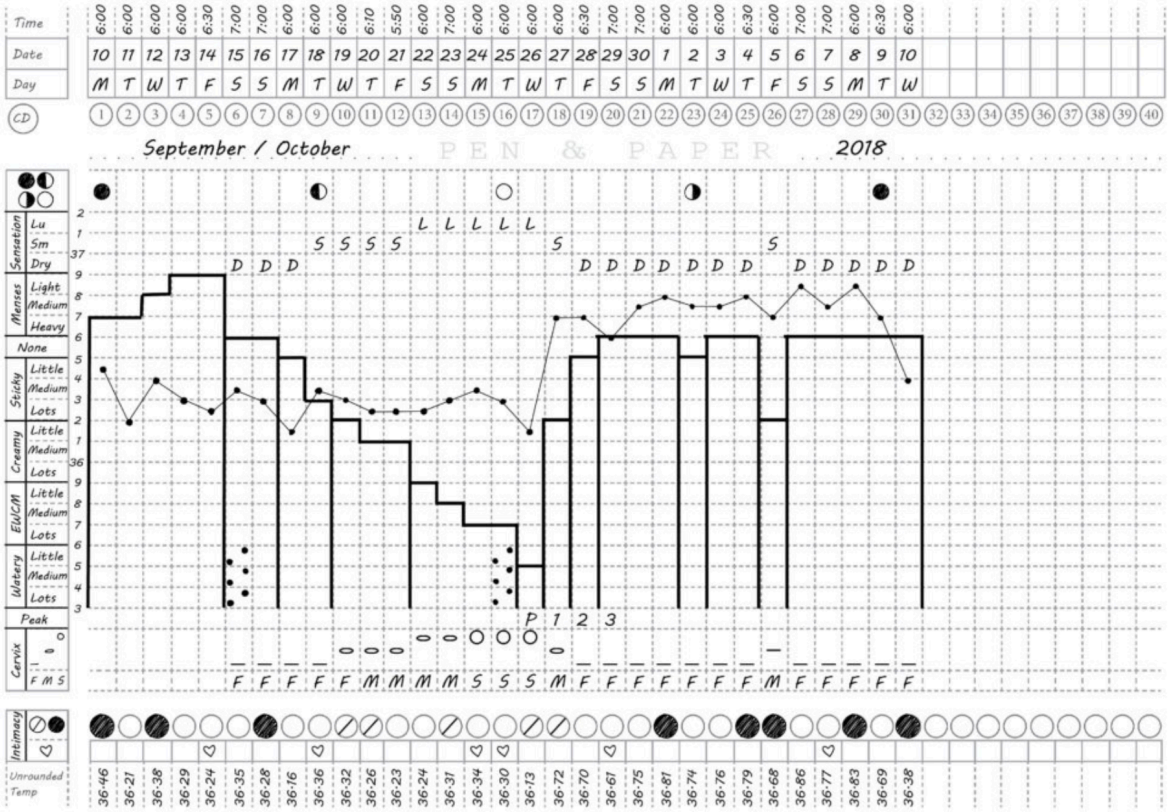


Fig. 3 An example of a pen & paper chart (Source: FertilityCharting.com.au)

Femtech

While not all users of FABMs do so using a tech option, various applications and devices have entered the market in recent years to facilitate FABM practices. Femtech is an umbrella term for digital health applications related to women's health (Das, 2018). It is part of a revolution in healthcare, preventive medicine, and public health being driven by new health-related digital medical technologies known as "digital health," "eHealth," "Medicine 2.0," and 'Health 2.0." (Lupton, 2013). It is an industry expected to be worth $50 billion by 2025 (Frost and Sullivan, 2018).

In the FABMs space, Femtech includes both the apps and devices available to users to practice various FABM methods. At the population level, Femtech-based FABMs have the potential to support better general health knowledge and outcomes for

women. Typically, menstrual and fertility health has been assessed individually at medical appointments. However, these evaluations rely on memory-based self-reporting with rare opportunities to assess data at the population level (Symul, Wac, Hillard, & Salathé, 2019). With apps, there is potential to collect huge amounts of data about menstrual cycles and fertility, allowing science to address many blind spots that currently exist with regards to female health (Weigel, 2016).

When considering app/device combinations, a major advantage of their use is their simplicity when compared to traditional FABM practices. While typically a user would have to remember to track multiple signs of fertility, record them, and interpret their recordings, apps/devices can remind users to take their readings, often only require one data point, store data, can interpret that data, and can give users practical, easy-to-understand feedback such as "fertile" or "not fertile." (Fig. 4) App/device combinations also integrate the experience usually syncing automatically so that a use does not have to take their data using one product and then manually enter it into an app or notebook later (Zimmerman, 2017).

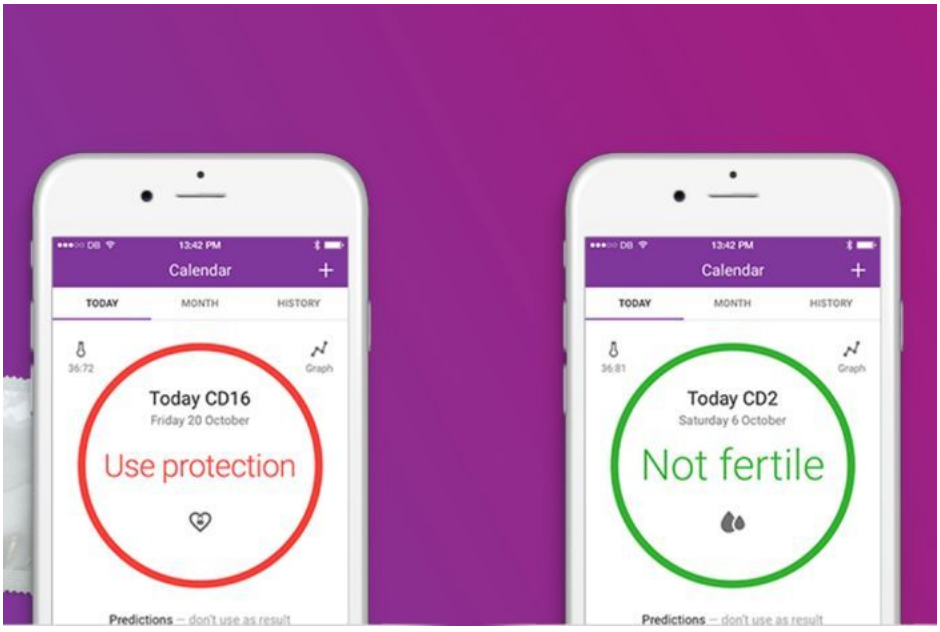


Fig. 4 The feedback on fertility status displayed in the Natural Cycles App.

Using tech-based methods of FABMs is linked to the rise of the "digitally engaged patient," a lay person advised to use digital technologies as part of being an involved patient. This idea is linked to the conception of the patient as consumer that has been around since the consumerist and health activist movements of the 1970s. During this period, there were calls to democratize healthcare by making lay people more knowledgeable about health and medical issues and more engaged in preventative health behaviors (Lupton, 1997). In the 1970s, lay people did not have much access to alternative sources of medical knowledge outside the news media, patient support groups, printed newsletters, or books written for lay readership. Through Web 1.0 and Web 2.0 technologies, access to medical information and other patient's experiences has increased dramatically. These technologies suggest empowerment through self-monitoring and self-care and suggest that better control over the body can be achieved through technology. With this perspective, lay people are expected to know how to monitor their own health markers, developing an expertise in body monitoring that was once exclusively reserved for healthcare professionals in Western medical settings (Lupton, 2013).

In part, these apps have emerged to fill the void left by other health trackers. For example, the Health Kit in the Apple Watch debuted in 2015 with the option to enter 150 different kinds of health data but did not include space for menstrual cycle data (Weigel, 2016) There are approximately 100 apps now available that can be used for tracking fertility and menstrual cycles. These Femtech options have gained legitimacy and evidence-based apps are even included in the United States Department of Health and Human Services Healthy People 2020 Campaign and their aim to reduce unintended pregnancy by 10% by next year (Mangone, Lebrun, & Muessig, 2016).

However, the majority of the applications available are not explicitly designed for avoiding pregnancy but rather are marketed as either menstrual cycle-tracking apps or as pregnancy-planning apps (Duane, Contreras, Jensen, & White, 2016). Natural

Cycles, self-proclaimed as the "first and only contraceptive app" is the only app/device-based FABM certified for use as a contraceptive in both the European Economic Area and the United States (Natural Cycles, 2019). However, the app has come under scrutiny after numerous reports of failure emerged in Sweden, where the app was designed. Sweden's Medical Products Agency investigated the app and found that the failure rate with typical use was 6.9%, a higher rate than the 1% perfect-use failure rate originally more prominently advertised by the company. Natural Cycles was asked to showcase the typical use failure rate more clearly (Lomas, 2018). Daysy, a smart thermometer and application has faced similar scrutiny for poor study design in its study exploring the device's effectiveness as a contraceptive (Koch et al., 2018). Both apps/devices rely on the BBT Method and use advertising that suggests the device alone can identify the fertile window without tracking any additional data points (Fig. 5).

Fig. 5 A Daysy advertisement showcasing the simplicity of using it.

This bad press and potential for legal battles may be linked to other app/device companies deciding to position themselves as menstrual trackers or conception aids rather than making overt claims that they can be used to prevent pregnancy. However, despite how these products are marketed, because the same data is necessary for either contraception or conception, users can still use the data provided by them as tools for avoiding pregnancy as an off-label use of the products.

Femtech used for FABM can be broken into two major categories: period trackers and BBT applications with a handful of other devices tracking other measures. This list is not exhaustive as more apps and devices are entering the market but gives an overview of the different types of tools available.

Period Trackers including Clue, Female Health on Fitbit, Flo, Period Tracker Lite, etc. These applications focus on tracking the dates of the menstrual period. At their most basic, they rely on the lengths and timing of previous cycles to predict when future cycles will occur. Their cycle predictions can be used to estimate the fertile window and date of ovulation and some do so automatically in the app (Fig. 6).

Fig. 6 Clue's data displays predicting menstruation and the fertile window as well as allowing input on other measures.

Basal Body Temperature Applications like Natural Cycles, Wink, Ono, Tempdrop, and Daysy rely on BBT readings as well as input on the menstrual cycle to predict fertile windows based on past cycles (Fig. 7). Temperature is measured using thermometers than can be used orally, vaginally, or under the armpit, bracelets/armbands worn overnight, or in-ear devices also worn overnight. Wink,

Ono, and Tempdrop are advertised as tools to measure BBT that can be used in conjunction with apps.

Fig, 7 The Wink is a smart thermometer that syncs with the Kindara app

Other Devices including OvaCue track electrolyte levels in both saliva and cervical fluid to determine where a woman is in her cycle as those electrolyte levels correspond with hormonal shifts (Fig. 8).

Fig. 8 Ovacue measures electrolyte levels.

Risks & Critiques of Fertility Awareness-Based Methods

Critics of FABMs cite several reasons for believing them to not be ideal ways to prevent pregnancy. First, practicing FABMs requires a period of learning. This makes some believe that one needs to be highly intelligent and have a lot of time to commit to learning and practicing the method. However, research by the World Health Organization found that 93 percent of women, regardless of educational level, were capable of identifying and distinguishing between fertile and infertile cervical fluid (1981). Additionally, practitioners say that the methods can be learned easily within a few hours (Weschler, 2015).

Another issue is that FABMs as a whole are still often associated with the Rhythm Method making understanding their nuances a challenge. Though long promoted by the Catholic church, these methods have been shown widely to be insufficient for reliably preventing pregnancy (Tietze, Poliakkoff, & Rock, 1951).

There are also critiques associated with general squeamishness and taboo surrounding female bodies and their functions as well as taboos around sex. Discussing female bodily fluids is often considered inappropriate (Hammers, 2006; Bramwell, 2001). This means it is necessary for those interested in FABMs to overcome a potentially substantial amount of shame and discomfort around these topics. This shame and taboo can also be used to dismiss the idea of teaching women about FABMs or make teaching them challenging.

Additionally, there is a gap in knowledge around FABMs among medical professionals. While doctors, especially gynecologists, have extensive training in women's health, FABMs are not currently part of standard training and medical students have been found to lack both knowledge of and confidence in discussing these methods with their patients. This means that patients are unable to get accurate and complete information about FABMs from the professionals they trust

for information on family planning (Danis, Kurz, & Covert, 2017). Doctors tend to be biased towards other options because medical school teaching typically focuses on perceived effectiveness of a method above all other potential priorities or concerns like avoiding side effects or minimizing invasiveness. Additionally, hormonal contraceptives have become standard practice because they are presented as benign and more similar to a supplement or vitamin than a drug. Doctors are also taught to prescribe them for menstrual irregularities (Hendrickson-Jack, 2019).

Lastly, there is some taboo surrounding critiques of hormonal methods of birth control particularly in feminist circles. Because access to reliable birth control has been a hard-won right, offering critiques of hormonal contraceptives, in particular oral contraceptives, can be met with distain (Hendrickson-Jack, 2019). In the United States in particular, criticism of the pill is viewed as irresponsible as threats to birth control access have risen (Griggs-Spall, 2013).

Risks & Critiques of Applications & Devices

Tech-based FABMs have also received unique criticism beyond their reliance on FABM principles. First, privacy concerns about potential access to the fertility data and sexual histories of users makes some wary. Second, the Femtech industry as a whole has been critiqued as a modern gloss on the health and beauty industry simply applying feminism and technology to the same anxieties and insecurities used to sell women cosmetics and diets. Companies, including Daysy and Natural Cycles, have been critiqued for aggressively marketing their products through social media influencers to a young audience that often has had no prior education on or exposure to FABMs and is thus in a poor position to make an informed choice about whether or not to use one of these methods, apps, or devices (Fig. 8). Influencers promoting these products are usually paid for these promotions and do not need to have any training or licensure related to FABMs or health education to be part of these campaigns (Brebner, 2018) This perspective views women as consumers with fears

about their bodies and life choices that can be remedied with products rather than as patients (Altman, 2019).

Fig. 8 An example of a paid advertisement used by Daysy in partnership with a health influencer and blogger

Others are concerned that one of the appeals of FABMs, their affordability, is now being changed as expensive apps and devices, costing hundreds of dollars, enter the space and are marketed so as to seem necessary for practicing FABMs (Weigel, 2016).

Though most FABM educators advocate for tracking multiple signs of fertility to ensure proper readings, many apps rely on just one marker, often basal body temperature or dates of the menstrual period. This loses some of the body literacy potential of traditional FABM practices (Zimmerman, 2017). In addition, relying on one marker makes the practice riskier as BBT alone can only tell that ovulation has already happened. Cervical fluid consistency and cervical positioning/feeling are fertility indicators that show when ovulation is approaching. This is important because, for FABMs to be most effective, users should be able to identify the window of days prior to ovulation (Brebner, 2018). Additionally, BBT can be affected by many

external factors (Weschler, 2015). Menstruation alone can confirm that ovulation has happened (though anovulatory bleeds and mid-cycle bleeding are also possible and can be confused with menstruation) weeks after the fact giving no practical information about fertility in real time. In the latest update of *Taking Charge of Your Fertility,* Toni Weschler even describes most apps as "nothing more than a high-tech version of the ineffective Rhythm Method" for these reasons (2015). She recommends deleting apps that predict fertility based on the first day of the last menstrual period. She argues that useful apps should at minimum allow for the input of cervical fluid and BBT and ideally, include space for tracking secondary signs of fertility including ovulatory spotting, increased sex drive, and breast tenderness. Weschler also recommends using apps mainly to conveniently store and access charts at any moment. She does not see them as adequate replacements for proper fertility awareness education and states that they should never be exclusively relied upon for practicing FABMs for contraceptive purposes (p. 73). This sentiment is echoed by Lisa Hendrickson-Jack in *The Fifth Vital Sign* where she recommends FABM users either turn off prediction settings on apps they use or rely on pen and paper to avoid the temptation to take previous cycles as predictors of one's current cycle (2019).

Applications have also been found to often be inaccurate when predicting cycle length (Moglia et al., 2016) or fertility window (Duane et al., 2016) creating concerns about whether women should be relying on them at all.

Digital health technologies also make specific demands of patients who have to remember to engage in self-monitoring practices throughout their days. Some argue that these practices turn empowerment into a set of obligations (Veitch, 2010).

FABM devices have also received government warnings regarding some of them marketing themselves as contraceptives (Polis, 2019). However, these restrictions on what can be called contraceptives have received critique from the FABM community, some of whom argue that these restrictions are intended to protect the contraceptive

market for pharmaceuticals. To comply with these restrictions, apps/devices might decide to market themselves "for planning" and/or "prevention of pregnancy" but avoid the use of the word "contraceptive" even if many women still use them as such (Jardim, 2019).

Problem Statement and Research Questions

One fifth of women in the United States report being interested in FABMs when provided with positive information about them. However, currently, only 1-3% of women in the US are using them (Stanford, Lemaire, & Thurman, 1998). Therefore, there is a gap between women who would like to practice FABMs and those who actually do so. Because FABMs are not currently a dominant contraceptive practice in any country, there could be similar gaps elsewhere.

This research seeks to understand the decision-making processes of women practicing FABMs to understand what influences a woman to take the step from considering a FABM to actually doing so.[3] It also seeks to understand how they implement the use of practices for contraceptive use and their relationship to FABMs both alone and with Femtech as a social practice. While there is ample research focused on particular methods of contraception and their efficacy and safety, there is little research about the decision-making process (Picavet, Van der Leest, & Wijsen, 2011).

There is also a lack of knowledge about where women are getting their information about FABMs both regarding initial introductions to the practices and regarding knowledge about how to use the practices (Pallone & Bergus, 2009). By understanding how women are getting their information about FABMs and educating themselves in their decision-making process, FABM educators and public health professionals can better tailor their efforts to ensure evidence-based information is reaching desired populations and enabling those who desire to practice FABM to do so from a fully-informed place. This is not to privilege FABMs over other forms of contraceptives but rather to contribute to providing diverse options to meet diverse needs and priorities by ensuring that accurate information is being shared about both the most effective practices and their success and failure rates.

[3] While the focus group of this research is on individuals who identify as women, it should be noted that not all who practice FABMs identify as women.

There is also little knowledge on the social support systems FABM users have. Whether FAMB users are more likely to have friends and peers who use the practice or doctors who support the practice than non-FAMB users has yet to be explored.

Because Femtech is so new, there is also little understanding of how women make the decision to use these tools and how they integrate them into FABM practices and whether they are using Femtech with understandings of its flaws and limitations.

Lastly, this research will explore how FABM users are defining ideal reproductive health and contraceptive effectiveness outcomes and how they weigh potentially conflicting goals.

This research has high societal relevance contributing to greater awareness and understanding a promising option for pregnancy prevention and planning. Typically, efforts to reduce unplanned pregnancies have focused on pregnancy prevention over the health and safety of women (Grigg-Spall, 2013). FABM practices provide an option for family planning without the health risks of other methods.

Though FABMs can be used for both pregnancy planning and prevention, this research will narrow the focus on usage for prevention, also known as TTA or "trying to avoid"-use in FABM communities, for a few reasons. First, the intentions of a user attempting to get pregnant and one trying to avoid pregnancy are opposites. Additionally, because of the time constraints of a minor thesis, a narrow focus is expected to give more in-depth findings than a broader focus might considering the limitations of the study.

The theoretical framework and problem statement have been used to formulate the following research questions.

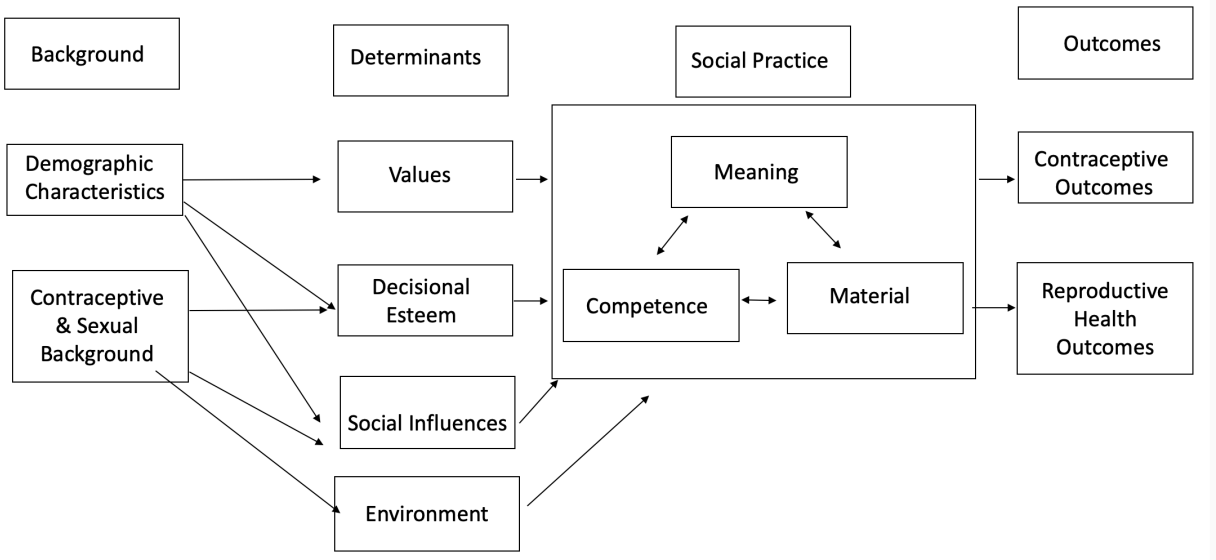
RQ: Why do women decide to use FABMs and what elements support their continuous practice?

SQR1: What background characteristics and determinants influence those who eventually become FABM users?
SRQ2: How are they defining positive reproductive health and contraceptive outcomes?
SRQ3: How are women engaging with FABMs in general and FABMs with Femtech as social practices?

Theoretical Framework

This research will combine two established theoretical frameworks to understand the decision-making process in adoption and usage of users FABMs as well as understand who these users are. The first, contraceptive decision-making, is a framework used to understand the influences on users when deciding between multiple contraceptive options as well as their use and the eventual health outcomes of choosing a particular method. The second, social practice theory, evaluates the relationship between meaning, competence, and material when engaging with a practice. Blending these two theories views the use of FABMs as a social practice with multiple potential influences.

Contraceptive Decision-Making & Social Practice



The main part of the theoretical framework for this research is based on the contraceptive decision-making framework that was developed by Rutgers, a sexual and reproductive health and rights organization in The Netherlands. This framework has been used to understand the decision-making process between various types of contraceptives and will here be used specifically to understand the decision-making process regarding the choice to use FABMs. This framework was designed because in most perspectives on decision-making, the quality of the decision-making process is related to the quality of the decision. However, in the case of contraceptive choice, there is no one ideal method and all have advantages and disadvantages and different users may have varying prominent concerns or factors that they consider. It is based on the reasoned action approach, an approach that aims to explain the relationship between attitudes and behaviors within human action used to predict how people will behave based on their pre-existing attitudes, behavioral intentions, and expectations of outcomes as a result of performing the behavior. It also emphasizes "contextualized rationality" or how social and cultural environments influence choice (Kohler, 1997).

The framework first takes into account demographic background variables including race and ethnicity, age, education level, socioeconomic class, and contraceptive and sexual background. This includes previous experiences with contraception, sexual behavior, relationship characteristics, and child wish. This background information acknowledges that contraceptive decision-making is an ongoing process dependent on life stage, situation, experiences, knowledge, and new information (Free et al., 2005). Background characteristics can directly influence behavior but also may influence behavioral determinants (Green, Johnson, & Kaplan, 1992).

While the background characteristics and identity markers appear to directly influence determinants which influence social practice in this visual illustration of the framework, these relationships are not always so linear. Postmodern theory allows for an understanding that identity is complex and that an individual's socially constructed identities may be in conflict with one another. Additionally, people's

values, influences, environment, and decisional esteem my shift over time depending on new contexts and experiences.

The importance of specific characteristics is broken down below.

Education Level: Education level is linked to contraceptive method choice as well as both the consistent and (in)consistent uses of the methods chosen. In the United States, women with at least high school education have been found to be more likely to use oral contraceptives than women who used no forms of contraception or women who used condoms (Krings et al, 2005).

Religion and Ethnicity: Religion and ethnicity can impact contraceptive choice (De Graaf et al. 2005), especially considering that many religious groups and leaders prohibit the use of certain types of contraception. Strong religious ties may result in abstaining from contraception or choosing a natural method (Oddens, 1996).

Age: Age is linked to other characteristics including relationship type and duration, parity (number of children), desire for children, and general life aspirations. Older women are more likely to have steady, long-term relationships compared to young women. Older women are also likely to have more experience with multiple birth control methods. Older women are less likely to use oral contraceptives and are more likely to use long-term sterilization methods than younger women.

Contraceptive Career: Women often use multiple types of contraceptives throughout their lives. They often choose to stop using hormonal methods after long use and then start to prefer non-hormonal alternatives (Rensman, 2006).

Second, values, decisional esteem, and social influences are determinants included based on conflict theory. This model does not have behavior as its end point but rather focuses on outcomes with regard to contraception and reproductive health.

Values: According to conflict theory, information and values are important in decision-making. Women can have different priorities with regards to their contraceptive choice including effectiveness, side effects, health risks, STI protection, and effects on one's sex life. The aspects assigned the most value change over both the lifetime of users and with the times. For example, effectiveness used to be widely considered to be the greatest concern, but now, health risks caused by prolonged use of hormones are of greater concern (Van Dalen et al. 2004).

Decisional Esteem: Behavior has been shown to be very influenced by self-efficacy or one's confidence in their ability to perform said behavior. This is known as decisional esteem. This esteem is liked to improved quality of the decision-making process (Chambers & Rew, 2003).

Social Influences: Women do not make contraceptive choices alone. They can be influenced by their partners who bring their own demographic characteristics, expectations, beliefs, and attitudes to the decision though partners are not always a source of information (Picavet, Van der Leest, & Wijsen, 2011). The relationship quality and power dynamics can also have an influence. Still, many women report making their contraceptive choice without their partner because they prefer to have control over their contraception and because of men's beliefs that it is women's responsibility to protect themselves from pregnancy (Picavet & Wijsen, 2009). This also contributes to women's reservations towards male oral contraceptives. While many men are interested in the option, more than half of women do not intend to use them if they become available because they do not trust men to take birth control seriously as they do not run the risk of getting pregnant. Additionally, some men do not want their partners to use any type of birth control leading women to choose discrete options like the IUD or implant (Lowe, 2002). Male resistance to particular methods, like condoms, also factors in. Users of FABMs tend to communicate more about contraception with their partners than users of other methods. Friends and the

internet have also been found to be major sources of information about contraceptive options (Picavet, Van der Leest, & Wijsen, 2011).

Healthcare professionals also play a role. Contraceptive counseling by healthcare professionals can help prevent unintended pregnancy by helping individuals and couples adopt and correctly use the contraceptive methods that are most appropriate and effective for them (Pazol, et al. 2015). Family doctors are the most common source of information though the information received is often very limited and mainly focused on oral contraceptives and condoms (Picavet, Van der Leest, & Wijsen, 2011). Most doctors are not well-versed enough in FABMs to provide patients with adequate information (Weschler, 2015). The general sex and sexuality education received is also important. Individuals can gain knowledge about contraceptives from parents, schools, and the media (Skouby, 2004).

Environment: Lastly, environmental constraints also are considered part of her social influences and may act as barriers to obtaining or using particular methods. Healthcare access can be a major influence in contraceptive decision making as those without health insurance are limited to options that do not require a prescription or medical intervention and are within their budget. Even those with health insurance may struggle if the cost of an appointment to get a prescription and the contraceptive itself are not totally covered (Snider, 2019). There can also be certain stigmas associated with certain forms of contraceptives in different communities that make those contraceptives less accessible. Access to information is also considered part of one's environment.

Outcomes: Outcomes can be conceptualized in multiple ways. The most obvious is whether or not the method is actually reliable. However, other measures are increasingly being used to assess the quality of the contraceptive decision-making process. These include satisfaction with the method, dissatisfaction with side effects, and fear of long-term health risks (Free, Ogden, & Lee, 2005).

Social practice theory was added to the existing contraceptive decision-making framework that was originally titled, "behavior." This decision was made because social practice theory allows for a deeper examination of behavior. Social practice theory argues that social practices should be seen as the sites of social order and change, that behaviors are driven by beliefs and values, and that lifestyles and tastes are expressions of personal choice (Shove, Pantzar, & Watson, 2012). Practices are seen as configured or shaped by the many interconnected elements that comprise the conditions of existence for a practice. These elements include bodily and mental activities, things and their use, and background knowledge in the forms of know-how, states of emotion, and motivational knowledge. Individuals are carriers of a practice rather than a subject of analysis on their own (Reckwitz, 2002). With relation to health, social practice theory demonstrates the dynamics between agency, structure, daily life, health, and ill-health (Maller, 2015).

Social practice theory with regards to health research is an alternative to paradigms that focus exclusively on either structural barriers to health or individualistic theories of human behavior. With this, patterns of health and wellbeing are seen as influenced by the behaviors people enact (Blue, Shove, Carmona, & Kelly, 2014). This model challenges the idea that individual decision making is the main determinant of behavior decisions (Maller, 2015). Social practices are acknowledged as having their own histories and trajectories distinct from the moment they are implemented and from their continuous practice (Shove & Pantzar, 2005).

Shove et al. (2012) translated this theory into a conceptual framework illustrated below. It examines the intersection between three elements:

Meanings: symbolic meanings, ideas, aspirations, cultural conventions, expectations and socially shared meanings
Materials: objects, tools, infrastructures, hardware, the human body

Competences: practical knowledge of the practice and the skills to execute the practice (Shove et al., 2012)

The three elements integrate in the moment of practice (Maller, 2015). These links are made and sustained through an ongoing circuit of reproduction.

This framework was used to formulate interview questions regarding FABM decision-making processes and practices.

Methods

This research took an exploratory qualitative approach consisting of semi-structured interviews with women with experiences using various types of FABMs to prevent pregnancy. Semi-structured interviews were the chosen method because of the topic's sensitivity. The aim was to create a comfortable dialogue in which participants felt able to discuss their experiences and perspectives in a safe and free space. As a researcher, I was actively engaged in the conversations, sharing my own experiences with tracking my cycle and discussing FABMs with my social network. While an interview guide was designed to outline key talking points (see appendix), the aim was to allow users to share their experiences in as relaxed an environment as possible to avoid putting them on the spot or directly asking about aspects that may be perceived as too personal. An exploratory approach was taken because of the flexibility of the approach to address different types of questions and the opportunity to clarify existing concepts.

Data Collection

Due to the time and resource limitations of a minor thesis, this research focused on a small population of FABM users obtained through various social media channels and my personal network. An interest questionnaire was distributed in Facebook groups related to women's health and sent directly to personal contacts to collect contact information as well as basic demographic information on interested participants (see appendix).

Six interviews were conducted via Skype using Skype's built-in recording function and one was held in person and recorded using the iPhone's voice memo function. The interviews each lasted approximately 30-45 minutes. All participants were assigned a number to protect privacy and all identifying information was removed from the transcription. These details were included in the consent form and information sheet

that all participants signed and read before speaking with me. All participants were later assigned a pseudonym for easier referencing throughout this paper.

Study Population

Participants in the study were selected to meet the following criteria:

- They had used a FABM for at least 3 months to avoid pregnancy.
- They spoke English.
- They identified as women.
- They had or currently used Femtech in some form.

The demographic and background characteristics of the participants are outlined in the table below.

The Participants:

Pseudonym	**Rebecca (FABM instructor)**	**Nina**	**Angela**	**Samantha**	**Chloe (FABM instructor)**	**Tess**	**Anne**
Nationality	American (living in the Netherlands)	Dutch	American (living in France)	Australian	Australian	Dutch	Dutch
Age	28	32	25	28	27	27	25
Education	Bachelor's	Master's	Bachelor's	Master's	Associate's	Bachelor's	Master's
Interview Method	In-person	Skype	Skype	Skype	Skype	Skype	Skype
Partner Status	Long-term partner	Long-term partner	Long-term partner	Single	Long-term partner	Long-term partner	Long-term partner
Religion (upbringing, schooling, and/or currently practicing)	Christian	n/a	Christian	Jewish	Catholic	Christian	Christian

Sex education	Comprehensive	Comprehensive	Not sure	Not sure	None	Abstinence Only	Not sure
Other Contraceptive history	Oral contraceptives	Condoms, Hormonal IUD, oral contraceptives	Oral contraceptive	Condoms	Oral contraceptives, condoms	Oral contraceptives, condoms, Nuvaring	Oral contraceptives, condoms
Pregnancy History	None	Gave birth 5 weeks before the interview, had used FABM both to prevent & conceive	Currently pregnant using FABM, also had used FABM to prevent pregnancy	1 unplanned pregnancy & termination while using FABM	None	None	None
FABM	Symptothermal	Symptothermal	Symptothermal	Symptothermal	Symptothermal	Rhythm	Symptothermal
Femtech experience (current & past)	Kindara – currently, Wink - previously	Kindara - currently	Natural Cycles- currently	Kindara – currently, Clue, Natural Cycles - previously	Kindara, Tempdrop – currently, Wink - previously	Clue - currently	Flo - currently
Ethnicity	European	Caucasian	White	Jewish Middle Eastern/Jewish Eastern European	Caucasian	Dutch	White/Dutch

Data Analysis

Interviews were transcribed by the researcher into Word and then coded in a deductive process using labels derived from the contraceptive decision-making framework and social practice theory in the first cycle of coding. In the second cycle of coding, those codes were further broken down into more narrow themes following a thematic coding process. Quotes that clearly expressed the most common, interesting, or poignant sentiments were noted.

Results

The results are presented by research question and broken into subsections based on common themes. Selected quotes are used to illustrate concepts and reflect the most representative and/or poignant points made by the respondents. The quotes have also been lightly edited for grammar and clarity.

Background Characteristics and Determinants

SQR1: What background characteristics and determinants influence those who eventually become FABM users?

Demographic Characteristics

Nationality, Ethnic Background, and Education

These characteristics were indicated in the pre-interview questionnaire. Nationality, ethnic background, and education levels were not cited by any of the respondents as a major influence in their decision to use FABMs. With regards to these measures, these respondents were also a quite homogeneous group with all having at least some college or university education. They also all had Western backgrounds and lived in Western countries. In the Netherlands, the United States, France, and Australia, where the respondents had either grown up or currently resided, there is a focus on hormonal methods of contraception. FABMs are not the norm in any of these contexts. Oral contraceptives, IUDs, condoms, and sterilization are more popular options in all four countries (Richters, et al, 2003; Jones, Mosher, & Daniels, 2012; Bajos, Panjo, Bohet, & Moreau, 2014; Statistics Netherlands, 2014).

Religion

Among respondents, religion did not play a major role in the eventual choice to use FABMs. Though two who came from Christian backgrounds had been exposed to the concept of Natural Family Planning through personal contacts, none of the respondents described personally holding a religious opposition to other methods of

contraception including hormonal methods and barrier methods. None faced religious pressure to use FABMs.

> *So, I first heard about Natural Family Planning (NFP). I was engaged and didn't want to go on the pill because I had been on it previously for acne and didn't like how it made me feel…And only one friend mentioned to me, she was like, "You should look into Natural Family Planning."…NFP is exactly like FAM, the only difference is the name and the religious connotation. (Rebecca)*

Sex Education

Religion also did not make a major difference in the type of sex education received at home and at school. Though several respondents cited their religious upbringing and schooling as reasons for why they did not receive detailed sexual education, their experiences did not vary significantly from the education described by those who attended non-religious schools. In general, respondents received minimal sexual education at home and at school growing up.

> *So, I was brought up in a Catholic family and I went to a Catholic primary school and high school so none of that was talked about in my home environment. It was like the topic that you don't speak about. And then when I was in school, we didn't have any sex ed at all. (Chloe)*

> *I just remember learning very basic stuff about maybe like fertilization like how a baby is made, you know, like an egg and a sperm. I don't even remember learning about periods at school to be honest. I remember learning at home with mum, through books, and I cried the first time I got my period because I didn't know what it was. (Samantha)*

Angela, however, was the only respondent who described very open attitudes towards sex at home.

> *I grew up in a Christian home so I knew that sex was something I wanted to wait to have until I got married. My mom and dad were really open about talking about sex with us…It was equally conservative in that my parents talked about sex as something for marriage but equally liberal in that we were open to talk about whatever we wanted to with our parents. And I would say that church and family informed my understanding about sex more than school than peers ever did. (Angela)*

The other respondents reported not talking much about sex at home.

> *I grew up in a family that was also a little bit, more conservative than the school so I was raised Protestant and I think maybe we once got a small book for teenage people but I'm not sure if I even read it. And I don't remember any conversations with my parents about it. I think it was more a topic for them. They were afraid to talk about it, I guess. And when I was in my puberty, I brought it up sometimes just to see how they react. And I think they feared the topic a little bit. (Anne)*

The school sex education experiences described ranged from abstinence-focused education (1) to comprehensive education (2)[4] that included discussions on preventing sexually transmitted infections and unplanned pregnancies. Three were unsure how to categorize their education and one reported receiving no sex education at school. Regardless of the depth of their educations at home and at school, all reported that any sex education had not included information about their cycles in detail beyond a general understanding of menstruation. With that, FABMs were not taught to any respondents in school or at home.

Contraceptive and Sexual Background

Negative Experiences with other Contraceptives

A major draw for FABM users was their negative experiences with other contraceptives in the past. Most (6) had used a hormonal method, either an oral contraceptive or IUD, at some point. They had used these methods both as contraceptives and to treat other issues including acne. Experienced side effects included depression, low libido, gallbladder removal, and digestive issues. Not all of them had realized that they were experiencing the side effects while they were using the method but did notice the difference when they stopped.

[4] Abstinence-Only-Until-Marriage Programs/Sexual Risk Avoidance Programs are defined as programs that teach abstinence as the only morally correct option of sexual expression for teens. Contraception information is usually censored. Comprehensive Sex Educations can still teach abstinence as the best method for avoiding pregnancy & STIs but also teach about contraceptives and safe sex. These programs are more likely to frame sexuality as natural, normal, and healthy. (Alford, 2001)

I didn't experience them until I stopped the pill. Like I didn't know that I was experiencing them because I realized that I lost my libido and I didn't know any different. I thought that was just normal and then I stopped and then everything kicked in, I was like, "Oh now I know what a libido feels like." (Chloe)

I got really depressed because of the pill. At least I noticed when I stopped using it, I felt so much more, first, and I felt so much better, second, so it was like, "Wow, what was that?" (Tess)

One respondent, however, had not used a hormonal method and had used condoms prior to and alongside practicing FABMs because she had never experienced any of the side issues that hormonal methods are prescribed for. She had never felt interest in using these methods.

And I was never really attracted to the idea of HBCs. I don't know why, because all my friends took it. I can't explain why. I was just...I never had really issues with severe acne or period pain or any other hormonal or fertility issues so the only purpose of going on hormonal birth control would be for contraception and I wasn't in a long-term relationship so I guess I never really wanted to, never needed to. (Samantha)

Negative Associations with Hormonal Methods

There were also ideas that taking hormonal birth control was not good, even if they did not have specific knowledge of the potential risks or side effects at the time.

But it was interesting like I always knew that I shouldn't be taking it. I just felt like it wasn't the right thing to do. But it was interesting. Even though I didn't have that education with my parents I do remember that they were very anti-birth control and I remember my parents would be talking about it and saying how bad it is for a woman to take it and my dad refused to let my mom take it. But he got a vasectomy anyways so that's the option that they took. So yeah, they always drilled it into our heads, and I always felt bad taking it, like a bad child, but I felt like I had no option. And I was dating a guy that was in the Navy so he would go away on deployment and I would stop taking it when he would go away. So, I felt like I had to give myself a break. (Chloe)

Learning that there were non-hormonal methods allowed users to avoid the side effects and aversions they felt towards hormonal birth control.

Discovering FABMs

None of the respondents had received any information on FABMs as teens. Instead, FABMs were something they heard about through word of mouth or stumbled across online in their twenties and early 30s. In general, mentions of FABMs in their life had been brief and negative with FABMs presented as high-risk compared to more common options like the pill and IUD.

> *You know, because you go to the doctor and it's like IUD, pill. They list everything with the percentages [of risk] and then the last one is Natural Family Planning...question mark, question mark, question mark. And you're like, "Oh my gosh!" (Angela)*

Gaining access to information about their bodies through FABMs was described as an exciting moment where respondents felt they finally had information that had been left out of their lives and they described quickly getting curious about the practice and having desires to learn more.

> *Learning about FAM – I was like "What the hell is this?" My head was spiraling. It was like heaven doors open. I was like, "Ahhh!" (Chloe)*

Samantha, however, described how her early negative associations with the practice had made her feel shocked when a friend told her she was using them as contraception.

> *I yelled at her basically and said, "Are you crazy? Do you wanna get pregnant? Do you want to have a baby?" And after I let it all out, I got a little bit curious. (Samantha)*

Samantha felt that her friend was approaching FABMs from a different headspace since the friend knew that if she got pregnant on accident, she would keep it. Samantha, on the other hand, knew that she absolutely did not want to get pregnant and would not continue an unplanned pregnancy. After some thought, she did some research and felt secure in trying it once she understood the science behind it.

Values

Feminism, Women's Liberation, and "Hippie" Movements

Feminist and women's liberation values played a role. Some respondents saw FABMs as part of a new wave of feminism that embraced femininity and supported increased body literacy while also acknowledging the tension between their values and the values of first and second-wave feminism that fought for hormonal and other contraceptives. Though the feminist movement had and continues to fight for access to hormonal birth control, FABMs were seen by these users as a next step in freedom of choice, a new type of freedom that did not just mean being able to plan when and if to have children but a freedom to know one's body and a freedom from having to manipulate it's natural processes in order to avoid pregnancy.

> *There are feminists who are like, "Don't take my birth control." But there's like a new wave of feminism where we want to be in touch with our femininity and our cycles and we are women. We don't need to take this pill that makes us a man, we don't want to be men. (Rebecca)*

Anne described making the choice to practice FABMs as part of her feminism. Though she did not experience hormonal contraceptive side effects herself, she witnessed the struggles friends went through and began to question the methods. She also saw FABMs as more feminist than other contraceptive options because of the opportunity to involve partners.

> *I think it sounds really hippie but I feel like it's a little bit a contra movement that we can plan and make everything.…I think it's interesting that the pill gave us super much freedom, you know women, and this was like a liberation so a lot of older, for example, aunties, don't understand that a lot of young girls go off the pill because it's like, "Girls it's freedom." But I think the concept of freedom is something different. It's not always building your life safely or something. I don't know, this is the association that I have. Like becoming more aware of how your body works, this is a really big thing, and also becoming more aware of like, what is freedom? Like is it freedom for a woman to have to do it all on your own, like the contraception? Is it freedom or no? (Anne)*

Decisional Esteem

Confidence

For the users, developing confidence with using FABMs was a quick process with those who had transitioned off hormonal birth control taking extra time to be able to chart effectively as their hormonal cycles stabilized.

> *I was only cautious because I had just come off of the pill so then I was like, "I just need to be careful on my first cycle off of the pill" But I wasn't quite sure. The first few months you're like "Maybe I got pregnant." But after 3 months I was like, "Ok this works." (Angela)*

Getting education was another important factor in confidence-building. This varied among the participants with some teaching themselves through books and online resources and others taking courses or seeing specialists. Samantha felt strongly that users should work with a professional and avoid becoming too confident with online resources.

> *But if anyone is to go into it, I would say find a specialist, or one person that's quite experienced that can support you through it because I think I started on my own and probably got too confident with online information. (Samantha)*

With this confidence in their abilities, the respondents felt passionately about sharing this knowledge with Angela expressing that she was willing to participate in this research to further wider knowledge and understanding of FABMs. They engaged in this in their communities and also felt that participating in this research was an important contribution to supporting growing understandings of these practices.

> *I'm trying to tell all my friends and raise awareness because I think our moms' generations really knew about this but didn't talk about it, and I think we need to educate our friends about it. I don't really care what people do. I don't care what kind of birth control method people use. It does not matter to me; I just get upset when girls don't have all the options presented. (Angela)*

Social Influences

Healthcare Professionals

The respondents did not currently share that they practiced FABM with their doctors after negative attitudes towards the practice had been expressed. They preferred to

avoid discussing it if possible. Those that had disclosed their decision to practice FABMs to their general practitioners or obstetricians in the past found that they were critiqued, with doctors telling them the methods were likely to fail and too risky, making them reluctant to share with other healthcare professionals in the future.

> *I didn't really mention it to my doctor here. I don't mention it anymore because I'm sick of the flack. (Rebecca)*

There was also an expectation that Western medical doctors would not support the practice even if it had to been discussed with them yet.

> *I am not always very outspoken about those things. I already think they won't like it or they will be skeptical about it. (Nina)*

Lack of healthcare professional support did not deter FABM-users from continuing their practice. After Angela described her doctor telling her that FABMs were too risky and that she should only practice if she was comfortable with the likely reality that she might get pregnant, she described her thought process,

> *Whatever, I feel better. My husband's happy, I'm happy, I don't really care. You can't prescribe me medication now. We're happy. (Angela)*

Additionally, doctors were not seen as able to provide any information the users could not find and interpret independently.

> *I could figure it out for myself. And I think I maybe had the feeling that the doctor would tell me to use the pill or, I'm not sure, but I think the doctor would just ask me the same questions as I ask myself like, "What is the risk? for example, and "Are you ok with the risk?" I think it wouldn't make sense. I can do it myself or with my boyfriend. We can be critical by ourselves. (Angela)*

However, Nina reported supportive experiences with her midwife and a doctor she described as an "alternative doctor" who she went to see when she had had an IUD. The midwife was informed on FABMs and the alternative doctor described the hormonal IUD as "an intrusion" and was supportive of non-hormonal methods of

contraception. Additionally, Samantha saw a specialist with a Western medicine nursing background as well as research background who helped her with the practice.

Partners

All of the respondents reported supportive experiences with their partners and had had positive experiences sharing their idea of wanting to practice FABMs with them.

> *No, no one [supported her choice] except my husband. He was fully supportive. (Rebecca)*

Samantha and Angela also shared experience with their partners downloading the Natural Cycles and Kindara apps to their phones so that they could be aware of the tracking as well.

> *He was also tracking, like he had the Kindara app so he would see every morning when I enter in my, well not every morning. (Samantha)*

In Anne's case, her boyfriend was actually the one who discovered the Sensiplan (Symptothermal) Method and suggested they look into them.

> *Actually, my boyfriend he came up with this Sensiplan thing. He sent it to me through Whatsapp. He just found it on the internet and he said, "Oh this is a combined method so you can do it more precise. Maybe we try this." (Anne)*

Social Media

Social media played an important role for engaging in a supportive community of other FABM-users as well as to learn and get information, especially when first starting out. Four referenced the importance of Facebook groups[5]. In these groups, FABM users can ask questions, share photos of their charts, and support each other. Additionally, group moderators have curated free resources in these groups including lists of the best basal body temperature thermometers, book recommendations, and

[5] The most popular Facebook group among FABM-users, "Fertility Awareness Method of Birth Control" has 25, 000+ members.

supplement suggestions and have made subgroups for FABM users to discuss related issues.

> *After joining all those Facebook community groups, I was like, "Oh my god, how did I not know this before?" People are so knowledgeable and you learn so much from reading a post a day, some other people's experiences. (Samantha)*

Family and Friends

Respondents had at most a few friends that also practiced FABM but it was not the norm in their social groups with most of their peers opting for hormonal or barrier methods.

> *I ask all the girls [in her friend group] "Who wants to join this?" Because I think it would help me to have a little bit of a community feeling so we could compare our experience, for example. And until now no one reacted, so most of them want to stay with the safer option, I mean the pill. But a few are very curious and they ask me, "Oh how's it going?" And I tell them all the time, "I'm still not pregnant so it's working. (Anne)*

Another theme that emerged was the pressure to be good ambassadors for the practice before speaking about it. Users felt that they had to be prepared to answer questions about the practice and did not always feel willing to take on that role.

> *Maybe I also don't speak about it so often and I try to be really complete when I talk about it so they have a bit more information. If I think people will not be open to it, I'm not necessarily starting conversations about that. (Nina)*

They also had faced judgement in the past that made them reluctant to speak about it in the present.

> *I was doing it wrong at the start so I did a lot of reading and kind of spoke to my one friend, but I didn't know anyone else doing it & I was very afraid of telling people. Still, I'm a bit more confident in telling people, but I still get the same judgmental, skeptical reactions. (Samantha)*

One respondent who shared about her experience very openly with friends, explained that while she did sometimes get negative reactions, she did not take them personally

explaining that she knew that the concerns came from people not being educated on how women's cycles function.

> *But it all comes from an illiteracy of knowing how women's bodies work…People don't understand that there's a science and a cycle that is happening that you can't control and that happens whether you know about it or not. (Angela)*

Environment

None of the respondents reported environmental constraints regarding access to contraceptive options and knowledge when they needed them. However, Chloe acknowledged that there could be constraints or difficulties when integrating the practice into one's habits. This was an issue she saw come up with her clients.

> *Yeah it all really depends on their lifestyle and like how bad do you want this? Like how bad do you want to change a habit and actually implement it in your lifestyle because it's something you need to do every morning and then you obviously check your cervical fluid and whether you update it during the day, at the end of the day, or throughout the day, it's something that you have to implement and the biggest struggle I find is that when you have a little, like something knocks you over in life and then you kind of fall off and you have to come back on, like from anything, like people moving house, relationship break ups, traveling, losing your thermometer, and I feel like people will be like, "Oh I didn't chart these 3 days and it's hard to get back into." (Chloe)*

Summary – Background and Determinants

The FABM-users in this sample had very similar background characteristics and determining factors and experiences. They shared general access to knowledge, resources, and options, were not heavily influenced towards FABMs from their cultural backgrounds. They were secure in their abilities to make informed decisions about their bodies. They derived most of their support from other women who practice FABMs, who they mostly interacted with online, and their partners. Their motives for initially becoming interested in the practice echoed previous findings in that they mainly wished to avoid the side effects of other contraceptives, align themselves with feminist values, include their partners, and experience natural cycles.

Reproductive Health and Contraceptive Outcomes

SQR2: How are they defining positive reproductive health and contraceptive outcomes?

Contraceptive Outcomes

Contraceptive Goals and Pregnancy Intentions

Per the parameters of this research, all of the respondents focused on their experiences of trying to avoid pregnancy using FABMs. For them, success with the method meant not falling pregnant unexpectedly. However, there was nuance to this attitude.

While planning for pregnancy might often be thought of as a binary issue between desired and not desired, the respondents described their attitudes towards desire for pregnancy as existing on a spectrum. The line between respondents who were "TTA/trying to avoid" and women who are "TTC/trying to conceive," was blurred. Of the respondents, only Samantha felt strongly that an unplanned pregnancy was absolutely not a desirable outcome at this time. She had experienced one unplanned pregnancy and termination using the application Natural Cycles to practice FABMs and had since deepened her understanding of the nuances of the practices and begun working with a fertility awareness specialist to support her in practicing fertility awareness. The others had either already used FABMs to plan for a pregnancy (Nina and Angela), were planning to soon transition to using FABMs for conception instead of contraception (Rebecca), or felt that while an unplanned pregnancy at this moment would not be ideal, it would also not be unbearably disruptive to their lives.

Tess knew that Rhythm Method was not the most effective way to prevent pregnancy but liked that it did not require a large amount of energy and time investment to avoid pregnancy and knew that if she were to have an unplanned pregnancy, she and

her partner would be able to manage it. She also thought critically on what it meant to live in an era in which women could actively decide whether or not to get pregnant and compared it to earlier eras when having intercourse meant accepting more risk of pregnancy.

> *The normal mood is like "I don't want kids." And I'm not even sure if I want them at all. And I don't think our situation right now, like it's ok, like if it would happen it's ok, we can handle it but it's not ideal. I wouldn't say far from ideal but it gets near. But then there are other times…Ok, this is sort of a thought experiment that I'm always doing. I'm always thinking about how we control so much of our lives right now. Also, because we know so much about medicine and we can control our period and whether we have babies or not and I'm like, "Well, this is also kind of weird." Like 50 years ago, I wouldn't have an option, it would be having sex and you get pregnant, that's the way it is… So, I don't really, really want kids but I'm also not really against it. If it happens, it's ok. I don't want to do that much effort to not have a kid. (Tess)*

There was, however, general confidence that an unplanned pregnancy was highly unlikely because they had taken the time to learn about FABMs and best practices.

> *People always ask me, "Are you still scared?" And I'm like, "Never. I have 100% confidence every time I have unprotected sex, I will not get pregnant." (Rebecca)*

Still, there was acknowledgement that user errors could happen. Angela explained that women should be aware that any errors that lead to unplanned pregnancies would probably be user-errors rather than issues with FABMs themselves.

> *If you're gonna get pregnant unexpectedly, chances are it's because you made a mistake. And you have to take responsibility for what you're doing. (Angela)*

Reproductive Health Outcomes

Avoiding Side Effects

Reproductive health outcomes were focused on the avoidance of the side effects they described experiencing or witnessing their friends experiencing. For FABM-users, the

time and effort required to practice these methods was worth the ability to avoid these side effects.

> *I'm not really happy with what's out there at the moment. Like I wish the fertility awareness method didn't have to take so much work and effort and maybe in the future we would we be able to find something that's easier for people to access that doesn't have so many potential glitches. Because I get why that's scary and you need to know all of these glitches quite well. But at the moment, there's nothing else out there. You go to the doctor and their fix is hormones. And I hate that. I believe it's not good for you. (Samantha)*

Body Literacy

Unanimously, respondents cited increased body literacy as an important health outcome. How deeply they wanted to be body literate ranged from Tess who liked having an idea of when she could expect her menstrual period and having a general idea of her fertile window but did not find it important to be 100% precise,

> *I remember a friend telling me about temperatur-ing and I was like, "That's too much work." You need to do that regularly at the same time and I'm not good at these things so we just did condoms, but not every time like, "Oh, I think I'm fertile...Ok, let's [use a condom]." So that was tricky business because it felt a bit unsafe, but we didn't like using condoms like all the time so it was like ok so this is the best out of all options. (Tess)*

to the Sympothermal Method users who expressed that they found learning about their bodies to be fascinating and something that they thought was essential knowledge for all women, whether or not all women want to use FABMs exclusively as their contraceptive method of choice.

> *I'm really fascinated by the body and I think it's so cool that our body can, our body is so complicated. I'm humbled by our bodies. I am humbled by every new thing I learn that my body is capable of. I was so excited to learn that our cervical mucus can deflect dying sperm, the defective sperm. It's like, "Wow! We rock!" It's so cool. It's little things like that I find fascinating and if I can use that to my advantage, meaning my health, to avoid taking hormones…But it does take work. I understand people get turned off by the idea that it takes work and effort but I find it interesting so it doesn't feel like work. (Samantha)*

There was a sense of frustration that this body literacy was something they had to discover for themselves later in life rather than something they learned growing up.

> *How did I get through public school, multiple gynecology appointments, a life of openness with older women and nobody ever tell me that my high energy and low energy every month makes sense and, you know, the cycle syncing? And it's so logical. How did nobody ever tell me about this? (Angela)*

Summary – Contraceptive & Reproductive Health Outcomes

The respondents prioritized body literacy, avoiding unintended pregnancies, and avoiding side effects of other contraceptives. However, their attitudes towards pregnancy were complex and existed on a spectrum for most of the women between an absolute desire to not become pregnant at this time and an absolute desire for children. There was also a general knowledge that unplanned pregnancies could be handled financially and logistically with their partners. There was acknowledgement that mistakes could be made with FABMs but also confidence in their own abilities to practice. There was also frustration with the experience of discovering information about their cycles later in life and needing to teach themselves what they saw as critical information.

Social Practice

SRQ3: How are women engaging with FABMs in general and FABMs with Femtech as social practices?

Once the decision was made to practice a FABM, they became a social practice influenced by the determinants and background characteristics that was maintained over time.

Meaning

FABMs took on meanings beyond simply ways to avoid pregnancy. These meanings came were influenced by the values that motivated the initial use of FABMs. They

methods took on the body literacy, partner involvement, feminist, women's liberation, and "hippie" movement meanings outlined in the values section of this paper.

> *I agree that it should be a 5th vital sign like a basic reading. I've also started to think a lot about men's fertility as well like maybe there's a way for men to be empowered to read their own vital signs in fertility as well. So yeah, that's the biggest attraction for people who are skeptical about it for contraception. Ok fine, but if you know that you could prevent or pick up early signs of endometriosis or infertility or anything like that, then why wouldn't you? (Samantha)*

Competence

Key competences to engaged in FABM-use were the ability to first select the appropriate FABM method for their contraceptive and reproductive health goals, the ability to learn and understand how to apply the method, and the ability to actually be able to do so through interpreting the bodily signs needed.

The users gained competence quickly as partially evidenced by their high levels of decisional esteem. They were confident in their abilities to learn and were able to comfortably implement the practice within a few cycles.

They gained this competence largely by teaching themselves through books and online resources. Samantha worked with a specialist and Rebecca and Chloe went on to become instructors themselves.

Chloe, however, had struggled with learning and feeling comfortable with the method at first especially because she was transitioning off hormonal birth control when she started and found that her bodily signs were not lining up with what she expected.

> *I read Taking Charge of Your Fertility which was even more confusing, like the cervical fluid is really good, but with the temperature it confused me because we use Celsius in Australia and it was hard to convert. And I did do a course. It was a 3-month course with Grace of the Moon. And I still felt confused after that. I don't know. I think it just took time to grasp. And the*

other thing I realized is when you're coming off birth control and learning it's like a double-whammy because your hormones are going crazy so it's like, why aren't I like the textbook, what's wrong with me? I don't have egg-white fluid like they say in the book and yeah, I found that really difficult to do. Yeah, I think that's why I found it difficult. (Chloe)

Materials

The key material for practice FABMs was the female body itself. Secondary materials included thermometers, Femtech devices and applications (Fig. 9), and pens and paper used to chart.

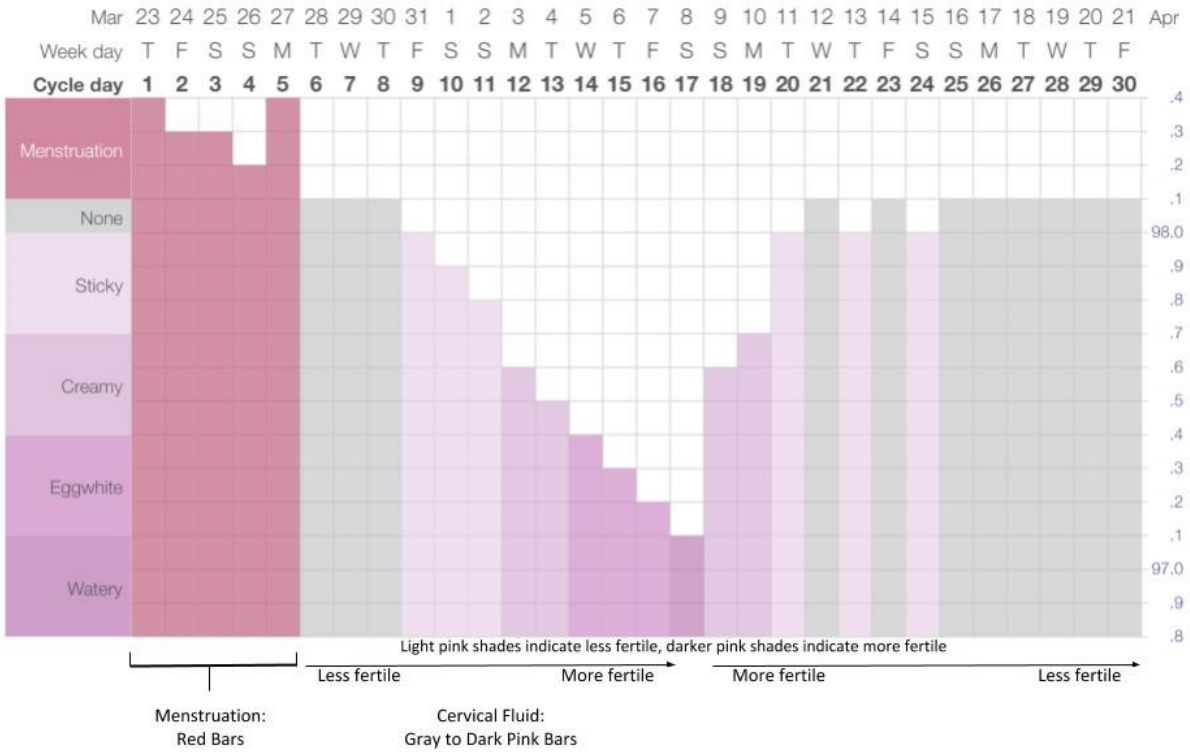


Fig. 9 The layout of a chart in the Kindara app.

All of the respondents had used some form of Femtech ranging from using the Kindara app to store their charting data to using Natural Cycles and the Wink device. Only Samantha reported using and pen and paper charting which she did in addition to tracking in the Kindara app to show her specialist who preferred viewing charts on paper.

I only use Kindara. Nah, I don't use paper. The specialist uses paper so I do write things down when I go see her and then we go over it on paper but everything is on the app as well. (Samantha)

However, the overwhelming opinion among the Syptothermal Method users was that for FABMs to be most effective, users should learn how to chart without Femtech and know the signs beyond BBT. Users reported cross-checking their own readings with predictions from Kindara and Natural Cycles and finding errors. The apps were seen as providing a false sense of security, especially for new users.

I think that is the fault with the app, that it makes you feel like you have everything you need. But I think that you can't replace basic knowing of what's going on in your body. (Angela)

I switched it so when it's telling me that I'm fertile. I can tell, based on my charts, that I'm not. So that's why I could never trust anything but the actual data, the actual cervical fluid and basal body temperature. (Rebecca)

However, with that knowledge, Angela viewed the applications as something that could be helpful especially if there was support from the company in the early stages of implementation as she had experienced with Natural Cycles. She described why she had chosen to use Natural Cycles after hearing a positive review from her cousin,

They held your hand through the whole thing and they were science-based and then it was in process of being certified by the FDA as a birth control method and they do all the charting for you. You put in the numbers, but they actually create your chart. Because I learned how to do it by hand if I wanted to but your girl doesn't have time for that. I just what them to tell me "red" or "green" and that's it. I was like, "It's so user friendly, I can just put it in my phone, put it on my husband's phone." It's super black and white, like red-green-that's it. (Angela)

Applications and devices were critiqued for not being able to account for circumstances in the user's life that could affect ovulation.

It's supposed to tell you when you're ovulating, but I guess that would make sense if life was simple. The app doesn't know what the weather outside is and if you're stressed and if you've just been flying or changed time zones and all that stuff. (Samantha)

The Wink device was seen as useful because it synced automatically with the Kindara app and took temperature in less time than a regular BBT thermometer, but the device was also critiqued for being expensive and poorly made. Both users who had experimented with it felt that it did not last long enough for the price.

> *And sure enough, mine starts cracking and it had just been sitting on my nightstand for a year and I think it finally breaks, like no longer works after maybe a year and 5 months, not a long time. And then I contact them and I was like, "Mine's just broken." and they were like, "We can offer you a $30 off a new one which is $120." So, I was like, "Not if it's gonna break again." So now I don't use it. But it was nice when I did. (Rebecca)*

Chloe however did use the Tempdrop herself and recommend it to her clients because it takes temperature readings throughout the night, eliminating concerns about remembering to take one's temperature before getting out of bed or being consistent with the time of morning the temperature is taken.

> *I do advocate for the Tempdrop because that's what I use now. So, when they say, "I don't have time. Or I don't wake up early or like the same time every day." That's the story of my life so I wear the Tempdrop as well and it's been amazing. (Chloe)*

Both of the FABMs educators recommended that their clients start with a basic thermometer to avoid the temptation to depend on devices and only implement the use of Femtech once they had gained knowledge and confidence.

> *I do advise when starting out to use a regular BBT thermometer just because it's good to bring it back to basics. (Chloe)*

All the Syptothermal Method users relied on regular BBT thermometers with the exception of Chloe who used the Tempdrop. Tess did not use a thermometer to practice the Rhythm Method.

In Samantha's experience with her unplanned pregnancy, she had believed that the apps could provide more detailed and accurate information than she would be able to

provide for herself. However, she found that the Natural Cycles app over-simplified the practice.

> *My other mistake pre-termination was that I was relying on the apps, very much so, I thought that they had this sophisticated formula that would tell me when I'm ovulating that I wouldn't be able to figure out. But it turns out actually that it's quite a simple formula and our bodies aren't that consistent and actually I can tell...We did know it, but we didn't know how to read the glitches. So now I feel so more confident and being pregnant was not pleasant and obviously was trauma to the body, but it hasn't turned me off from fertility awareness but in fact it's made me more passionate about it...unusually. (Samantha)*

Summary – Social Practice

FABM-use became a meaningful social practice for all respondents and a way to assert their values. They gained the key competences quickly and felt confident in their abilities to successfully avoid pregnancy. Femtech apps were mainly used for convenience and data storage but prediction functions were viewed with skepticism and caution. The Wink was viewed as not worth the cost though the Tempdrop was viewed favorably.

Discussion

This research sought to understand why and how women make the decision to practice FABMs over other forms of contraception and what their experiences of making that choice are. It sought to understand their influences, priorities, and context when making these decisions. Additionally, it sought to understand their continual use of FABMs as a social practice. Though no definitive statements can be made about the experiences of FABM-users as a whole, this research did provide insight into the experiences of a subset of users.

The main research question can be answered as follows.

Why do women decide to use FABMs and how are they implementing the practice using them?

The women in this study decided to use FABMs for a combination of reasons citing feminism, dissatisfaction with other methods both because of side effects and aversion to the idea of manipulating their bodies, and a desire for body literacy among main motivations. They were influenced towards using them largely by social media and online communities and often discouraged by family, friends, and mainstream healthcare professionals. There was a disconnect between the support in their virtual communities and the lack of it in their real-life communities.

The experiences and contexts that led them to FABMs echoed the findings of other research. Their contraceptive background proved to be important as it was often negative experiences with other methods of contraception that drove them to explore other options. Sexual education background was not influential in deciding to use FABMs as deep knowledge and understanding of their cycles and fertility had been missing in their education.

Feminist, women's liberation, and "hippie" values were the most important common values. With these values, there was also value placed on knowing one's body and involving one's partner in contraceptive decisions and practices.

Decisional esteem was high in the group with all feeling confident and trusting in their abilities to make informed choices about what was best for their bodies and execute the practice effectively. Respondents with less focus on practicing effectively also had fewer concerns about a potential unplanned pregnancy.

They developed confidence and competence quite quickly once they learned the science and charted consistently and successfully for a few months. The users trusted their abilities to practice FABMs effectively. They also quickly became passionate about the practice feeling that it was essential, empowering knowledge that they had been denied as teens and young adults and something that should be shared.

Respondents were generally enthusiastic about sharing the practice but also cautious and had to read people and situations before sharing. They experienced feelings of pressure to be experts in the practice and not make mistakes when speaking about it. This experience was also common in the recruitment phase of this research. One personal contact who had shared the research with friends she knew used FABMs reported a friend saying that she did not feel knowledgeable enough to contribute to the research. While each woman is the expert on her own experience and practice, there is an idea that one needs more formal expertise to speak on this issue.

From a material standpoint, the main material was the female body that experiences the cycles. The devices and applications used to support the practice were also important materials that facilitated the development of a deeper understanding of the female body. Tech options were generally viewed with skepticism and caution though they had some allure as sophisticated algorithms in earlier months of charting for some. Devices were appreciated for their convivence but also not seen as necessary

or always worth the price. Femtech apps made charting easier and more accessible and were generally used over pen and paper but they were not viewed as essential to the practice. The devices and applications were used more to store data than for their prediction functions. Even those that used applications or devices more intensively did so with deep knowledge of FABMs and did not rely exclusively on app predictions with the exception of the Rhythm Method user. Femtech was far less integral to the practices of this group of women than expected. The use of apps over pen and paper may speak to the fact that this group of women came to know about FABMs once these devices/applications were already available and thus never had to rely on pen and paper charting. They were all of the generation that has spent their either adult lives with access to smartphones and apps. Books, internet resources, and courses were also important materials that provided information and support.

The practices of FABMs were not just about avoiding pregnancy for these women but had deeper meaning and symbolism related to larger issues including disconnect from their bodies, wanting to experience natural cycles, getting their partners involved in contraception, questioning the medical establishment, and taking control over their bodies. The practice also had social significance connecting them to other users through online communities and with some of their in-person network.

The most important outcomes were to avoid pregnancy without having to compromise on their values or experience the side effects often associated with contraceptives.

The commonalities found among these respondents include their Western backgrounds, their generally high level of educational attainment, their feminist values, their dissatisfaction with standard medical practices with regards to contraception options, and their status as women in their late twenties and early thirties. These communalities may have contributed to their shared experiences in finding the resources to learn about FABMs and feeling competent and able to implement these practices.

The common challenges including not having support from healthcare professionals or most of their in-person social groups are of note as is the importance of online communities. While the relationship between learning through word-of-mouth in social networks and contraceptive choice has been previously explored, how this social learning occurs online is a newer topic of research. It has been found that women who rely on social networks to evaluate contraceptive options may fail to adopt the appropriate one for them and that they may deviate once they are able to obtain enough information about alternatives. Still, social learning has been found to be a solution to the lack of publicly available and reliable information (Kohler, 1997). Facebook groups have more recently been recognized as important sites of health information and communication with interactions structured around sharing information and emotions as well as community building (Zhang, He, & Sang, 2013), experiences echoed by this research's respondents.

The differences were highlighted by two respondents who practiced differently. First, Tess was unique in choosing to practice the Rhythm Method. Her decision to practice this method highlights further that women have different priorities when selecting a method. For her, using a FABM she knew was less reliable but also took less effort was more appealing than using a more intensive FABM. She was willing to accept some increased risk in exchange for a less time and effort heavy FABM.

Additionally, Samantha was unique in her stance that having a child was absolutely not a desirable outcome at this point in time. Samantha also had the combined experiences of using FABMs exclusively for contraception when she had been in a long-term relationship and using FABMs in conjunction with condoms with new partners. Her experience showcased how FABMs can be used for body literacy while still relying on barriers for extra contraceptive insurance and STI protection.

Practical Implications

As previous research has noted, mainstream medical professionals currently lack training in FABMs. This makes them unable to provide comprehensive information to patients interested in using this method. Additionally, path-dependent adoption has occurred with other types of birth control like the pill and IUD making those options more normative in the eyes of mainstream medical culture and positioning those who practice FABMs as "alternative." However, women are using these methods in growing numbers and this research suggests that many would like support from their doctors in using them or at least be able to trust that their doctors are expressing opinions on these methods from informed standpoints rather than simply dismissing the methods because they are not informed on them. In order to support the use of the right contraceptives for each individual, healthcare professionals should have facts-based knowledge regarding all the available options and be able to direct interested patients to experts and specialists. This facilitates following the principles of voluntarism and informed choice regarding contraceptive options. These principles mean that each woman has the right to choose the number, timing, and spacing of her own children and has the freedom to choose whether and when to use contraception. Contraceptive choice should also come from a wide range of options with detailed information available about use, advantages, and side effects. Overcoming misconceptions about each option is crucial to expanding options (Malarcher et al, 2016).

Another issue with getting support to practice FABMs is that specialists in FABMs remain few in number and difficult to access. Organizations, like FertilityUK and Justisse International, certify reproductive health and fertility awareness practitioners and keep databases of certified individuals. However, practitioners can be difficult to find and women interested in FABMs may not even know these types of specialists exist. Additionally, many of these specialists practice as health or fertility coaches, a service often not covered by insurance or healthcare systems in

most countries, creating a financial barrier to practicing FABMs with knowledgeable support (Brebner, 2019a). This could be solved through the expansion of healthcare coverage to include more diverse types of practitioners or by integrating these services into current medical roles.

This lack of knowledgeable doctors and inaccessibility of specialists can lead FABM-curious individuals to turn to online resources and teaching themselves through books. Though many of these resources are extensive and making resources free or affordable democratizes the information and the practice, the responsibility then falls on users to gather and sift through information and decide what is trustworthy. This can be empowering as women are able to rely on themselves rather than the medical system and learn more about their health and their bodies in the process, but it can also be daunting and isolating. Users must then use this information to develop an understanding of their own bodies without assistance with interpretation. Differences in failure rates between self-taught FABM-users and those who work with instructors have not been sufficiently explored though early research suggests that practicing under supervision yields higher success rates (Brebner, 2019a). This again brings up the issue of whether increased access to health knowledge is liberating or a burden.

Spreading knowledge in the healthcare community is also essential to have factual information in media coverage on fertility awareness. Though there has been recent coverage of FABMs in mainstream publications like *Cosmopolitan Magazine* (Smothers, 2019), these pieces often rely on interviewing doctors without any training in the practice perpetuating myths and misconceptions (Brebner, 2019b). This creates fear and stigma based on a lack of understanding and can discourage those interested in FABMs.

Additionally, because the respondents who had used applications to estimate their fertile window found errors with the predictions, this research brought up further

questions on the effectiveness of applications and devices for practicing FABMs and the ethics of their marketing. Even when applications and devices are not explicitly advertised for contraceptive use, the estimates they provide on the fertile window can tempt users into relying on them. This could lead to more unplanned pregnancies than if all apps required users interpret their charting data themselves. This group of women was largely informed on how to cross-check any application predictions with their fertility signs, but this may not be the norm in the Femtech-using population.

This research also illustrated the complexity of attitudes towards pregnancy. Most of the respondents sat somewhere between feeling that they absolutely did not want a baby at this time and would terminate an unplanned pregnancy and feeling absolutely ready. This nuance showcases the challenges of understanding why people choose their contraceptive methods and why they may or may not choose to follow perfect use rules. Attitudes towards pregnancy are an interaction between context, stance, and behavior (Barrett, Smith, and Wellings, 2004) and decisions made based on those elements are not always clear-cut. Previous research has shown that even couples that say they are actively avoiding pregnancy also say they would consider a potential unplanned pregnancy as okay, welcome, or even very positive (Gomez, Freihart, Villaseñor, Arcara, & Arteaga, 2016). A woman's attitudes towards pregnancy can greatly inform the choice of contraceptive and this knowledge is something that doctors could use in consultations to support contraceptive decision-making rather than assuming that all women seeking contraceptive advice would absolutely not be okay with an unexpected pregnancy.

These interviews also illustrated that the use of FABMs is not universally ideal. FABMs require a substantial amount of time and effort, especially at the beginning during the learning phase. Using them can also be costly if one decides to pursue coaching, courses, or Femtech options. Women also may not wish to have the deep knowledge of their bodies that these practices require preferring methods that allow them distance from their biology. They may prefer a long-term method like an IUD

or implant that does not require daily effort. The use of FABMs also cannot alleviate the symptoms that some women use hormonal birth control to mitigate like acne, severe menstrual pain, and heavy flows. While many FABM-advocates argue that hormonal birth control's masking of symptoms rather than treating causes is not ideal, many women lack options for pursuing other treatments for these struggles, especially in a medical system that often does not take women's medical challenges and pain seriously (Hoffman & Tarzian, 2001; Norman, 2018) and therefore may need to rely on hormonal methods to manage their health challenges. The use of FABMs alone also does not protect against sexually transmitted infections though FABMs can be used in conjunction with barrier methods which do offer those protections.

Theoretical Reflection

The merging of the contraceptive decision-making framework and social practice theory proved to be effective in establishing what to discuss with FABM-users and sorting and categorizing their responses. However, the framework can be easy to use too simplistically. For example, one's religious background or identity might be linked to exposure to certain attitudes towards contraception but does not guarantee that those attitudes will be internalized or taken into account when actually making choices for oneself. The demographic characteristics only give clues into potential influences but the design of the framework also suggests a linear pathway from background to decision to practice to outcomes. In reality, human behavior is often far less rational and decision-making is an ongoing process. This is echoed in previous research that has shown that women who share social similarities, including comparable environments, geographic proximity, and overlapping social networks, exhibit dramatically different adoption levels of contraceptives despite their commonalities (Lesthaeghe, 1977; Livi-Bacci, 1986). While this group shared many commonalities, their decision to use FABMs is not common in the wider populations of women like them.

Limitations

A major limitation of this research is the small sample size that limits the generalizability of the findings. While the intention was to find participants through social media using Facebook groups and personal contacts for maximum variation sampling in order to give a more diverse picture of FABM-users, accessing these groups proved more challenging than expected. Some of the larger, broader Facebook groups focused on fertility awareness declined permission for me to post about my research and other groups deleted my posts. Because of this, I only had access to smaller Facebook groups and my personal network. My final participants came from three main sources: my personal contacts, a post in a Facebook group, and through the sharing of the research by early respondents.

It is important to note that the age range of the sample was quite narrow considering the whole population of child-bearing age and population of FABM-users. The small size of the sample stemmed from the difficulties in recruiting subjects and the short time frame of the research. The narrow age-range of respondents may be attributable to my own age. As a 28-year old, I was positioned roughly at the median of the spread of ages of women who agreed to speak with me so my status as a peer may have made certain women more willing to speak with me. This may have also influenced the attitudes towards pregnancy intention of my sample since all were at a life stage where unexpected pregnancies might have different consequences than for women much younger or much older. Additionally, the respondents all had some type of post-secondary education. As a master's student myself, this was another way that I was a peer for this group. Lastly, as a researcher, I chose to share my own experiences with sex education, navigating contraceptive decision-making, starting to chart my own cycles using the Kindara app and Wink device, developing my feminist values, and exploring healthcare as these topics emerged in discussion. While this may have influenced answers that I received, it also created a more comfortable atmosphere for respondents. The interviews were able to flow more as conversations between women

with shared experiences rather than as interviews with strict boundaries between researcher and respondent. This has implications for future research. Exploring attitudes towards FABMs among women in their late 30s and early 40s, for example, might be better explored by a researcher of that age. Additionally, my decision to focus recruitment through Instagram and Facebook might have limited me to a demographic with a heavy presence on those social media networks.

Because interviews require substantial time and effort without compensation from respondents, my sample may also be skewed towards a highly passionate and vocal subgroup of FABM-users who felt the effort required to participate in an interview was worthwhile. This may have contributed to why this group demonstrated a high level of knowledge of FABMs that may not be representative of the knowledge level of FABM-users as a whole, especially FABM-users who rely heavily on Femtech. To reach a broader sample, less intensive methods or interviews with compensation or incentives might be considered.

The sensitivity of the topics of contraception and female bodily functions may have also led to the difficulties with securing participants. The taboos around these subjects may have also caused the participants to censor themselves. This was attempted to be corrected for by ensuring that participants understood the purpose and scope of the research and ensuring that both interviewer and interviewee were in private spaces during the Skype calls and during the in-person meeting. However, the fact that the interviews were conducted mostly on Skype may have created some concerns about privacy and security that could have consciously or unconsciously affected respondent answers.

Because of the difficulties with finding willing participants, the scope of this research was widened from its original focus on American women to include any English-speaking woman. This made the research lose the specificity to the American context that was originally intended. However, having a culturally diverse sample did open

questions of the effects of cultural differences and different healthcare systems on FABMs that could be explored in the future. The scope was also widened from women who used BBT devices and applications to practice FABMs to any woman practicing any type of FABM who had used some type of Femtech because of the difficulties accessing women who used these particular types of devices.

For the Femtech aspect of the social practice, the low reliance on Femtech in this sample limits the conclusions about Femtech that can be drawn from their experiences. The results are therefore tentative and provide insight but no definitive conclusions.

Suggestions for further research

There are still many unknowns regarding FABMs. Additional research is needed to:

- understand whether the mid-range pregnancy intention is something shared among FABM users.
- understand whether pregnancy intentions vary significantly between FABM-users and users of other methods of contraception.
- understand how users with absolute 0 intention for pregnancy relate to the practice.
- explore the experiences of FABM-users in non-Western contexts
- explore the approach of non-Western healthcare professionals towards FABMs
- explore the level of knowledge of Femtech users about FABMs compared to those who use more analog methods
- understand the social practice of those who rely heavily on Femtech to make predictions and interpret data about their cycles
- understand the experiences of trans, non-binary, and gender nonconforming individuals who practice FABMs

Reflection

Reflexivity is an important element of the qualitative research process and involves reflecting on one's own biases and experiences (Burnard, 1995; Bengtsson, 2015). These biases and experiences include one's own experiences, beliefs, and attitudes based on their political and personal beliefs and social positions (gender, age, race, immigration status, and sexual orientation). Personal experience with a subject contributes to the design and analysis of research. This personal experience can be helpful as it directs the research and can help with finding discrepancies in the data (Catanzaro, 1998). But researchers should be able to separate themselves from the subject (Long & Johnson, 2000; Elo et al, 2014).

With this in mind, it is crucial for me to reflect on the knowledge and experiences that brought me to this topic. As a woman in her late twenties engaged in feminist causes and in health and wellness, FABMs became part of my awareness several years ago. I quickly became enthusiastic about them after experiencing frustration with navigating a mainstream healthcare system in the United States that did not take my concerns with issues surrounding my own hormonal health seriously. The body literacy piece of practicing FABMs was therefore the most attractive to me. Like the respondents, I thought it was something that should be taught to all women in school as it could be an effective tool for understanding their health while they could also rely on barrier methods of contraception as extra protection. After loosely tracking my cycles for health purposes for several years using the Clue application, I wanted to integrate more aspects of FABMs and also started seeing more Femtech options advertised on Instagram. I was immediately intrigued by these devices but questioned why. Having read extensively about FABMs, I knew that these expensive devices were not necessary to practice FABMs successfully. I wondered what drew me to Femtech and what about these devices made me feel that they would be

necessary for practicing FABMs myself. This led me to wanting to explore how other women interacted with these practices and any devices they used.

During the course of this research, I began using a Wink device and the Kindara application to further understand the experiences of the FABM-users, specifically the Syptothermal Method users, I was speaking with. I realized my biggest challenge was simply remembering to take my temperature as soon as I woke up and understood why this task might be off-putting for so many women. I also noted the difficulties with identifying the subtle shift in temperature post-ovulation. I decided that I would feel better taking a course or working with a specialist to become confident that I was interpreting the signs correctly. I also was acutely aware of the experience of needing to feel like an expert on the scientific details of FABMs both in writing this paper and in speaking about it in my communities. My experience reflected that of my respondents in that I felt that I needed to be highly detailed and accurate in explaining the scientific principles of the practice as these details are not common knowledge. In outlining the background for this paper, I questioned how detailed I needed to be since the average person's knowledge of how female cycles work can be minimal.

While I tried to distance myself from the subject when conducting interviews, I can imagine that my respondents noticed my enthusiasm for the subject and my passion for the feminist angle. Sharing some of my experiences during my discussions did however lead to additional insights from the respondents that might not have otherwise come up.

Being someone that is part of women's health and FABM-related online communities helped me understand the limitations of this study. From the conversations I have witnessed on Facebook and Instagram, I was able to note that the group of women I was able to speak with is not representative of the wide diversity of women using these practices and was rather representative of my peers.

Conclusion

This research explored the experiences of FABM-users to better understand their motives, challenges, and contexts. It contributed to the understanding that FABMs are a growing practice that needs research and support both of which are currently lacking as FABMs are not widely known about or supported in Western medical contexts. Respondents were found to sort through a variety of influences, values, and experiences to make the decision to use FABM as contraception and often did so with little support from their immediate communities. Online communities proved to be the site of much of their learning and support. Femtech not very important to this particular group and they generally relied more on their own knowledge and ability to understand their bodily signals.

FABMs were also found to be meaningful practices to express one's values through contraceptive choice. Though no definitive conclusions can be drawn from this research regarding FABM-users as a whole, the findings of this research do offer increased understanding of the experiences of a subset of FABM-users, namely highly educated Western women in their mid-twenties to early-thirties.

References

Alford, S. (Ed.). (2001). Sex Education Programs: Definitions & Point-by-Point Comparison. Retrieved from https://advocatesforyouth.org/resources/fact-sheets/sex-education-programs-definitions-and-point-by-point-comparison/

Altman, A. (2019, January 14). Mommy and Data. Retrieved May 29, 2019, from https://newrepublic.com/article/152693/femtech-companies-alleviate-exploit-female-anxiety

Andreassen, HK, Trondsen, M., Kummervold, PE, Gammon, D., & Hjortdahl, P. (2006). Patients who use e-mediated communication with their doctor: new constructions of trust in the patient-doctor relationship. *Qualitative health research*, *16* (2), 238-248.

Bajos, N., Rouzaud-Cornabas, M., Panjo, H., Bohet, A., & Moreau, C. (2014). The French pill scare: towards a new contraceptive model?. *Population & Societies*, (511), 1.

Barrett, G., Smith, S. C., & Wellings, K. (2004). Conceptualisation, development, and evaluation of a measure of unplanned pregnancy. *Journal of Epidemiology & Community Health*, *58*(5), 426-433.

Barron, D. (2017, January 15). Is the "Catholic method" of contraception just for 'holies' and 'hippies'? Retrieved June 5, 2019, from https://www.irishtimes.com/life-and-style/health-family/is-the-catholic-method-of-contraception-just-for-holies-and-hippies-1.2924535

Bauman, J. E. (1981). Basal body temperature: unreliable method of ovulation detection. *Fertility and Sterility*, *36*(6), 729-733.

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open*, *2*, 8-14.

Bigelow, J. L., Dunson, D. B., Stanford, J. B., Ecochard, R., Gnoth, C., & Colombo, B. (2004). Mucus observations in the fertile window: a better predictor of conception than timing of intercourse. *Human Reproduction*, *19*(4), 889-892.

Billings, EL (2008). The Billings Ovulation Method: observations, charting and rules.

Blue, S., Shove, E., Carmona, C., & Kelly, MP (2016). Theories of practice and public health: understanding (un) healthy practices. *Critical Public Health*, *26* (1), 36-50.

Bramwell, R. (2001). Blood and milk: Constructions of female bodily fluids in Western society. *Women & health*, *34*(4), 85-96.

Brebner, J. (2018, December 04). 5 Reasons I Don't Use Daysy or Natural Cycles. Retrieved June 13, 2019, from https://penandpaperfertility.com/2018/12/02/5-reasons-i-dont-use-daysy-or-natural-cycles/?fbclid=IwAR29fDgnKrqYyRnWOixdCIXD9Q-Kyu8q6MXErxYfZWCjPcbZwWCFtRKRwOI

Brebner, J. (2019, June 8a). Cosmopolitan Magazine: Bias Against Fertility Awareness Continues. Retrieved from https://fertilitycharting.com.au/2019/06/06/cosmo-incompetence-the-bias-against-fertility-awareness-continues/

Brebner, J. (2019, June 30b). On A Budget: How To Chart With $20. Retrieved from https://fertilitycharting.com.au/2019/06/29/on-a-budget-how-to-chart-with-20/

Briden, L. (2015). *Period Repair Manual: Natural Treatment for Better Hormones and Better Periods*. Createspace Independent Pub.

Brighten, J. (2019). *Beyond the Pill: A 30-day Program to Balance Your Hormones, Reclaim Your Body, and Reverse the Dangerous Side Effects of the Birth Control Pill*. HarperCollins.

Bryman, A. (2015). *Social Research Methods* (4th ed.). Oxford: Oxford University Press.

Burnard, P. (1991). A method of analysing interview transcripts in qualitative research. Nurse Education Today, 11, 461–466.

Cain, S. (2019, May 29). 'I'm such a big fan of the menstrual cycle!' – the women asking whether it's possible to have a better period. Retrieved June 3, 2019, from https://www.theguardian.com/society/2019/may/29/im-such-a-big-fan-of-the-menstrual-cycle-the-women-asking-whether-its-possible-to-have-a-better-period?CMP=share_btn_tw

Catanzaro, M. (1988). Using qualitative analytical techniques in: N. F. Woods, & M. Catanzaro (Eds.), Nursing: research theory and practice (pp. 437–456). St. Louis: The CV Mosby Company.

Centers for Disease Control and Prevention. (n.d.). Contraception | Reproductive Health | CDC. Retrieved May 28, 2019, from https://www.cdc.gov/reproductivehealth/contraception/index.htm

Cleland, J., & Wilson, C. (1987). Demand theories of the fertility transition: An iconoclastic view. *Population studies*, *41*(1), 5-30.

Clowes, B. (n.d.). Did You Know That Birth Control Harms the Environment? Retrieved June 6, 2019, from https://www.hli.org/resources/what-are-the-environmental-impacts-of-hormonal-birth-control/

Contraceptive Use in the United States. (2018, July 26). Retrieved May 31, 2019, from https://www.guttmacher.org/fact-sheet/contraceptive-use-united-states

Danis, P. G., Kurz, S. A., & Covert, L. M. (2017). Medical Students' Knowledge of Fertility Awareness-Based Methods of Family Planning. *Frontiers in medicine*, *4*, 65.

Das, R. (2018, April 12). Women's Healthcare Comes Out of The Shadows: Femtech Shows the Way to Billion-Dollar Opportunities. Retrieved May 29, 2019, from https://www.forbes.com/sites/reenitadas/2018/04/12/womens-healthcare-comes-out-of-the-shadows-femtech-shows-the-way-to-billion-dollar-opportunities/#1bbe8d716159

Duane, M., Contreras, A., Jensen, E. T., & White, A. (2016). The performance of fertility awareness-based method apps marketed to avoid pregnancy. *J Am Board Fam Med*, *29*(4), 508-511.

Duane, M. (2017, November 02). Stop Denying Science. Birth Control Isn't Necessary for Women's Health. Retrieved August 12, 2019, from https://thefederalist.com/2017/11/02/stop-denying-science-birth-control-isnt-necessary-womens-health/

Druet, A. (2017, August 31). What is a period? Menstruation 101. Retrieved June 3, 2019, from https://helloclue.com/articles/cycle-a-z/what-is-period-menstruation-101

Eddo-Lodge, R. (2010, August 03). Why it's ok to prescribe the pill to pre-teens. Retrieved June 18, 2019, from https://www.theguardian.com/society/joepublic/2010/aug/03/pre-teens-on-pill

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: a focus on trustworthiness. SAGE Open, 4.

Frank-Herrmann, P., Heil, J., Gnoth, C., Toledo, E., Baur, S., Pyper, C., ... & Freundl, G. (2007). The effectiveness of fertility awareness-based method to avoid pregnancy in relation to couple's sexual behavior during fertile time: a prospective longitudinal study. *Human Reproduction*. *22* (5).

Free, C., Ogden, J., & Lee, R. (2005). Young women's contraception use as a contextual and dynamic behaviour: A qualitative study. Psychology and Health, 20 (5), 673- 690.

Frost & Sullivan. (n.d.). Femtech Market- Digitizing Women's Health. Retrieved from https://store.frost.com/industries/femtech-market-research.html

Galan, N. (2018, September 21). What to know about the last week of birth control pills. Retrieved June 3, 2019, from https://www.medicalnewstoday.com/articles/323138.php

Gardner, A. (2017, November 03). A Right-Wing Magazine Is Claiming Birth Control Isn't Necessary for Women's Health. Retrieved August 12, 2019, from https://www.glamour.com/story/federalist-says-birth-control-isnt-necessary-for-womens-health

Gladwell, M. (2000, March 5). John Rock's Error. Retrieved June 16, 2019, from https://www.newyorker.com/magazine/2000/03/13/john-rocks-error-2

Glenza, J. (2019, May 30). Revealed: Women's fertility app is funded by anti-abortion campaigners. Retrieved May 30, 2019, from https://www.theguardian.com/world/2019/may/30/revealed-womens-fertility-app-is-funded-by-anti-abortion-campaigners

Gomez, A., Freihart, B., Villaseñor, E., Arcara, J., & Arteaga, S. (2016). It is not right, but is it okay? The acceptability of unintended pregnancy among young couples. Contraception, 94(4), 423.

Graaf, de, H., Meijer, S., Poelman, J., Vanwesenbeeck, I. (2005). Seks onder je 25e. Delft: Uitgeverij Eburon

Grigg-Spall, H. (2013). *Sweetening the pill: Or how we got hooked on hormonal birth control*. Winchester, England: Zero Books.

Hammers, M. L. (2006). Talking about "down there": The politics of publicizing the female body through The Vagina Monologues. *Women's Studies in Communication*, *29*(2), 220-243.

Hampton, K. D., Mazza, D., & Newton, J. M. (2013). Fertility-awareness knowledge, attitudes, and practices of women seeking fertility assistance. *Journal of Advanced Nursing*, *69*(5), 1076-1084.

Hilgers, T. W. (2010). *The NaProTECHNOLOGY revolution: Unleashing the power in a woman's cycle*. New York: Beaufort Books.

Hoffmann, D. E., & Tarzian, A. J. (2001). The girl who cried pain: a bias against women in the treatment of pain. *The Journal of Law, Medicine & Ethics*, *28*(4_suppl), 13-27.

Jardim, N. (2019, June 09). Daysy Fertility Monitor: Is it right for you? Retrieved June 10, 2019, from https://nicolejardim.com/daysy-fertility-monitor/

Jardim, N., & Kringoudis, N. (2017, July 3). Eco-Woman: Natural Choices for Birth Control, Sexuality, and Menstruation [Web log post]. Retrieved June 5, 2019, from https://nicolejardim.com/047-eco-woman-natural-choices-for-birth-control/

Jones, J., Mosher, W., & Daniels, K. (2012). Current contraceptive use in the United States, 2006–2010, and changes in patterns of use since 1995. *Natl Health Stat Report*, *60*(60), 1-25.

Justisse International. (n.d.). Retrieved May 30, 2019, from https://www.justisse.ca/index.php/pages/page/body-literacy

Kambic, R. T., & Lamprecht, V. (1996). Calendar rhythm efficacy: a review. *Advances in contraception*, *12*(2), 123-128.

Koch, M. C., Lermann, J., van de Roemer, N., Renner, S. K., Burghaus, S., Hackl, J., ... & Hack, C. C. (2018). Improving usability and pregnancy rates of a fertility monitor by an additional mobile application: results of a retrospective efficacy study of Daysy and DaysyView app. *Reproductive health*, *15*(1), 37.

Kohler, H. P. (1997). Learning in social networks and contraceptive choice. *Demography*, *34*(3), 369-383.

Kresge, N., Khrennikov, I., & Ramli, D. (2019, January 24). Retrieved May 30, 2019, from https://www.bloomberg.com/news/articles/2019-01-24/how-period-tracking-apps-are-monetizing-women-s-extremely-personal-data

Krings, K. M., Matteson, K. A., Allsworth, J. E., Mathias, E., & Peipert, J. F. (2008). Contraceptive choice: how do oral contraceptive users differ from condom users and women who use no contraception?. *American journal of obstetrics and gynecology*, *198*(5), e46-e47.

Kumar, N. S., Richer, J., Owen, G., Litman, E., Horwitz, K. B., & Leslie, K. K. (1998). Selective down-regulation of progesterone receptor isoform B in poorly differentiated human endometrial cancer cells: implications for unopposed estrogen action. *Cancer research*, *58*(9), 1860-1865.

Lesthaeghe, R. J. (2015). *The decline of Belgian fertility, 1800-1970*. Princeton University Press.

Livi-Bacci, M. (1986). Social-group forerunners of fertility control in Europe.

Lomas, N. (2018, September 17). Natural Cycles contraception app told to clarify pregnancy risks. Retrieved June 5, 2019, from https://techcrunch.com/2018/09/17/natural-cycles-contraception-app-told-to-clarify-pregnancy-risks/

Long, T., & Johnson, M. (2000). Rigour, reliability and validity in qualitative research. Clinical Effectiveness in Nursing, 4, 30–37.

Lundgren, R. I., Karra, M. V., & Yam, E. A. (2012). The role of the Standard Days Method in modern family planning services in developing countries. *The European Journal of Contraception & Reproductive Health Care*, *17*(4), 254-259.

Lupton, D. (1997). Consumerism, reflexivity and the medical encounter. *Social science & medicine*, *45*(3), 373-381.

Lupton, D. (2013). The digitally engaged patient: Self-monitoring and self-care in the digital health era. *Social Theory & Health*, *11*(3), 256-270.

Maller, CJ (2015). Understanding health through social practices: performance and materiality in everyday life. *Sociology of Health & Illness*, *37* (1), 52-66.

Mangone, E. R., Lebrun, V., & Muessig, K. E. (2016). Mobile phone apps for the prevention of unintended pregnancy: a systematic review and content analysis. *JMIR mHealth and uHealth*, *4*(1), e6.

Malarcher, S., Spieler, J., Fabic, M. S., Jordan, S., Starbird, E. H., & Kenon, C. (2016). Fertility awareness methods: distinctive modern contraceptives. *Global Health: Science and Practice*, *4*(1), 13-15.

Maller, C. J. (2015). Understanding health through social practices: performance and materiality in everyday life. *Sociology of Health & Illness*, *37*(1), 52-66.

Moglia, M. L., Nguyen, H. V., Chyjek, K., Chen, K. T., & Castaño, P. M. (2016). Evaluation of smartphone menstrual cycle tracking applications using an adapted APPLICATIONS scoring system. *Obstetrics & Gynecology*, *127*(6), 1153-1160.

Morris, NM, Underwood, LE, & Easterling Jr., W. (1976). Temporal relationship between basal body temperature and luteinizing hormone surge in normal women. *Fertility and sterility*, *27* (7), 780-783.

Nargund, G. (2009). Declining birth rate in Developed Countries: A radical policy re-think is required. *Facts, views & vision in ObGyn*, *1*(3), 191.

Natural Cycles. (n.d.). Natural Cycles FAQs | Contraception Questions | Natural Cycles. Retrieved June 5, 2019, from https://www.naturalcycles.com/en/faqs

Norman, A. (2018). *Ask Me about My Uterus: A Quest to Make Doctors Believe in Women's Pain*. Bold Type Books.

Oddens, BJ (1996). *Determinants of contraceptive use: National population-based studies in various Western European countries*. Delft: Eburon.

Oddens, B. J. (1999). Women's satisfaction with birth control: a population survey of physical and psychological effects of oral contraceptives, intrauterine devices, condoms, natural family planning, and sterilization among 1466 women. *Contraception*, *59*(5), 277-286.

Odeblad, E. (1994). The discovery of different types of cervical mucus and the Billings Ovulation Method. *Bulletin of the Natural Family Planning Council of Victoria*, *21*(3), 3-34.

Pallone, S. R., & Bergus, G. R. (2009). Fertility awareness-based methods: another option for family planning. *J Am Board Fam Med*, *22*(2), 147-157.

Pazol, K., Zapata, LB, Tregear, SJ, Mautone-Smith, N., & Gavin, LE (2015). Impact of contraceptive education on contraceptive knowledge and decision making: a systematic review. *American journal of preventive medicine*, *49* (2), S46-S56.

Picavet, C., Van der Leest, L., & Wijsen, C. (2011). Contraceptive decision-making: Background and outcomes of contraceptive methods. *Utrecht: Rutgers FPW* .

Piccinino, L. J., & Mosher, W. D. (1998). Trends in contraceptive use in the United States: 1982-1995. *Family planning perspectives*, 4-46.

Polis, C. B. (2017, May 4). Understanding effectiveness estimates for fertility awareness based methods of contraception. Retrieved from

http://chelseapolis.com/blog/understanding-effectiveness-estimates-for-fertility-awareness-based-methods-of-contraception

Polis, C. B., PhD. (2019, June 9). How an unethical company (Daysy) responded to retraction of their study. Retrieved June 10, 2019, from http://chelseapolis.com/blog/how-an-unethical-company-daysy-responded-to-retraction-of-their-study?fbclid=IwAR0JvUBMRykCvENDdUpt06kIkAuB8m2FW8pbmaQzCfgR6Jk0irC30OKgeG0

Polis, CB, & Jones, RK (2018). Multiple contraceptive method use and prevalence of fertility awareness based method use in the United States, 2013–2015. *Contraception*, *98* (3), 188-192.

Rako, S. (2003). *No more periods?: the risks of menstrual suppression and other cutting-edge issues about hormones and women's health*. New York: Harmony Books.

Ray, L. (2018, December 12). The menstrual cycle: More than just your period. Retrieved May 30, 2019, from https://helloclue.com/articles/cycle-a-z/the-menstrual-cycle-more-than-just-the-period

Rensman, E. (2006). De pil in Nederland: Een mentaliteitsgeschiedenis. Amsterdam: Athenaeum – Polak & Van Gennep.

Richters, J., Grulich, A. E., de Visser, R. O., Smith, A. M., & Rissel, C. E. (2003). Sex in Australia: contraceptive practices among a representative sample of women. *Australian and New Zealand journal of public health*, *27*(2), 210-216.

Scherwitzl, E. B., Danielsson, K. G., Sellberg, J. A., & Scherwitzl, R. (2016). Fertility awareness-based mobile application for contraception. *The European Journal of Contraception & Reproductive Health Care*.

Shove, E., Pantzar, M., & Watson, M. (2012). *The dynamics of social practice: Everyday life and how it changes*. Sage.

Sifferlin, A. (2018, August 15). Can Fertility Apps Replace Birth Control? Retrieved May 22, 2019, from http://time.com/5365564/fertility-apps-contraception/

Sinai, I., Lundgren, R., Arévalo, M., & Jennings, V. (2006). Fertility awareness-based methods of family planning: predictors of correct use. *International family planning perspectives*, 94-100.

Shove, E., & Pantzar, M. (2005). Consumers, producers and practices: Understanding the invention and reinvention of Nordic walking. *Journal of consumer culture*, *5*(1), 43-64.

Shove, E., Pantzar, M., & Watson, M. (2012). *The dynamics of social practice: Everyday life and how it changes*. Sage.

Skouby, S.O. (2004). Contraceptive use and behaviour in the 21st century: a comprehensive study across five European countries [Electronic version]. The European Journal of Contraceptive and Reproductive Health Care, 9, 57-68.

Snider, S. (2019, May 2). The Cost of Birth Control. Retrieved June 22, 2019, from https://money.usnews.com/money/personal-finance/family-finance/articles/the-cost-of-birth-control

Sole-Smith, V. (2019a, May). The Point of a Period. *Scientific American*, *320*(5), 33-38.

Sole-Smith, V. (2019b, May). Why Are Girls Getting Their Periods So Young? *Scientific American*, *320*(5), 38-38.

Stanford, J. B., Lemaire, J. C., & Thurman, P. B. (1998). Women's interest in natural family planning. *Journal of Family Practice*, *46*(1), 65-71.

Statistics Netherlands. (2014, June 19). Fewer women on the pill, IUDs more popular. Retrieved from https://www.cbs.nl/en-gb/news/2014/25/fewer-women-on-the-pill-iuds-more-popular

Tietze, C., Poliakoff, S. R., & Rock, J. (1951). The clinical effectiveness of the rhythm method of contraception. *Fertility and sterility*, *2*(5), 444-450.

Urrutia, R. (2019, April 24). What Cycle Tracking Can Tell You About Your Health. Retrieved June 14, 2019, from https://healthtalk.unchealthcare.org/what-cycle-tracking-can-tell-you-about-your-health/

Vekemans, M. (1997). Postpartum contraception: the lactational amenorrhea method. *The European Journal of Contraception & Reproductive Health Care*, *2*(2), 105-111.

Weigel, M. (2016, March 23). 'Fitbit for your period': The rise of fertility tracking | Moira Weigel. Retrieved June 3, 2019, from https://www.theguardian.com/technology/2016/mar/23/fitbit-for-your-period-the-rise-of-fertility-tracking

Wershler, L. (2013). Foreward. In *Sweetening the pill: Or how we got hooked on hormonal birth control*. Winchester, England: Zero Books.

Weschler, T., MPH. (2015). *Taking charge of your fertility: The definitive guide to natural birth control, pregnancy achievement, and reproductive health*. New York, NY: William Morrow, an imprint of HarperCollins.

Wilcox, A. J., Weinberg, C. R., & Baird, D. D. (1995). Timing of sexual intercourse in relation to ovulation—effects on the probability of conception, survival of the pregnancy, and sex of the baby. *New England Journal of Medicine*, *333*(23), 1517-1521.

Wijsen, C., & Zaagsma, M. (2006). Zwangerschap, anticonceptie en abortus. In F. Bakker, & I. Vanwesenbeeck, (Eds.), Seksuele gezondheid in Nederland 2006 (pp. 67-88). Delft: Eburon Uitgeverij.

World Health Organization. (1981). A prospective multicentre trial of the ovulation method of natural family planning. I. The teaching phase. *Fertility and Sterility*, *36*(2), 152-158.

Veitch, K. (2010). The government of health care and the politics of patient empowerment: New Labour and the NHS reform agenda in England. *Law & Policy*, *32*(3), 313-331.

Zhang, Y., He, D., & Sang, Y. (2013). Facebook as a platform for health information and communication: a case study of a diabetes group. *Journal of medical systems*, *37*(3), 9942.

Zimmerman, V. (2017, March 02). Do I Still Use the Daysy? Retrieved June 3, 2019, from https://www.youtube.com/watch?v=khheREDT5lY

Appendix

Interview Guide

Topics:

- Background and demographics
    - gathered via pre-interview questionnaire found at https://docs.google.com/forms/d/1nzF28dPRRvCskncK5WnFaeztoCYxmxK59A5ce3LRfgk/edit
- Influences and education
    - What was your general sex education experience at home and at school?
    - Did you learn about FABMs during any health education in school/at home?
    - Were you exposed to FABMs at any other period? Through what channels?
    - Have you used an app/device to practice FABM? Why or why not? For how long?
    - How did you learn to practice FABM?
- FABM
    - How long was it before you were comfortable relying on it for contraception?
    - Have you shared your use of FABM with your doctor, family, and/or friends?
- For Femtech users
    - What features of the app/device do you use to practice FABM?
    - Do you rely on it exclusively for contraception?
    - Are you tracking other data points or taking any notes in the app?
    - Have you used the app/device to plan a pregnancy before?
    - Do you plan to use it if/when you would like to get pregnant?
- Outcomes
    - What are your current attitudes towards pregnancy?

Interview Email

Dear ____,

Thank you for expressing interest in participating in an interview for this research project. Your time and consideration are much appreciated. Attached, you will find an information sheet outlining the basic purpose of this research along with logistical details. You will also find a consent form. If you are still interested in participating in this interview, please electronically sign the consent form and email it back to me at cassandra.gonzalez@wur.nl. Additionally, please send me the best times and dates for you to be interviewed. Interviews will take place throughout July and the first 2 weeks of August. They can take place during the week or on the weekends, whichever is most convenient for you. Once I receive your consent form and availability, I will send you a calendar invitation with an interview appointment and my Skype contact information.

For the interview, please make sure that you are able to be in a quiet, private space with a strong Wifi connection to ensure the quality of the recording as well as to give you privacy.

Interview Information Sheet

Research Project Title: Experiences and Practices Among Users of Fertility Awareness-Based Methods of Contraception

Researcher: Cassandra Gonzalez

About the project:

This research is seeking to understand the decision-making process as well as the practices of users of fertility awareness-based methods of contraception (FABMs).

This research will consist of an interview over Skype, lasting approximately 45 minutes, to discuss the participant's decision-making and practices in using FABMs. These interviews will be recorded using Skype's recording feature and transcribed by the researcher.

There are no known risks to participating in this research and all contributions will be kept confidential.

Taking part in the study is voluntary and you may choose not to take part or cease participation at any point before, during, or after the interview.

This research is part of a minor thesis towards an MSc. in Communication, Health, and Life Sciences at Wageningen University in the Netherlands.

Upon request, all participants may be provided with a copy of the final research product at the end of September 2019.

Interview Consent form

Research Project Title: Experiences and Practices Among Users of Fertility Awareness-Based Methods of Contraception

Researcher: Cassandra Gonzalez

Research Participant's Name:

The interview will take approximately 1 hour. I do not anticipate that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

Thank you for agreeing to be interviewed as part of the above research project. Ethical procedures for academic research require that interviewees explicitly agree to being interviewed and how the information contained in their interview will be used. This consent form is necessary for me to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation. Please read the accompanying information sheet and then electronically sign this form to certify that you approve the following:

- the interview will be recorded and a transcript will be produced
- the transcript of the interview will be analyzed by Cassandra as the research investigator
- access to the interview transcript will be limited to Cassandra and academic colleagues and researchers with whom she might collaborate as part of the research process
- any summary interview content, or direct quotations from the interview, that are made available through academic publication or other academic outlets will be anonymized so that you cannot be identified, and care will be taken to ensure that other information in the interview that could identify yourself is not revealed
- the actual recording will be kept until the final thesis has been turned in and graded and will be deleted after October 1, 2019
- any variation of the conditions above will only occur with your further explicit approval

By signing this form, I agree that:

- I am voluntarily taking part in this project. I understand that I don't have to take part, and I can stop the interview at any time;
- The transcribed interview or extracts from it may be used as described above;
- I have read the information sheet;
- I don't expect to receive any benefit or payment for my participation;

- I can request a copy of the transcript of my interview and may make edits I feel necessary to ensure the effectiveness of any agreement made about confidentiality;
- I have been able to ask any questions I might have, and I understand that I am free to contact the researcher with any questions I may have in the future.

_____
Printed Name

_____ _____
Participant's Signature Date

_____ _____
Researcher's Signature Date

Contact Information

Researcher: Cassandra Gonzalez
Email: cassandra.gonzalez@wur.nl
Skype: cassandra.a.gonzalez