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Fertility Awareness Based Methods (FABMs): Evaluating and Promoting Female Interest for Purposes of Health Monitoring and Family Planning

Amylynn Smith

University of Arkansas, Fayetteville

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Fertility Awareness Based Methods (FABMs): Evaluating and Promoting Female Interest for
Purposes of Health Monitoring and Family Planning

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Community Health Promotion

by

Amylynn Smith
University of South Florida
Bachelors of Science in Exceptional Student Education, 2009

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University of Arkansas

This thesis is approved for recommendation to the Graduate Council.

Heather Blunt-Vinti, PhD
Committee Chair

Leah Henry, PhD
Committee Member

Kristen Jozkowski, PhD
Committee Member

Abstract

Natural or fertility awareness-based methods (FABMs) help users monitor, interpret, and systematically chart female biological markers. FABMs are used as family planning methods and sometimes as reproductive health monitoring methods. The American College of Obstetricians and Gynecologists (ACOG) encourages medical professionals to use female reproductive cycle patterns, ‘the female fifth-vital sign’, as a means of improving the diagnosis and treatment of reproductive health diseases, disorders, and conditions. Patients need to have accurate knowledge of healthy and unhealthy cycle patterns. The general public does not have a sufficient level of fertility health knowledge. This study examined whether females that are interested and not interested in using FABMs for health monitoring and family planning differ in their mean reproductive health knowledge scores (average of six knowledge questions), and whether certain demographic characteristics or having been prescribed the hormonal birth control pill for reproductive health abnormalities predict female interest in using FABMs for health monitoring or family planning. A 52-item survey was administered to a national sample of 665 reproductive age women in March 2018. An independent samples t-test and two binary regression models were run using the Statistical Package for Social Sciences software (SPSS). Of the total 665 female participants 279 (41.9%) females reported not being interested in using FABMs for family planning and 386 (58%) females are interested. Females who were not interested in using FABMs for health monitoring ($n=352$) had a statistically significantly ($p<.05$) higher mean knowledge scores (73.6%) compared with the knowledge scores (68.8%) of females who were interested ($n=237$). Similarly, females who were not interested in using FABMs for family planning ($n=279$) had a statistically significantly ($p<.05$) higher mean knowledge scores (75.1%) compared with the knowledge scores (69%) of females ($n= 386$) who were interested.

No demographic characteristics nor having been prescribed the hormonal birth control pill for reproductive health abnormalities significantly predicted female interest in using FABMs for health monitoring or family planning. These findings suggest that interest in FABMs for family planning or health monitoring is not isolated to a specific demographic of reproductive age women.

Keywords: reproductive health, fertility awareness-based methods, infertility

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Dedication

This thesis is dedicated to my family!

Table of Contents

Introduction.....	1
Family Planning.....	3
Avoiding Pregnancy.....	3
Achieving Pregnancy.....	5
Reproductive Health.....	6
Female Reproductive Health Knowledge.....	9
Fertility Awareness Based Methods (FABMs).....	10
Five Primary Types.....	11
Calendar and Lactation Methods.....	12
Cervical Fluid Methods.....	13
Sympto-Thermal and Sympto-Hormonal Methods.....	13
Family Planning.....	14
Avoiding Pregnancy.....	15
Achieving Pregnancy.....	16
Female Reproductive Health.....	17
Current Study.....	18
Methods.....	20
Participants & Procedures.....	20
Measures.....	22
Data Analysis.....	26
Research Question One.....	28
Research Question Two.....	28

Results.....	29
Discussion.....	31
Limitations.....	33
Future Research and Implications for Public Health.....	34
Conclusion.....	35
References.....	37
Appendices	47

Introduction

Evidence suggests that one in 10 women worldwide are affected by endometriosis which can lead to infertility (Research priorities in endometriosis published, 2009). In fact, data from the 2002 National Survey of Family Growth (NSFG) conducted by the Centers for Disease Control and Prevention (CDC) estimated 7.3 million American women aged 15–44 years had impaired fecundity (i.e., experienced difficulties conceiving or bringing a pregnancy to term during their lifetime), with 11.5% of them receiving infertility services (Chandra, Martinez, Mosher, Abma, & Jones, 2005). In addition, some women of reproductive age suffer from a variety of chronic and acute reproductive health problems, including: infertility, endometriosis, polycystic ovarian disease, premenstrual syndrome, uterine fibroids, heavy or painful periods, and hypothalamic amenorrhea (Boyle, de Groot, Andralojc, & Parnell, 2018; Common Reproductive Health Concerns for Women, 2018; Nnoaham et al., 2011; Vigil, Ceric, Cortés, & Klaus, 2006).

The United States' public health initiative, Healthy People 2020, identified the reception of reproductive health services as a leading health indicator for reproductive and sexual health attainment (U.S. Department of Health and Human Services (USDHHS), 2010). The American College of Obstetricians and Gynecologists (ACOG) encourages patients, as early as adolescents, and primary care clinicians to discuss reproductive health patterns at every patient visit in an effort to improve the diagnosis and treatment of reproductive health problems (American College of Obstetricians and Gynecologists, 2015). However, research suggests that 40% of American women do not know about or understand their fertility cycles, and are therefore ill-equipped to monitor their reproductive health patterns (ACOG, 2015; Lundsberg, Pal, Garipey, Xu, Chu, & Illuzzi, 2014). In addition, clinicians continue to prescribe the

hormonal birth control pill as the first-line of treatment for symptoms related to a variety of reproductive health problems (Legro et al., 2013). Prescribing hormonal birth control contradicts ACOG's recommendation to have females monitor their cycle patterns and receive treatments that correct underlying reproductive health problems, not simply manage symptoms (ACOG, 2015).

On the other hand, natural or fertility awareness-based methods (FABMs) are comprehensive reproductive health methods that enable women to monitor, manage, and maintain their reproductive health as well as plan their family (Boyle et al., 2018; Hilgers, 2004; Institute for Reproductive Health, n.d.; Smoley, & Robinson, 2012; World Health Organization, 1995). FABMs are evidence based methods that have no side effects, and are free of hormonal therapies, injections, and implants (Manhart, Duane, Lind, Sinai, & Golden-Tevald, 2013; Urrutia et al., 2018). Certain FABM educational programs provide direct instruction to users providing them with necessary knowledge about biological markers, as well as have the skills to follow evidence based protocols for tracking and charting reproductive health patterns (Arevalo, Jennings, Nikula, & Sinai, 2004; Arevalo, Jennings, & Sinai, 2002; Bhargava, Bhatia, Ramachandran, Rohatgi, & Sinha, 1996; Fehring, Schneider, Raviele, Rodriguez, & Pruszynski, 2013; Frank-Herrmann et al., 2007; Howard, & Stanford, 1999; Peterson et al., 2000). Research suggests that charting with a FABM produces an effective diagnostic tool for identifying and treating underlying causes of reproductive health problems, including infertility (Boyle et al., 2018; Hilgers, 2004; Vigil et al., 2006). In addition, FABMs are effective and comprehensive family planning methods, helping couples to avoid and achieve pregnancy (Boyle et al., 2018; Manhart et al., 2013; Urrutia et al., 2018). Therefore, women can potentially use FABMs to access the full scope of reproductive health services: family planning, health monitoring, and

knowledge about healthy menstrual cycle patterns (Boyle et al., 2018; Hilgers, T.W. 2004; Vigil et al., 2006). However, we do not yet know if females are interested in using FABMs for health monitoring or if females are still interested in using them for family planning.

Family Planning

Beginning at the onset of puberty, healthy males are always fertile, constantly producing sperm (Hilgers, 2002). Females are mostly infertile during their reproductive years (Duane, 2019; Hilgers, 2002). A female's reproductive years range from 12 to 51 years of age (ACOG, 2015). Over the course of the average 21-35 day cycle a female ovulates once, typically releasing one egg, with an average fertile window of 6 days (Briden, 2017; Wilcox, Weinberg & Baird, 1995). Given the physiological nature of the male and female reproductive systems an inclusive discussion of family planning must address the full scope of a couples' reproductive capacity to either avoid or achieve pregnancy.

Avoiding Pregnancy

There are 6.1 million pregnancies each year in the United States; 45% of those are unplanned (Finer & Zolna, 2016). Unplanned pregnancy rates are higher for Black and Hispanic women, 18-24 years old, partners that cohabit, those with an income below the poverty line, and those who have not completed high school (Finer & Zolna, 2016). An inability to access family planning services also contributes to unplanned pregnancy rates (Chandra et al., 2005; Chandra-Mouli, McCarraher, Philips, Williamson, & Hainsworth, 2014). Barriers to access include cost, service office hours and locations, and a lack of knowledge of available resources and services in communities (Guttmacher Institute, 2014b). Unplanned pregnancy is associated with negative maternal and infant health outcomes and an increase in cost to the general public (Child Trends,

2007; D'Angelo, Gilbert, Rochat, Santelli, & Herold, 2004; Guttmacher Institute, 2015; Tsui, McDonald-Mosley, & Burke, 2010).

Healthy men and women have about a 30% chance of achieving a pregnancy resulting from random acts of sexual intercourse during a single female reproductive cycle, with an 82% chance of conception over the course of 12-months (Wilcox et al., 1995; Zinaman, Clegg, Brown, O'Connor, & Selevan, 1996). The most effective method to avoid unplanned pregnancy is to abstain from all acts of sexual intercourse (American Academy of Pediatrics, 2016; "How effective are abstinence and outercourse?" 2019; "Sexual Risk Behaviors," 2018). 1.5% of sexually active men and women practice periodic abstinence to avoid pregnancy (NCHS National Survey of Family Growth, 2018). Most sexually active men and women use pharmaceutical birth control, sterilization procedures, or barrier methods to avoid pregnancy (NCHS National Survey of Family Growth, 2018). Pharmaceutical birth control or barrier methods mitigate the chances of an unplanned pregnancy while remaining sexually active (Reproductive Health: Contraception, 2018). Nearly all sexually active females report using a pharmaceutical birth control or barrier method during their lifetime (Daniels, Mosher & Jones, 2013). In the United States the most common methods of birth control are female sterilization (18.6%), the oral birth control pill (12.6%), long-acting reversible contraceptives (LARCs) (10.3%), and male condoms (8.7%). Typical use method effectiveness rates for avoiding pregnancy range from 99% (hormonal implant-LARC) to 87% (male condom) (Reproductive Health: Contraception, 2018). Despite high effectiveness rates, 47% of women who have used at least one method of birth control will discontinue use due to dissatisfaction with the method (Daniels et al., 2013). The most commonly cited reason for discontinuation of hormonal methods, such as the birth control pill (64% discontinuation rate) and some LARCs, is side

effects (Daniels et al., 2013). Therefore, females that are able to access family planning services may not find a method with which they are satisfied. In addition, a variety of factors influence a woman's choice of birth control including: birth control options available, cost of method, sexual partnership characteristics, how frequently they engage in sexual intercourse, religious affiliation, pregnancy and method related experiences (having had an unplanned pregnancy while using a birth control pill in the past), and attitudes toward use of the method (Daniels et al., 2013; Guttmacher Institute, 2014a; Wiesman, Lehman, Legro, Velott, & Chuang, 2015). Therefore, helping women and couples find, access, and effectively use methods to avoid pregnancy that are free of side-effects, are cost effective, and address other influencing factors will help couples achieve planned pregnancies and avoid unplanned pregnancy. Eventually leading to improved health, social, and economic outcomes for parents and children (Cheng, Schwarz, Douglas, & Horon, 2008; Child Trends, 2007; D'Angelo, Gilbert, Rochat, Santelli, & Herold, 2004; Finer, & Zolna, 2016; Guttmacher Institute, 2015; Kost, Landry, & Darroch, 1998; Tsui et al., 2010).

Achieving Pregnancy

Conception requires the presence of healthy male sperm, a healthy female egg, and the presence of high quality female cervical fluid (Hilgers, 2002; Odeblad, 1994). When a healthy man and woman engage in random acts of sexual intercourse they have a 30 percent chance of conceiving a child during each reproductive cycle (Wilcox et al., 1995; Zinaman et al., 1996). The majority of men and women report that parenthood is a goal for their future (Hammarberg et al., 2017a; Prior, Lew, Hammarberg, & Johnson, 2018; Sorensen et al., 2016). On average men and women desire or expect to have two or more children during their reproductive life (National Center for Health Statistics, 2016; Prior et al., 2018). Health factors that predict an increased or

decreased likelihood of a couple achieving a pregnancy include: age, weight (overweight or underweight), diet, alcohol consumption, stress, level of caffeine intake, smoking, presence of reproductive disease, and sexual health history (Centers for Disease Control and Prevention, 2014). Research suggests the general public is not knowledgeable about these factors and research suggests that more people are starting families later in life (Bunting et al., 2013; Hammarberg, Collins, Holden, Young, & McLachlan, 2017a; Hammarberg et al., 2017b; Houston, Abraham, Huang, & D'Angelo, 2006; Lundsberg et al., 2014; Peterson et al., 2012). Additionally, male and female fertility experiences in the United States differ when considering factors such as: level of educational level, household income in relation to the federal poverty line, and Hispanic origin and race (National Center for Health Statistics, 2018b).

Reproductive Health

Reproductive health refers to the diseases, disorders, and conditions that affect the functioning of the male or female reproductive system at every stage of life (Reproductive Health, 2018). Examples of female reproductive diseases are endometriosis, polycystic ovarian disease (PCOS), uterine fibroids, gynecologic cancers (cervical, uterine, ovarian), sexually transmitted infections (STI), premenstrual syndrome (PMS), and ovarian dysfunction (Common Reproductive Health Concerns for Women, 2018; Houston, Abraham, Huang, & D'Angelo, 2006; Vigil et al., 2006). Reproductive diseases, disorders, and conditions can result in impaired fecundity, the inability to conceive or carry a pregnancy to term and have a live birth (Common Reproductive Health Concerns for Women, 2018). At least 6% women are unable to achieve a pregnancy after engaging in sexual intercourse for 12 months (Boyle et al., 2018). While almost 15% of women will experience a miscarriage during the first trimester of pregnancy (Cohain, Buxbaum, & Mankuta, 2017).

The average female enters menarche, onset of menstruation, around the age of 12 or 13 (ACOG, 2015). However, a female begins the process of reproductive maturation as an embryo (Vigil, Lyon, Flores, Rioseco, & Serrano, 2017). Female reproductive functioning begins in the brain with communication between the hypothalamus and pituitary gland, the HPO axis (Popat, Prodanov, Calis, & Nelson, 2009). Evidence suggests that it takes years for the HPO axis to mature (Mansfield & Emans, 1989). Establishing a healthy HPO axis and regular cycle patterns is associated with an adolescent's body weight, diet, gene structure, the presence of synthetic or artificial hormones, as well as environmental factors (Briden, 2017; Damstra, 2002; Mansfield & Emans, 1989; Popat et al., 2009; Vandenberg et al., 2012; Vigil et al., 2017; World Health Organization, 2011). During this time, it is normal for adolescent females to experience irregular cycle patterns (Mansfield & Emans, 1989). When cycle irregularity is not attributed to a maturing HPO axis, but an other anatomic or endocrine problem, underlying reproductive diseases, disorders, and conditions should be medically investigated (Mansfield & Emans, 1984; Popat et al., 2009; Vigil et al., 2017).

As much as 75% of adolescent females, ages 10-19 years old, report problems with menstruation as their primary reason for doctor's visits (Slap, 2003). In December 2015, ACOG, endorsed by The American Academy of Pediatrics, published a committee opinion encouraging physicians to inquire about their adolescent patients' menstrual pattern at every appointment (ACOG, 2015). Tracking cycle patterns during adolescence, dubbed tracking the female 'fifth vital sign', can help clinicians identify and treat a variety of female reproductive problems (ACOG, 2015). This suggestion is negated when physicians use the hormonal birth control pill as the first-line of treatment for reproductive problems (Legro et al., 2013). In fact, one in three women are reportedly taking the birth control pill to regulate their menstrual cycle (as cited in

Lambert, 2015). However, when females track their natural menstrual cycle patterns using cooperative and corrective treatments underlying causes of symptoms can be addressed (ACOG, 2015; Brown, 2011; Mansfield & Emans, 1984; Popat et al., 2008; Vigil et al., 2006). Early diagnosis and treatment of various reproductive problems may prevent infertility and impaired fecundity in the later stages of a woman's reproductive years (Centers for Disease Control and Prevention, 2014). Currently, an accurate diagnosis of certain reproductive disorders can take up to 11 years, and can be associated with an inept production of natural female hormones (Briden, 2017; Ding et al., 2017; Goodman et al., 2015; Rogers et al., 2009; Sinaii, Cleary, Ballweg, Nieman, & Stratton, 2002). Research suggests there are many short and long-term health benefits associated with the natural production and fluctuation of ovarian hormones, estradiol and progesterone (Briden, 2017; Manuvais-Jarvis, Clegg, & Hevener, 2013; Mecangi et al., 2014; Mohammed et al., 2015; ; Mong et al., 2011; Prior, 2014; Sathi, Kalyan, Hitchcock, Pudek, & Prior, 2013; Schussler et al., 2008; Smith et al., 2014). Therefore, earlier diagnosis and treatment of reproductive diseases may allow females to experience the health benefits associated with natural progesterone and estrogen (Briden, 2017; Manuvais-Jarvis et al., 2013; Mecangi et al., 2014; Mohammed et al., 2015; ; Mong et al., 2011; Prior, 2014; Sathi et al., 2013; Schussler et al., 2008; Smith et al., 2014)

Female Reproductive Health Knowledge

Reproductive cycle phases are distinct from one another, yet work systematically to orchestrate a functioning reproductive cycle (Briden, 2017; Hilgers, 2002; Vigil et al., 2017). The fluctuation of hormones, beginning in the female brain and endocrine system, is essential for the overall health and function of the reproductive cycle (Popat et al., 2009). The follicular phase begins with the first day of menstruation and continues until ovulation (Briden, 2017; Fehring, Schneider, & Raviele, 2006). Ovulation happens once each cycle; however, the process of follicular maturation leading to ovulation takes 100 days (Briden, 2017). A healthy ovulatory event precedes a healthy luteal phase, 9-17 days in length, and a healthy menses (Briden, 2017; Fehring, Schneider & Raviele, 2006; Hilgers, 2002). Sufficient knowledge about each phase of the cycle, not just ovulation or menstruation, constitutes adequate reproductive health knowledge. The ability to identify healthy and unhealthy cycle patterns is an important skill for females seeking care for reproductive cycle problems (ACOG, 2015)

Findings from previous research suggests the general public, practicing medical professionals, and medical trainees, are lacking knowledge of fertility health topics in different ways (Kudesia, Chernyak, & McAvey, 2017; Lampic, Svanberg, Karlstrom, & Tyden, 2006; Lundsberg et al., 2014; Peterson et al., 2012; Prior et al., 2018; Slap, 2003; Sørensen et al., 2016; Stern, Larsson, Kristiansson, & Tyden, 2013). These studies primarily explored the amount of knowledge participants had about ovulation, family planning intentions, assisted reproductive technologies, physiological and life-style factors impacting the ability to achieve pregnancy, and menstruation (Kudesia et al., 2017; Lampic et al., 2006; Lundsberg et al., 2014; Peterson et al., 2012; Prior et al., 2018; Slap, 2003; Sorensen et al., 2016; Stern et al., 2013). While other studies examined participant knowledge, attitudes, and beliefs regarding ovulation and

menstruation they failed to investigate participants' knowledge of healthy reproductive cycle patterns (e.g., "How long is a healthy menses?", or "What is a healthy cycle length, in days?") (Houston et al., 2006; Lundsberg et al., 2014; Slap, 2003). Knowledge and understanding of healthy reproductive cycle patterns can help patients identify abnormalities and seek a diagnosis or receive treatment for a reproductive disease, disorder, or condition (ACOG, 2015; Boyle et al., 2018; Hilgers, 2004; Popat et al., 2009; Vigil et al., 2006).

Having knowledge about healthy reproductive cycle patterns is important for the general and medical populations (ACOG, 2015). Research suggests that males and females want to know and understand their fertility health (Hampton, Mazza, & Newton, 2013; Lundsberg et al., 2014). However, one study found that 40% of women aged 18-40 were not knowledgeable about when ovulation occurs or the characteristics of cervical fluid secretions that are observable during that cycle phase (Lundsberg et al., 2014). The same study also reported that 40% of women were unaware that females do not produce new eggs during their reproductive life (Lundsberg et al., 2014). Although, Lundsberg et al., (2014) found that the majority of women (70%) believe that females should consider their reproductive health well before they are ready to conceive.

Fertility Awareness Based Methods (FABMs)

Natural or fertility awareness-based methods (FABMs) refer to family planning methods that allow users to identify various external biological markers that are indicative of their fertility health (Odeblad, 1994; Pallone & Bergus, 2009; Pyper, 1997; Smoley & Robinson, 2012). External biological markers can include: basal body temperature, urinary metabolites, and cervical fluid secretions (Odeblad, 1994; Su et al., 2017). All FABMs are free of artificial hormonal therapies, injections, implants, and have no side effects (Manhart et al., 2013; Urrutia

et al., 2018). Additionally, some FABMs can help users achieve pregnancy and monitor their reproductive health (from menarche to menopause) (Boyle et al., 2018; Hilgers 2004; Vigil et al., 2006). Thus, FABMs can be used to meet a wide range of female reproductive health needs: family planning (achieving or avoiding) and monitoring reproductive health. Despite the utility of modern FABMs, and the research suggesting women are interested in using FABMs for family planning, it is estimated that only 1% to 3% of reproductive age females in the United States are currently using a FABM (as cited in Pallone & Bergus, 2009; Stanford, Lemaire, & Thurman, 1998). These estimates only reflect rates of FABM use for family planning. There is no information about the percent of females that are using a FABM for health monitoring. FABMs are family planning options suggested for use by the World Health Organization (WHO), American College of Obstetricians and Gynecologists (ACOG), Centers for Disease Control and Prevention (CDC) and most recently by the Food and Drug Administration (FDA) (ACOG, 2019; “Contraception,” 2018; “FDA Allows Marketing of First,” 2018; World Health Organization, 1988).

Five Primary Types

FABMs are often classified based on their underlying mechanism(s) of action (Smoley & Robinson, 2012). The five primary FABM categories are calendar methods, lactation methods, cervical fluid methods, sympto-thermal methods, or sympto-hormonal methods (Fehring et al., 2013; Smoley & Robinson, 2012). Some FABMs can be used to help couples achieve pregnancy; however, they are commonly discussed as methods to avoid pregnancy (Boyle, 2017; Hilgers, 2004; Manhart et al., 2013; Urrutia et al, 2018). Effectiveness rates for avoiding pregnancy and a brief explanation of specific FABMs will now be explored in more detail.

Calendar and Lactation Methods.

The Standard Days Method® (SDM), is an effective, inexpensive and modern calendar-based family planning method (Arevalo et al., 2002). Developed by Georgetown University's Institute for Reproductive Health (IRH), SDM helps women avoid pregnancy by using a color-coded string of beads, CycleBeads®, to track when they are menstruating and when they are most likely to be fertile (Sinai, Jennings & Arévalo, 2004). Users do not monitor external biological markers. This modern calendar based method is for women with regular length cycles, ranging from 26-32 days which encompasses 80% of female cycles (Arevalo et al., 2002; Sinai, Jennings & Arévalo, 2004). With perfect use, 5% of women will get pregnant after one year (Arevalo et al., 2002). With typical use, 12% of women will experience an unplanned pregnancy after one year (Arevalo et al., 2002).

The Lactational Amenorrhea Method (LAM) is based on the scientific understanding of the natural suppressive effect that exclusive breastfeeding has on female ovulation for up to six months postpartum (Labbock et al., 1997). During breastfeeding, the nipple stimulation that results from infant suckling interferes with hormone communication between the brain and ovary which suppresses ovulation (Chao, 1987). The LAM protocol is highly effective at helping postpartum mothers avoid pregnancy if they have not had a return of menses, are exclusively and frequently breastfeeding (daytime and nighttime), and their infant is less than 6 months old (Labbock et al., 1997). Postpartum mothers make no observations of biological markers when using LAM. The perfect use rate for avoiding pregnant is 99% and the typical use rate is 98% (Labbock et al., 1997).

Cervical Fluid Methods.

Three FABM mucus methods will be discussed here, The Billings Ovulation Method (Billings Method), The Creighton Model FertilityCare System (Creighton Model), and the Two Day Method. Cervical fluid method users identify their ovulatory phase by making external observations of fluid secretions present at the vulva (Fehring, 2002; Odeblad, 1994). Daily tracking of cervical fluid informs users about their reproductive cycle phase (fertile or infertile) and health (Fehring, 2002; Hilgers, 2004; Odeblad, 1994; Vigil et al., 2017). Protocols have been developed for Billings and Creighton Model users with various cycle patterns (irregular, regular, anovulatory, post-partum, etc...). Perfect use pregnancy rates among the aforementioned methods range from 0.1 to 3.5 per 100 women years (Hilgers & Stanford, 1998; Urrutia et al., 2018). Use effective pregnancy rates range from 3.2 to 33.6 per 100 women years (Hilgers & Stanford, 1998; Urrutia et al., 2018).

Sympto-Thermal and Sympto-Hormonal Methods.

Once a female ovulates the rise in progesterone has a thermogenic effect on her basal body temperature raising it by 0.5-1.0-degree Fahrenheit for the duration of the luteal phase (Su et al., 2017). Tracking basal body temperature is a retrospective indicator that ovulation has occurred. Method users take their basal body temperature at the same time every day and track cervical fluid secretions, count calendar days, or feel for the positioning of the cervix (Smoley & Robinson, 2012; Urrutia et al., 2018). Typical use pregnancy probability rates range from 1.8-33 unplanned pregnancies per 100 women years, with perfect use pregnancy rates ranging from 0.4-12 unplanned pregnancies per 100 women years (Urrutia et al., 2018).

Approximately 35-44 hours prior to ovulation a female will experience a rise in her luteinizing hormone level (LH level) with a noticeable surge 10-12 hours preceding ovulation

(Cahill, Wardle, Harlow, & Hull, 1998; Hoff, Quigley, & Yen, 1983; Su et al., 2017). Users of a sympto-hormonal method track daily urinary LH levels using a digital hormone reader, or a digital reader and cervical fluid observations (Fehring, Schneider, Raviele, & Barron, 2007). Typical use pregnancy probability rates range from 2-25.6 unplanned pregnancies per 100 women years, with perfect use pregnancy rates ranging from 0-12.1 unplanned pregnancies per 100 women years (Urrutia, 2018). Some researchers propose that the use of a sympto-hormonal method is not always the most efficacious application of the underlying physiological science (Qublan et al., 2006; Su et al., 2017).

Family Planning

Females and their partners use FABMs to inform their choice of when they will engage in sexual intercourse based on their family planning goals (Manhart et al., 2013; Urrutia et al., 2018). Evidence suggests that typical use failure rates for avoiding pregnancy are comparable between some FABMs and pharmaceutical or barrier methods (“Contraception,” 2018). Typical use pregnancy rates for methods such as the hormonal shot, oral birth control pill, the patch, male or female condoms, and spermicides range from 4% to 21% (“Contraception,” 2018). Typical use pregnancy rates per 100 woman years for FABMs range from 2-23% (Urrutia et al., 2018). FABMs can help users identify days when they are fertile in order to target sexual intercourse when they want to achieve a pregnancy (Wilcox et al., 1995). A couple’s time to pregnancy (TTP) is the number of female reproductive cycles that pass where acts of sexual intercourse take place and pregnancy is not achieved. TTP can be lessened when sexual intercourse occurs on days associated with a high probability of conception taking place (Stanford & Dunson, 2007).

Avoiding Pregnancy.

Based on recent evidence found from a systematic review of the literature, perfect use pregnancy probability rates for FABMs range from 0-12.1, and typical use pregnancy rates range from 0.4 to 33.6 per 100 woman-years (Urrutia et al., 2018). Efficacious use of FABMs to avoid pregnancy stipulates that users abstain from sexual intercourse during the fertile window (Howard & Stanford, 1999; Manhart et al., 2013). Furthermore, users experience greater degrees of effectiveness when avoiding pregnancy when they learn method protocols from trained educators (Arevalo et al., 2004; Arevalo et al., 2002; Bhargava et al., 1996; Hilgers & Stanford, 1998; Howard, & Stanford, 1999; Fehring et al., 2013; Frank-Herrmann et al., 2007; Peterson et al., 2000; Sinai, Jennings & Arévalo, 2004). The range of reported typical use and perfect use effectiveness rates reflects 1) different study designs 2) participant demographic characteristics 3) the study's timeline or approach used for determining participant's pregnancy intentionality 4) study participants documented the use of barrier methods during the fertile window and 5) the mechanism(s) of action on which the method is based (Manhart et al., 2013; Urrutia et al., 2018). Further discussion of these topics is not pertinent to the focus of this paper; however, these issues are addressed in greater detail by scholars in published literature (Frank-Herrmann et al., 2007; Stanford & Dunson, 2007). While FABMs are commonly referenced as methods used to avoid pregnancy, some FABMs have evidence supporting their utility in helping reproductively healthy and unhealthy partners achieve pregnancy (Boyle et al., 2018; Gnoth, Godehardt, Godehardt, Frank-Herrmann, & Freundl, 2003; Stanford, & Dunson, 2007; Tham, Schliep, & Stanford, 2012).

Achieving Pregnancy.

According to Wilcox, Weinberg, and Baird (1995), the majority of pregnancies are achieved when sexual intercourse takes place within a six-day window, ending with the day of ovulation. In fact, evidence suggests that the optimal time for a couple to engage in sexual intercourse and have the highest likelihood of a single act resulting in a pregnancy is two days prior to ovulation (Tiplady, Jones, Campbell, Johnson, & Ledger, 2013). Accurate identification and interpretation of cervical fluid secretions is an effective approach for females seeking to identify their six-day window of fertility (Odeblad, 1997). However, research suggests the general public does not have this basic fertility knowledge (Kudesia et al., 2017; Lundsberg et al., 2014). Most evidence based FABMs require that females and their partners receive direct and explicit instruction about biological markers, observational routines, and method specific tracking protocols from a trained FABM educator in order to effectively learn method protocols (Arevalo et al., 2004; Bhargava et al., 1996; Fehring et al., 2013; Hilgers & Stanford, 1998; Labbok et al., 1997; Sinai et al., 2004). These educational phases address a variety of fertility knowledge topics (Arevalo et al., 2004; Bhargava et al., 1996; Fehring et al., 2013; Hilgers & Stanford, 1998; Labbok et al., 1997; Sinai et al., 2004). Furthermore, the knowledge and understanding gained from working with FABM educators can equip method users with the necessary skills to track their cycle health, and to avoid or achieve pregnancy (Boyle et al., 2018; Hilgers, 2004; Vigil et al., 2017; Vigil et al., 2006).

Female Reproductive Health

FABMs can be used by females throughout their reproductive life (Arevalo et al., 2004; Arevalo et al., 2002; Bhargava et al., 1996; Briden, 2018; Chao, 1987; Fehring et al., 2007; Golden-Teveld, 2013; Hilgers, 2004; Tham et al., 2012; Vigil et al., 2006). Cervical fluid methods work for females with varying cycle patterns: irregular, regular, anovulatory, premenopausal, postpartum, and breastfeeding (Bhargava et al., 1996; Chao, 1987; Fehring, Barron, & Schneider, 2005; Hilgers, 2004). Evidence suggests that charting each phase of the female reproductive cycle using cervical fluid methods can address underlying reproductive diseases, disorders, and conditions (Boyle et al., 2018; Hilgers, 2004; Vigil et al., 2017; Vigil et al., 2006). Charting is a diagnostic tool that allows trained clinicians to assess a patient's reproductive health and use cooperative medical and surgical treatments to address and attempt to correct underlying causes of reproductive abnormalities (Tham et al., 2012; Stanford, Parnell, & Boyle et al., 2008; Vigil et al., 2017). Furthermore, ACOG recommends females begin to track and chart their cycle patterns during adolescents (ACOG, 2015). Charting during adolescence may help address the underlying causes of menstrual disorders that affect 75% of young female patients (ACOG, 2015; Slap, 2003).

Restorative Reproductive Medicine (RRM) refers to reproductive medicine where by medical and surgical techniques are used to cooperatively restore reproductive health and ovarian function (Boyle et al., 2018). Clinicians practicing RRM use patient charting as a diagnostic tool to assess and treat underlying causes of reproductive diseases that can lead to impaired fecundity (Boyle et al., 2018; Common Reproductive Health Concerns for Women, 2018; Hilgers, 2004; Stanford et al., 2008; Tham et al., 2012; Vigil et al., 2006). Medical practices that establish healthy reproductive cycle patterns by restoring ovulatory function and the fluctuation of ovarian

hormones can lead to improved female health, pregnancy rates, and live birth outcomes (ACOG, 2015; Boyle et al., 2017; Briden, 2017; Schüssler et al., 2008; Hilgers 2004; Popat et al., 2009; Prior, 2014; Vigil et al., 2017).

In fact, one study examined where RRM treatments were used to correct underlying causes of impaired fecundity in couples who had not received IVF treatments and had struggled for an average of 5.6 years to have a child reported live birth rates of 61.5% (Stanford et al., 2008). More recent evidence suggests that for females of advanced maternal age (35-38 years old) and undergone multiple failed attempts of IVF treatment, they had a successful live birth rate of 37.5% with RRM (Boyle et al., 2018). The same study reported that women over 40 who had undergone multiple failed attempts of IVF treatment, had a 27.4% live birth rate (Boyle et al., 2018). Compared with IVF, charting the female cycle with a FABM in conjunction with restorative reproductive healthcare results in more favorable outcomes for mothers and infants with potential economic savings to the health care system (Boyle et al., 2008; Centers for Disease Control and Prevention, 2018). However, only 3-6% of medical professionals are knowledge about FABMs and there applications to women's reproductive health (Stanford, Thurman & Lemaire, 1999).

Current Study

In 1998 and 2006 respectively, two separate cross-sectional survey studies reported female interest in using natural family planning (NFP) to avoid or achieve pregnancy in isolated populations in Missouri and Arizona (Leonard, Chavira, Coonrod, Hart, & Bay, 2006; Stanford et al., 1998). These two studies suggested that a percentage of females are interested in using NFP methods for family planning (Leonard et al., 2006; Stanford et al., 1998). In 1998, 22.5% of female respondents expressed an interest in using a NFP method to avoid a pregnancy, and

37.4% were interested in using NFP to achieve a pregnancy (Stanford et al., 1998). In 2006, 61% of females said they would be 'likely' or 'very likely' to use a NFP method to avoid a pregnancy, and 50% said they would use NFP to try to achieve a pregnancy (Leonard et al., 2006). Leonard et al., (2006) and Stanford et al., (1998) used different survey instruments to measure females' interest in FABMs in two different populations of females.

These previously conducted surveys (1998 and 2006) are the most recent data available describing female's interest in using NFP, and suffered from limitations. For example, the 1998 study collected data from 484 potentially fertile women via mail-based surveys by randomly selected driver's license renewal records in Missouri, between 1991 and 1992 (Stanford et al., 1998). The 2006 study included 357 women, 82% of which were Hispanic, and collected survey responses from women of reproductive age (18 to 44) waiting for a medical appointment at one hospital system in Phoenix, AZ (Leonard et al., 2006). Studies limited by geographic location and social indicators (e.g., having driver's license) limit the conclusions that can be made (Leonard et al., 2006; Stanford et al., 1998). In light of recent research suggesting the utility of FABMs in women's healthcare it is appropriate to ask females if they are interested in using FABMs for family planning and health monitoring (Boyle et al., 2018; Hilgers, 2004; Vigil et al., 2017).

Using data collected from a national survey of reproductive age women, 18-55 years old in spring 2018, this study examined whether females were interested or not interested in using FABMS for family planning or health monitoring. Previous studies found that pregnancy history, previous use of FABMs, future intention to have children and other factors predicted females interest in using FABMs for family planning (Leonard et al., 2006; Stanford et al., 1998). This study explored whether having been prescribed the hormonal birth control pill for

reproductive health abnormalities or certain demographic characteristics (age, race/ethnicity, marital/relationship status, religious affiliation, level of education, annual income, and health insurance status) or predicted females interest in using FABMs for health monitoring or family planning. In contrast to previous research on FABM interest, this study also examined the difference in reproductive health knowledge between females that reported being interested and not interested in using FABMs for health monitoring and family planning. Exploring knowledge score differences between interested and not interested females was predicted to be helpful the future planning of FABM public health programming. Thus, female interest in FABMs was examined by asking two research questions, 1) Is there a difference in the mean reproductive health knowledge score between females that are interested in using FABMs for health monitoring and family planning and females that are not interested in using FABMs for health monitoring and family planning? and 2) Does having been prescribed the hormonal birth control pill for reproductive health abnormalities and certain demographic characteristics predict females' interest in using FABMs for health monitoring or family planning?

Methods

Participants & Procedures

A national sample of 665 women of reproductive age, 18-55, completed an online survey between March 4, 2018 and March 11, 2018. The survey was administered by Qualtrics Online Survey Company. Qualtrics elicited incentivized participation from their national pool of participants who met specific eligibility criteria. Eligibility criteria included being biologically female, between the ages of 18-55, be potentially fertile (i.e., having not had a hysterectomy, oophorectomy, or been sterilized, and having not yet entered menopause), and be currently or planning to engage in vaginal-penile sexual intercourse with male partners only or both male and

female partners. Participants who indicated that they did not plan to ever engage in vaginal-penile sexual intercourse or only engage in sexual intercourse with female partners were not prompted to complete the final section of the survey about family planning. Participants read a consent clause prior to completing the survey that stated by beginning the survey they were consenting to participate. All survey responses were anonymous and participation in the study was voluntary. This study received approval from the Institutional Review Board (IRB) at the University of Arkansas prior to collecting data (see Appendix C).

In total, about 77% ($n=512$) of the participant were between the ages of 18 and 37 years old ($M= 31$, $SD= 8.44$) All participants identified as female ($n=665$). Almost 73% ($n=487$) of the participants identified as being White/Caucasian. Nearly 85% ($n=561$) of female participants were either living with a partner ($n=119$), married ($n=262$), or single ($n=180$). Half of the participants, 51% ($n=340$), identified as Christian. About 75% ($n=503$) of participants completed some college, have an associates, bachelors, masters, doctorate, medical doctor or other professional graduate degree. Exactly 17% ($n=113$) of participants reported an annual household income of less than \$15,000 and 19% ($n=129$) of participants reported an annual household income of more than \$75,000. Lastly, 85% ($n=557$) of the participants responded, “Yes,” when asked whether or not they had health insurance (see Appendix A, Table 1 for more demographic details).

Measures

The survey consisted of 52 questions divided into three sections. At the beginning of each section, participants were given a brief reading prompt explaining the aim of the survey section and included definitions of terminology found in the survey. Each of the three sections within the survey included a participant screening question that read, “This question is to make sure you are truly reading and answering the questions. If you are reading and answering questions please choose, ‘I am reading and answering questions,’ as your answer choice.” The question format was close-ended, open-ended, and there was one matrix question. Survey questions were created as well as adapted from previous studies and addressed: 1) personal knowledge about basic reproductive cycle health (e.g., length of days, knowledge of observable signs of fertility and infertility) 2) interest in use of FABMs for family planning (i.e., avoiding and achieving pregnancy when desired) 3) interest in use of FABMs to monitor health (for themselves and/or a family member – i.e. a daughter, niece, or young woman in their care) and 4) prior family planning methods that had been used, duration of use, and reason(s) for use/discontinuation (Stanford et al., 1998; Leonard et al., 2006; see Appendix B for the complete survey).

Demographics. Participants were asked to answer questions including their age, race/ethnicity, sexual identity, marital/relationship status, religious affiliation, educational attainment level, current household income, health insurance status, and reproductive health history. Reproductive health history questions, “How many times have you been pregnant?”, “How many pregnancies have you had that resulted in the birth of a living child? (total number of children born alive)”, as well as a screening question asking participants to identify whether or not they have already gone through menopause or have had a hysterectomy. Reproductive health

history questions were taken from a previous survey evaluating female interest in FABMs for family planning (Stanford et al., 1998).

Knowledge of female menstrual cycle. Participants answered seven knowledge-based questions about the female menstrual cycle. These questions were created based on previous research examining the general populations current fertility knowledge level as reported by Lundsberg et al., (2014), and in collaboration with professionals working in the field of reproductive healthcare. Various question formats were used. For example, some questions included “select all that apply” options (e.g., “What is considered a healthy menstrual cycle length?”), multiple choice (e.g., “How many days in each menstrual cycle does a female ovulate?”, options included one, two, three, a woman can ovulate once a day for more than three days each cycle, and I don’t know), and True/False (e.g., “It is NOT necessary for a female to ovulate regularly (approximately once a month) in order to be considered healthy as long as she is regularly bleeding.”). True/False questions also included an “I don’t know” option. Participants were asked to identify where or from whom they learned information about healthy menstrual cycle patterns. Knowledge question responses were scored as correct or incorrect.

Previous reproductive health experiences. Four survey questions inquired about female’s previous or current use of hormonal birth control to address an underlying reproductive health problem. Question formats included, “yes or no” (e.g., “Have you ever used or are you currently using a birth control pill or other hormonal contraceptive method as a treatment for a reproductive health problem such as: irregular cycles, painful periods, bad cramps, heavy periods, or other.”), and multiple choice, (e.g., “If you have used, or are currently using, a birth control pill or other hormonal contraceptives as a treatment for a reproductive health problem, who prescribed the treatment?”, options included medical professional, self-prescribed,

parent/family member, other). The third question prompted participants with an answer choice option of “select all that apply” (e.g., “Select the reason you FIRST started using the birth control pill or other hormonal contraceptives to treat a reproductive health problem?”). Lastly, females were asked to report at what age they recalled starting to use birth control to treat a health problem (e.g., “younger than 8 years old” to “after 50”). If participants responded, “no,” to ever having received hormonal birth control to treat a reproductive health condition they were automatically moved on to the next survey question.

Willingness to perform health behaviors. Participants were asked about their willingness to perform health behaviors necessary to make observations of reproductive biological markers. This included seven statements explaining various health behavior practices required of FABM users. A Likert type scale was used to measure participant willingness to perform the stated health behavior. An example statement is “Wiping with toilet tissue before and after EVERY bathroom visit looking for cervical fluid on a tissue.” Participants selected one answer choice (e.g., “I am NOT willing, I might be willing if I knew more, I am willing, I am already doing this”).

Use of family planning methods. Participants were first asked to identify, “choose all that apply,” important characteristics they consider when choosing a family planning method (e.g., reliability, effectiveness, ease of use, acceptability of method to a partner, potential side effects, cost, or other). Next, participants were asked to indicate which methods of family planning they were currently using or had previously used. For prior use, participants were asked to report, via open ended textbox, the reason for discontinuation of the method. This section also asked three closed-ended and one open-ended question created by the researcher in collaboration with colleagues about use of fertility/period tracking apps, including which apps, and why they were

using them (e.g., “Do you use a period tracking OR fertility tracking app?”, “Which app or apps did you use?”, “What is your purpose(s) for using a period tracking or fertility tracking app?”, “What is your commitment to the period tracking or fertility tracking app?”)

Familiarity with and interest in using FABMs. Participants were asked a single multiple-choice question to indicate when they would consider using FABMs (e.g., “When would you consider using a FABM?”). Answer choices included, “For monitoring my health,” “For family planning (achieving pregnancy only),” “For family planning (avoiding pregnancy only),” “For family planning (achieving and avoiding pregnancy),” “For family planning (achieving pregnancy only) and health monitoring,” “For family planning (avoiding pregnancy only) and health monitoring,” “For family planning (achieving and avoiding pregnancy) and health monitoring,” and “I would not use FABMs for monitoring my health or for family planning, even if I was confident in reliability, it was easy to learn and acceptable to my partner.”

Additional questions were adapted from previous studies measuring female interest in FABM use for family planning (Stanford et al., 1998; Leonard et al., 2006). Additionally closed-ended vs. open ended and multiple choice questions were generated to measure the extent to which participants were familiar with FABMs, (e.g., “Please check below **ALL** Fertility Awareness Based Methods (FABMs) that you are at all **FAMILIAR** with even if you have never used an FABM”), prior use of FABMs to monitor reproductive health (e.g., “Please check below **ALL** Fertility Awareness Based Methods (FABMs) that you have **EVER** used **TO MONITOR YOUR REPRODUCTIVE/MENSTRUAL CYCLE HEALTH ONLY.** ***This does NOT include using FABMs for the purposes of trying to achieve or avoid pregnancy.***”), with a follow-up open-ended question prompting the participant to elaborate on having used the ‘calendar rhythm method,’ (e.g., “You marked that you have used the Calendar Rhythm Method

to monitor your reproductive/menstrual cycle health. Please explain what the Calendar Rhythm Method is.”). The remaining questions inquired about prior participant use of FABMs for family planning (avoiding or achieving pregnancy), a “select all that apply” option choice was used for all questions. If participants selected prior use of the Calendar Rhythm Method for family planning they were not promoted to explain the Calendar Rhythm Method. Lastly, participants were asked to “select all that apply” when identifying other females, they believed might be interested in learning more about FABMs for family planning or health monitoring. Upon completion of the survey participants were provided direct links to various FABM teaching organizations if they wanted to learn more about a particular method.

Data Analysis

Statistical analysis was carried out using the Statistical Package for the Social Sciences (SPSS). Prior to calculating the mean reproductive health knowledge score, one knowledge question was eliminated (e.g., “True or False: It is not necessary for a female to ovulate regularly in order to be considered healthy as long as she is regularly bleeding.”). This question was removed because of conflicting findings in research that suggest ovulation is not essential for health and findings that suggest it is essential for health (Guttmacher Institute, 2011; Vigil et al., 2017). Thus, the mean knowledge score was calculated using the remaining six knowledge questions. After this question was eliminated, frequency and percent rates were generated for 1) the six reproductive health knowledge questions 2) prior or current use of hormonal birth control to treat reproductive health problems and 3) when participants indicated they would consider using FABMs.

Participant responses to the survey question, “When would you consider using a FABM?” was used to identify participants interested and not interested in using a FABM. Answer choices

allowed for participants to choose one of the options that included family planning only, health monitoring only, or a combination of both. For the purpose of the analyses, these responses were recoded into two different variables, one for interest in using FABMs for family planning, and the other for interest in using FABMs for health monitoring. To do this, any answer choice that included use for family planning was coded as 'yes' for interest in FABMs for family planning. Answer choices that indicated no interest in use for family planning, or use only for health monitoring, were coded as 'no' for interest in FABMs for family planning. Similarly, any answer choice that indicated interest in FABMs for health monitoring was recoded to reflect the selection of an answer choice with health monitoring as 'yes' and the selection of an answer choice without health monitoring as 'no'.

Due to the distribution of categorical demographic variables, some variables were dichotomized for the purpose of analyses. Demographic variables were dichotomized as follows: 1) race/ethnicity: white & non-white 2) relationship status: committed & non-committed 3) highest level of academic achievement: some college and above & no college 4) insurance status: insured & no insurance and 5) religiously affiliated and not affiliated. Given the homogeneous makeup of the participant sample, all females, participants' sex was not included in the analysis. In addition, the independent and categorical variable, prior or current use of hormonal birth control for reproductive health problems (e.g., "Have you ever used or are currently using a birth control pill or other hormonal contraceptive method as a treatment for a reproductive health problem, such as irregular cycles, painful periods, bad cramps, heavy periods, other...") was recoded using ones to indicate 'yes' and zeros to indicate a 'no'.

Research question one.

Two independent samples t-tests were run to answer the first research question, “Is there a difference between the mean knowledge scores of females who are interested or not interested in using FABMs for family planning or health monitoring?” The hypothesis was, there was no difference between the mean knowledge scores of females interested or not interested in FABMs for family planning or health monitoring. Mean knowledge scores were calculated for each group (interested and not interested) by averaging the number of correct responses to the six knowledge questions. Participant responses were scored as correct or incorrect. The average knowledge score for a participant that answered all six knowledge questions correctly was one. The independent variable was the mean knowledge score. The dependent variables were female interest in using FABMs for family planning or health monitoring.

Research question two.

Two binary logistic regression models were used to answer the second research question, “Does having been prescribed the hormonal birth control pill for health problems and certain demographic characteristics predict female interest in using FABMs for family planning or health monitoring?” The null hypothesis was that no demographic characteristics or prior or current use of hormonal birth control for a reproductive health problem would predict female interest in using FABMs for family planning or health monitoring. The research hypothesis was that one or more demographic variables would predict female interest in using FABMs for health monitoring or family planning. A second hypothesis was that previous or current use of hormonal birth control would positively predict female interest in using FABMs for health monitoring but not family planning. Independent variables included the demographic characteristics of the female participant population and prior or current use of hormonal birth

control. Dependent variables were female interest in using FABMs for family planning or health monitoring.

Results

Almost 75% ($n = 493$) of females indicated that they would consider using a FABM for health monitoring or family planning, while 25% ($n = 172$) of participants would not use a FABM for health monitoring or family planning (see Appendix A, Table 2). Of these women, 58% ($n = 386$) indicated they would consider using a FABM for family planning, and 42.8% ($n = 285$) would use a FABM for health monitoring. In contrast, 41.9% ($n = 279$) females would not consider using a FABM for family planning, and 57.1% ($n = 380$) would not consider using a FABM for health monitoring.

Research Question 1. Frequencies showed that 4.5% of females ($n = 30$) correctly identified short, regular, and long cycle lengths as possible healthy menstrual cycle lengths (see Appendix A, Table 3). The majority of females, 98.1%, correctly identified a healthy number of days for a female to be menstruating ($n = 652$). When asked, “Can a female become pregnant while on her menses?”, 68.5% of participants responded, “Yes,” ($n = 456$), 19.4% selected, “No,” ($n = 129$), and 12% answered, “I don’t know,” ($n = 80$). A fourth of females, 25% ($n = 166$), did not correctly identify, “One,” as the correct number of days a female ovulates each menstrual cycle. Of the 665 study participants, 59.5% ($n = 396$) chose, “True,” when responding to the ‘True/False’ statement, “Females are able to get pregnant at ANY time in their menstrual cycle.” Over 75%, ($n = 532$) of females indicated that females can identify when they are fertile by identifying external biological markers.

Contrary to the hypothesized outcome, there was a significant difference ($p < .05$) in the average reproductive health knowledge scores for females not interested in using FABMs for

family planning ($M= 0.75$, $SD= 0.23$) or health monitoring ($M= 0.73$, $SD= 0.23$) and females who were interested in using FABMs for family planning ($M= 0.69$, $SD= 0.23$) or health monitoring ($M= 0.68$, $SD= 0.23$) (see Appendix A, Table 4). For both outcomes, independent samples t-test results suggested those who were not interested in using FABMs had higher mean knowledge scores.

Research Question 2. Two binary logistic regression tests were conducted to predict interest in using FABMs for family planning ($n = 386$) and health monitoring ($n=285$). Predictor variables included age, annual household income, and the dichotomized demographic variables: race (white/non-white), religion (religiously affiliated/not religiously affiliated), relationship/marital status (committed/non-committed), education (some college/no college), and insurance status (insured/not insured). Prior or current use of hormonal birth control for reproductive health was also added as an independent, categorical, predictor variable that was dichotomized for both regression models (see Appendix A, Table 5).

The Hosmer and Lemeshow test was used to measure how well the data fit the statistical models, where an alpha level greater than .05 indicates a good fit (Bertolini, D'Amico, Nardi, Tinazzi, & Apolone, 2000). The data fit the two regression models for health monitoring ($p= 0.704$) and family planning ($p = 0.475$). No demographic variable, nor the use of hormonal birth control for health problems, significantly predicted ($p < .05$) female interest in using FABMs for health monitoring or family planning (see Appendix A, Table 6). Although, some variables did show a marginal significance ($p < .10$). For example, a trend in the data suggests that as previous or current use rates of hormonal birth control for reproductive health problems increase, interest in using FABMs for health monitoring decreases ($OR: 0.876$, $CI: 0.63-1.20$). In addition, as female age decreased interest in using FABMs for family planning increased ($OR: 0.981$, $CI:$

0.962-1.00). Thus, these results conclude a failure to reject the null hypothesis. The pseudo R^2 , Nagelkerke R^2 , did not suggest a significant relationship between the independent and dependent variables, 0.021 (interest in health monitoring) and 0.028 (interest in family planning).

Discussion

The purpose of this study was to explore whether females were interested or not interested in using FABMs for family planning and health monitoring in a national sample of women of reproductive age. First, differences were examined in the mean reproductive health knowledge scores for those participants indicating that they were and were not interested in using FABMs. The results suggest that females with lower mean reproductive health knowledge scores were more likely to be interested in using FABMs for health monitoring and for family planning. Differences in knowledge scores for participants who were and were not interested in using FABMs for family planning revealed, contrary to the hypothesis, those who were not interested in using FABMs for family planning had higher knowledge scores than those who were interested. Again, contrary to the hypothesis, those who were not interested in using FABMs for health monitoring had significantly higher mean knowledge scores than those who were interested. Perhaps females with more reproductive health knowledge are less interested in using a FABM for family planning or health monitoring because they feel confident in their level of fertility awareness and do not believe learning about a specific FABM is necessary. In contrast, females with lower mean knowledge scores may be more interested in FABMs for family planning and health monitoring because of a desire to learn more and fill the gaps in their fertility awareness knowledge. Therefore, females who are interested in using FABMs for family planning and health monitoring will benefit from the fertility awareness education they

receive while learning to use a FABM from a trained educator (Arevalo et al., 2004; Fehring et al., 2013; Hilgers & Stanford, 1998; World Health Organization, 1981).

Previous research examining reproductive knowledge related topics asked different questions and used a different scoring system (Kudesia et al., 2017; Lampic et al., 2006; Lundsberg et al., 2014; Peterson et al., 2012; Prior et al., 2018; Slap, 2003; Sorensen et al., 2016; Stern et al., 2013). Thus, findings from this study are hard to compare with findings from most other research measuring fertility health-related knowledge. That being said, the response frequencies for the individual knowledge questions found in this study corroborate with ACOGs' (2015) claim that females are not aware of what cycle patterns are healthy and unhealthy.

Results from this study suggest that current or previous use of hormonal birth control for reproductive problems and demographic characteristics are not significant ($p < .05$) predictors of female interest in using FABMs for health monitoring or family planning. Previous research by Stanford and colleagues, (1998) did find that age (< 30 years old) was a significant predictor of female interest in using FABMs to achieve pregnancy (family planning). A similar trend was found in this study suggests that as participant age decreased interest in using FABMs for health monitoring (OR: 0.98, CI: 0.96-1.00) and family planning (OR: 0.981, CI: 0.96-1.00) increased (see Appendix A, Table 6). Unlike this study, Leonard and colleagues, (2006) found that educational attainment significantly predicted female interest in using FABMs to avoid pregnancy (family planning). In contrast with Stanford and colleagues (1998) and Leonard and colleagues (2006), this study explored the previous or current use of hormonal birth control for health monitoring and demographic characteristics as predictor variables of female interest. These previous studies examined whether pregnancy history, pregnancy intentions, previous use

of natural family planning (NFP) methods, or a select number of demographic characteristics predicted female interest in the use of FABMs for family planning.

Surprisingly, the use of hormonal birth control did not predict interest in FABMs for health monitoring. FABMs are side-effect free alternatives to hormonal methods currently used to diagnose, manage, and treat reproductive health problems (Briden, 2017; Legro et al., 2013). In light of the large percentage of females that report discontinuing hormonal birth control due to side-effects, it was hypothesized that FABMs would be an interesting alternative for females prescribed hormonal methods for health problems. Findings from this study suggest that this may not be the case. In fact, marginally statistically significant ($p < .10$) trends in the data support the opposite. Given that no demographic variable significantly predicted female interest in the use of FABMs for health monitoring or family planning, FABM programs could be applicable and may be of interest to a broad range of the population.

Limitations

Some limitations deserve to be highlighted. While the participant sample size ($n= 665$) was drawn from a national participant pool it is not nationally representative. For example, 73% of the participants were White/Caucasian. In addition, the knowledge questions used in this study were created or adapted from other research. Therefore, this is not a previously validated instrument to measure reproductive health knowledge. Such an instrument does not exist. Future research may attempt to create a reliable measure to assess knowledge. While such surveys exist to measure knowledge about fertility as it pertains to the ability to conceive, that was not the goal of this study and therefore such instruments were not applicable. Furthermore, the survey is quite lengthy, a total of 52 questions. Therefore, participant burnout is also a potential threat to the validity and generalizability of findings.

Future Research and Implications for Public Health

This study contributes to the literature on females' interest in FABMs for family planning and health monitoring in three ways, 1) promoting FABM use in clinical practice 2) suggesting female interest in FABMs for health monitoring and 3) the need to improve reproductive and fertility health literacy by way of FABM public health programs. First, results suggest that women from a national sample, and of reproductive age, are interested in using FABMs for family planning and health monitoring. This finding is perhaps most descriptive of the interest of younger women. Further research is needed to explore physicians current knowledge about these methods as well as exploring their beliefs and attitudes about FABMs and their intentions to offer them in the clinical setting. Depending on those findings, research may need to examine how clinicians can improve their medical knowledge about the science and application of modern FABMs so that these methods can be offered to patients during family planning and reproductive health appointments. Second, this was the first study to assess females' interest in using FABMs for health monitoring, and we found that many are, indeed, interested in using them for this purpose (42.8%). Studies investigating how to best promote FABM use for health monitoring may help current and future FABM professionals more effectively market these methods to reproductive age women. Given that female *interest* in FABMs does not translate into the *use* of these methods, it may be helpful to explore factors that influence females' intention to use FABMs (Mikolajczyk, Stanford, & Rauchfus, 2003). Ones' intention to perform a behavior is arguably the best predictor of behavior (Ajzen & Klobas, 2013). Therefore, future research should explore the degree to which females' attitudes, subjective norms, and perceived behavioral control predict their intention to perform FABM related health behaviors (e.g., "Wiping before and after each bathroom visit to observe cervical fluid."). Further, research

exploring females' beliefs and knowledge about FABMs and their applications for reproductive health may provide insight about why more participants were interested in FABMs for family planning over health monitoring. Third, findings from this study corroborate findings from previous research as well as the recommendations from ACOG suggesting that public health researchers need to consider how to best improve or develop programming and intervention efforts that address reproductive health literacy in the general population (ACOG, 2015; Kudesia et al., 2017; Lampic et al., 2006; Lundsberg et al., 2014; Peterson et al., 2012; Prior et al., 2018; Slap, 2003; Sorensen et al., 2016; Stern et al., 2013). An increase in patients' reproductive health literacy is suggested as a way to hasten the identification and treatment of reproductive diseases, disorders, and conditions in order to improve long term reproductive health outcomes (ACOG, 2015). Certain FABM educational programs may be effective ways to address the knowledge gap and equip females with the necessary skills to monitor their female 'fifth vital sign'. Further research is needed to explore how such programs should be structured, identify the ideal setting for program implementation, and measure the short and long term outcomes (knowledge, health, etc.) of these programs. Further research is needed to explore physicians current knowledge about these methods as well as exploring their beliefs and attitudes about FABMs and their intentions to offer them in the clinical setting. Finally, more research is needed to examine why females with higher knowledge scores are less interested in using FABMs for health monitoring and family planning.

Conclusion

Females are interested in using FABMs. The American College of Obstetricians and Gynecologists (ACOG) suggests that females track their reproductive health patterns in order to improve short and long-term health outcomes (ACOG, 2005). Findings from this study and

others suggest women do not have a sufficient level of reproductive health knowledge in order to monitor their cycle patterns (ACOG, 2015; Kudesia et al., 2017; Lampic et al., 2006; Lundsberg et al., 2014). Further research is needed to explore whether females have the skills and intention to perform health behaviors associated with monitoring their reproductive cycle patterns. In addition, FABMs should be offered to patients during family planning appointments. Broader dissemination of FABM information and greater efforts to promote their use should be considered by public health professionals concerned with improving reproductive healthcare for all women.

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Appendices

Appendix A

Table 1

Summary of demographic variables ($n=665$)

<i>Demographic Variables</i>	Mean	SD
Age	31.11	8.44
	Frequency	Percent
Religious Affiliation		
Christian (Protestant)	143	21.5
Christian (Catholic)	159	23.9
Christian (Mormon/LDS)	14	2.1
Christian-Orthodox	24	3.6
Judaism	9	1.4
Islam	6	.9
Buddhism	6	.9
Hinduism	8	1.2
Atheist	32	4.8
Agnostic	50	7.5
Spiritual but not religious	68	10.2
Other	68	10.2
None	78	11.7
Relationship/Marital Status		
Married	262	39.4
Engaged	39	5.9
Single	180	27.1
Casually Dating	37	5.6
Living with a partner	119	17.9
Divorced	24	3.6
Widowed	4	.6
Race		
White/Caucasian	487	73.2
Black/African American	89	13.4
Hispanic	41	6.2
Native American	5	.8
Asian	29	4.4
Pacific Islander	1	.2
Other	13	2.0

Table 1 (Cont.)

Summary of demographic variables ($n=665$)

<i>Demographic Variables</i>	Mean	SD
Age	31.11	8.44
	Frequency	Percent
Education		
Less than a high school diploma	14	2.1
Some high school/vocational school	23	3.5
Vocational/Technical School	16	2.4
High school graduate or G.E.D	146	22.0
Some college	188	28.3
Associates degree	78	11.7
Bachelors degree	155	23.3
Master's level graduate	33	5.0
Doctorate level graduate	3	.5
Professional degree	4	.6
MD	1	.2
JD	1	.2
Other	3	.5
Insurance Status		
Yes	567	85.3
No	88	13.2
I don't know	10	1.5
Annual Household Income		
Less than \$15,000	113	17.0
\$15,000-\$30,000	123	18.5
\$30,000-\$45,000	119	17.9
\$45,000-\$60,000	110	16.5
\$60,000-\$75,000	71	10.7
More than \$75,000	129	19.4

Table 2

Summary of participant responses to, “When would you consider using a FABM?”

<i>Answer Choice</i>	Frequency	Percent
For health monitoring	107	16.0
For family planning (achieving pregnancy)	97	14.5
For family planning (avoiding pregnancy)	49	7.3
For family planning (achieving and avoiding pregnancy)	62	9.3
For family planning (achieving pregnancy only) and health monitoring	56	8.4
For family planning (avoiding pregnancy only) and health monitoring	32	4.8
For family planning (achieving and avoiding pregnancy) and health monitoring	90	13.5
I would not use a FABM for monitoring my health or for family planning	172	25.8
Total	665	100.0

Table 3

Summary of responses to reproductive health knowledge questions

Knowledge Questions	Answer Choices	Frequency	Percent
What is considered a healthy menstrual cycle length? (Select all that apply)			
	Short Cycles (21-25 days)	157	23.6
	Regular length cycles (26-35 days)	472	70.9
	Long cycles (36-48 days)	75	11.2
	Cycle Lengths of ONLY 28 days	156	23.4
	Other	33	4.9
	Short Cycles (21-25 days), Regular length cycles (26-35 days), Long cycles (36-48 days)*	30	4.5
How many days is considered a healthy length of menses (bleeding)?			
	1 day	3	.5
	2 days*	38	5.7
	3 days*	104	15.6
	4 days*	279	42.0
	5 days*	3	.5
	7 days*	60	9.0
	8 days*	168	25.3
	9 days	2	.3
	10 days	3	.5
	11 days	2	.3
	12 days	0	0
	13 days	3	.5

Table 3 (Cont.)

Summary of responses to reproductive health knowledge questions

Knowledge Questions	Answer Choices	Frequency	Percent
Can a female become pregnant while on her menses?	Yes*	456	68.5
	No	129	19.4
	I don't know	80	12.0
How many days in each Menstrual cycle does a female ovulate?	One*	166	25.0
	Two	54	8.1
	Three	111	16.7
	A woman can ovulate once a day for more than three days each cycle	148	22.3
	I don't know	186	28
True or False: A female is able to get pregnant at ANY time in her menstrual cycle?	True	396	59.5
	False*	269	40.5
True or False: Females are able to identify when they are fertile by monitoring external physical signs such as basal body temperature, cervical fluid discharge, or measuring urinary hormone levels.	True*	532	80
	False	33	5
	I don't know	100	15

Notes: *Correct answer

**Responses were scored "correct" only if the correct answer was selected. All other options were scored as "incorrect" for the purpose of the analyses

Table 4

Results of t-test for females interested and not interested in using FABMs for health monitoring and family planning

		Interested			Not Interested			<i>t</i>	<i>p</i>
		<i>n</i>	M	SD	<i>n</i>	M	SD		
Family planning	Mean Knowledge Score	386	.69	.20	279	.75	.23	-3.48	.00*
Health monitoring	Mean Knowledge Score	285	.68	.20	380	.73	.23	-2.77	.00*

Note: * $p < .05$.

Table 5

Number of participants who have used or are currently using a birth control pill or other hormonal contraceptive method as a treatment for a reproductive health problem, such as irregular cycles, painful periods, bad cramps, heavy periods, other

Answer Choice

	Frequency	Percent
Yes	350	52.6
No	315	47.4
Total	665	100.0

Table 6

Summary of Binary Regression Analysis for Variables Predicting Females' Interest in Using FABMs for Health Monitoring or Family Planning

Variables	Interest in FABMs (HM)					Interest in FABMs (FP)				
	<i>B</i>	<i>SE B</i>	β	95% C.I. for β		<i>B</i>	<i>SE B</i>	β	95% C.I. for β	
			Lower	Upper				Lower	Upper	
Age	-.015	.010	.985	.966	1.005	-0.19	.010	.981	.962	1.001
Education (less than college/some college)	.242	.186	1.27	.885	1.833	.302	.184	1.35	.943	1.939
Insurance Status (insured/not insured)	.350	.246	1.42	.877	2.298	.194	.238	1.21	.761	1.93
Religious Affiliation (religiously affiliated/not affiliated)	-.094	.163	.911	.661	1.254	-.023	.165	.977	.707	1.349
Relationship Status (committed/not committed)	-.145	.174	.865	.615	1.216	.270	.175	1.31	.930	1.845
Race (white/not white)	.248	.185	1.28	.892	1.841	-.014	.185	.006	.686	1.417
Use of Pill (used the pill/never used the pill)	-.132	.162	.876	.638	1.204	-.197	.164	.821	.596	1.132
Constant Nagelkerke										
R Square			.02					.028		
N			665					665		

Note: * $p < .05$.

HM: Interest in FABMs for health monitoring

FP: Interest in FABMs for family planning

FABM Interest Survey

Start of Block: Demographic Questions

Q107 INFORMED CONSENT STATEMENT

Female Interest in Fertility Awareness Based Methods (FABMs): For Health Monitoring and Family Planning

IRB#

Amylynn Smith, BS, CFCP University of Arkansas

Heather D. Blunt-Vinti, MPH, PhD

University of Arkansas

The Department of Health, Human Performance, and Recreation at the University of Arkansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You should be aware that participation is completely voluntary and that even if you agree to participate, you are free to withdraw at any time without penalty. Your relationship with the investigators will not be affected in any way if you refuse to participate.

We are conducting this study to better understand female knowledge of and interest in fertility awareness based methods (FABMs) for reproductive health monitoring and family planning. This will entail your completion of an anonymous online questionnaire. The questionnaire is expected to take less than 25 minutes to complete. If you participate in this study you will be one of approximately 3,000 individuals participating in the study. You must be at least 18 years old to participate.

This survey includes questions about your person knowledge about basic fertility cycle health, your interest in FABMs for health monitoring and family planning, as well as your satisfaction with prior family planning methods. If you do not wish to answer a specific question, you may leave it blank. If at any time you do not wish to continue with this survey, you can exit the study website.

Although participation may not benefit you directly, we believe that the information obtained from this study will help us gain a better understanding of what options females prefer for reproductive health monitoring and family planning options, which may help public health and education professionals to better design educational programs and research projects in these areas. In addition, this information may help to encourage the medical community to broaden the scope of family planning options they provide to patients and how they treat reproductive health problems. You may also receive compensation from Qualtrics® for your participation.

All efforts will be made to keep your personal information confidential and the survey will not collect any identifying information about you (such as your name, birthdate, etc.). We cannot guarantee absolute confidentiality. Any personal information you provide may be disclosed if required by law. Your identity will be held in confidence in reports in which the study may be published and databases in which results may be stored. The researchers have no connection to any products mentioned in the survey, although aggregate results may be shared with the company.

Your participation is solicited, although strictly voluntary. If you would like additional information concerning this study before or after it is completed, please feel free to contact us by phone or e-mail. At the conclusion of the study, you will have the right to request feedback about the results.

Starting the survey indicates your willingness to participate in this project and that you are at least the age of 18. If you have any additional questions about your rights as a research participant, you may contact either of the following:

The University of Arkansas Research Compliance:

Phone: 479-575-2208

Email: irb@uark.edu

Mail:

Ro Windwalker, CIP

Institutional Review Board Coordinator

Research Compliance

University of Arkansas

109 MLKG Building

Fayetteville, AR 72701-1201

Or

Amylynn Smith, BS, CFCP Principal Investigator

Department of Health, Human Performance and Recreation

University of Arkansas

308-T HPER Building

Fayetteville, AR, 72701

(813) 352-4404

as115@uark.edu

Heather D. Blunt-Vinti, PhD. Principal Investigator

Department of Health, Human Performance and Recreation

University of Arkansas

308-T HPER Building

Fayetteville, AR, 72701

(479) 575-4110

blunt@uark.edu

Note: if possible we strongly encourage that you complete the survey on a device other than a mobile phone.

PLEASE CLICK THE >> TO START THE SURVEY

Q104 The purpose of this study, Female Interest in Fertility Awareness Based Methods (FABMs): For Health Monitoring and Family Planning, is to inquire about your current level of knowledge in regards to reproductive health and fertility cycle patterns. FABMs are modern methods of family planning that can be used by females and their partners to monitor their reproductive health and as a means of achieving or preventing pregnancy.

In addition, we want to know what methods of family planning you have used or are currently using and if at anytime you discontinued the use of a method and for what reason. We are also curious if you currently use any of the fertility or period tracking apps available and if so for what purpose you use them. Lastly, we hope to briefly introduce you to FABMs (if you aren't currently familiar with them), to learn about your current level of familiarity with FABMs, and your level of interest in learning to use these methods for various purposes.

This information will enable us to share with the public health and medical community the level of interest you and women across the nation have in using, or at least learning more about FABMs.

Thank you for your participation!

Q39 What is your age

▼ 17 and under ... 56 and older

Skip To: End of Survey If What is your age = 17 and under

Skip To: End of Survey If What is your age = 56 and older

Q47 In what state of the United States do you currently live?

▼ Alabama ... Wyoming

Q40 What ethnicity/race do you most identify with?

▼ Asian ... Other

Q41 What is your sex?

Male

Female

Other (please specify): _____

Skip To: End of Survey If What is your sex? = Male

Skip To: End of Survey If What is your sex?(Other (please specify):) Is Not Empty

Q48 What is your current marital/relationship status?

▼ Casually Dating ... Widowed

Q44 What is your religion (if any)?

▼ Agnostic ... Other

Q43 What is the highest level of education you have completed?

▼ Less than a high school diploma ... Other

Q45 Which of the following categories is closest to the total income of your household per year?

▼ Less than \$15,000 ... More than \$75,000

Q46 Do you currently have health insurance?

- Yes
- No
- I don't know
-

Q52 How many times have you been pregnant?

▼ 0 ... more than 10

Q54 How many pregnancies have you had that resulted in the birth of a living child? (total number of children born alive)

▼ 0 ... More than 10

Q2.3 Please check below any of the conditions or surgeries that you have had (check all that apply):

- Menopause (change of life)
- Hysterectomy (uterus removed)

Skip To: End of Survey If Please check below any of the conditions or surgeries that you have had (check all that apply): = Menopause (change of life)

Skip To: End of Survey If Please check below any of the conditions or surgeries that you have had (check all that apply): = Hysterectomy (uterus removed)

End of Block: Demographic Questions

Start of Block: Fertility Health Questions

Q53

The following questions are for the purpose of understanding your current knowledge about the female menstrual cycle, and your experience with medical providers treating menstrual cycle problems.

For the purpose of this survey we define menstrual cycle, menses, and ovulation as:

menstrual cycle: All of the days from the start of one period until the day before your next period **menses:** The days of your cycle when you are bleeding **ovulation:** When the egg or ovum is released

Q1.2 What is considered a healthy menstrual cycle length? (Select all that apply)

- Short Cycles (21-25 days)
 - Regular Length Cycles (26-35 days)
 - Long Cycles (36-48 days)
 - Cycle lengths of ONLY 28 days
 - Other
-

Q60 How many days is considered a healthy length of menses (bleeding)?

▼ 1 ... 12

Q91 Can a female become pregnant while on her menses?

- Yes
 - No
 - I don't know
-

Q54 How many DAYS in each menstrual cycle does a female ovulate?

- One
 - Two
 - Three
 - A woman can ovulate once a day for more than three days each cycle
 - I don't know
-

Q51 True or False: It is NOT necessary for a female to ovulate regularly (approximately once a month) in order to be considered healthy as long as she is regularly bleeding.

- True
 - False
 - I don't know
-

Q59 True or False: A female is able to get pregnant at ANY time in her menstrual cycle?

- True
 - False
-

Q50 True or False:

Females are able to identify when they are fertile by monitoring external physical signs such as: basal body temperature, cervical fluid discharge, or measuring urinary hormone levels.

- True
 - False
 - I don't know
-

Q70 This question is to make sure you are truly reading and answering the questions. If you are reading and answering questions please choose, "I am reading and answering questions," as your answer choice.

- I am not really reading
- I don't care
- I am reading and answering questions

Skip To: End of Survey If This question is to make sure you are truly reading and answering the questions. If you are readi... = I am not really reading

Skip To: End of Survey If This question is to make sure you are truly reading and answering the questions. If you are readi... = I don't care

Q92 Where did you learn about what a healthy menstrual cycle is? Select all that apply.

- Father
- Mother
- Sibling
- Other family member
- A friend
- An FABM educator
- Sex education Class (school-based program)
- General Health/Science Class
- A partner
- A medical website
- Social media
- Women's health care professional
- Primary care physician
- Product labels
- Smart phone apps

Community health class

Planned Parenthood

Other

Q111 Have you ever used or are you currently using a birth control pill or other hormonal contraceptive method as a treatment for a reproductive health problem such as:

Irregular cycles Painful periods Bad cramps Heavy periods Other

Yes

No

Display This Question:

If Have you ever used or are you currently using a birth control pill or other hormonal contraceptiv... = Yes

Q112 If you have used, or are currently using, a birth control pill or other hormonal contraceptive as a treatment for a reproductive health problem, who prescribed the treatment?

Medical Professional

Self-Prescribed

Parent/Family Member

Other

Display This Question:

If you have used, or are currently using, a birth control pill or other hormonal contraceptive as... = Medical Professional

Or If you have used, or are currently using, a birth control pill or other hormonal contraceptive as... = Self-Prescribed

Or If you have used, or are currently using, a birth control pill or other hormonal contraceptive as... = Parent/Family Member

Or If you have used, or are currently using, a birth control pill or other hormonal contraceptive as... = Other

Q115 Select the reason you FIRST started using the birth control pill or other hormonal contraceptives to treat a reproductive health problem?

Choose ALL that apply.

- Irregular Cycles
 - Too long in-between periods
 - Painful Periods
 - Heavy Periods
 - Severe Cramping
 - Other
-

Display This Question:

If Select the reason you FIRST started using the birth control pill or other hormonal contraceptives...
= Irregular Cycles

Or Select the reason you FIRST started using the birth control pill or other hormonal contraceptives...
= Too long in-between periods

Or Select the reason you FIRST started using the birth control pill or other hormonal contraceptives...
= Painful Periods

Or Select the reason you FIRST started using the birth control pill or other hormonal contraceptives...
= Heavy Periods

Or Select the reason you FIRST started using the birth control pill or other hormonal contraceptives...
= Severe Cramping

Or Select the reason you FIRST started using the birth control pill or other hormonal contraceptives...
= Other

Q113

At what age did you FIRST start taking the birth control pill or other hormonal contraceptives as a treatment for your reproductive health problem(s)?

▼ younger than 8 ... after 50

Q89 The behaviors listed below are ways you can monitor your menstrual cycle health, and times of fertility and infertility. Please mark your willingness to perform the following behaviors to

prevent pregnancy without the use of hormonal supplements, devices, or other methods of artificial birth control.

	I am NOT willing	I might be willing if I knew more	I am willing	I am already doing this
Keeping track of my period lengths	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Taking your temperature first thing every morning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wiping with toilet tissue before and after EVERY bathroom visit to feel for a sensation of slippery/lubricati on	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wiping with toilet tissue before and after EVERY bathroom visit looking for cervical fluid on a tissue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wiping with toilet before and after EVERY bathroom visit and finger testing (trying to stretch) cervical fluid found on your tissue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peeing on a stick every morning and inserting it into a monitor that tells you how likely you are to get pregnant that day if you have sex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Recording the most fertile observation you saw during the day in a chart or on an app before going to bed each night



Q76 Please check below ALL statements that apply to you.

- I have had my tubes tied (a surgical tubal ligation to prevent pregnancy)
- I have had both of my ovaries removed (not just one)
- I have had a surgery that has made me unable to get pregnant for the rest of my life
- I have a condition that makes me unable to get pregnant for the rest of my life.
- None of the above apply to me

Skip To: End of Survey If Please check below ALL statements that apply to you. = I have had both of my ovaries removed (not just one)

Skip To: End of Survey If Please check below ALL statements that apply to you. = I have had a surgery that has made me unable to get pregnant for the rest of my life

Skip To: End of Survey If Please check below ALL statements that apply to you. = I have a condition that makes me unable to get pregnant for the rest of my life.

Skip To: End of Survey If Please check below ALL statements that apply to you. = I have had my tubes tied (a surgical tubal ligation to prevent pregnancy)

Q38 With whom do you **intend to** or with whom **do you** engage in sexual activity?

- Men only
- Women only
- Both men and women
- I do not intend to EVER engage in sexual activity

Skip To: End of Survey If With whom do you intend to or with whom do you engage in sexual activity? = Women only

Skip To: End of Survey If With whom do you intend to or with whom do you engage in sexual activity? = I do not intend to EVER engage in sexual activity

End of Block: Fertility Health Questions

Start of Block: Fertility Monitoring Question

Q105

The remaining questions will ask you about the following:

1. What methods of family planning you have used or are currently using
2. If at anytime you discontinued the use of a method and for what reason
3. Are you currently using any of the fertility or period tracking apps available and if so for what purpose you use them.
4. You will be briefly introduced to fertility awareness based methods (FABMs), asked about your current level of familiarity with FABMs, and your level of interest in learning to use these methods for various purposes.

For the purpose of this survey we define menstrual cycle, menses, and ovulation as:

menstrual cycle: as all of the days from the start of one period until the day before your next period **menses:** the days of your cycle when you are bleeding **ovulation:** when the egg or ovum is released

Q67 What characteristics are important to you when considering a method to use for family planning? (check ALL that apply)

Reliability (e.g., effectiveness)

Ease of use

Acceptability of method to a partner

Potential side effects

Cost

Other (please list): _____

Q1.13 Which method(s) of family planning do you currently use? Check all that apply.

- Condom
- Withdrawal ("pulling out")
- Birth control pill
- Birth control patch
- Vaginal ring (e.g., NuvaRing)
- The shot (Depo Provera)
- Spermicide foam/jelly/cream/film
- Hormonal IUD (e.g., Mirena, Skyla)
- Non-hormonal IUD (e.g., Paragard)
- Hormonal implant (e.g., Implanon, Nexplanon)
- Diaphragm
- Female tubal sterilization (e.g., tubes tied)
- In Vitro Fertilization (IVF)
- Emergency contraception (e.g., "Plan B")
- Calendar Rhythm

- Billings Ovulation Method (cervical mucus method)
 - Creighton Model Method (cervical mucus method)
 - Sympto-Thermal Method
 - Sympto-Hormonal Method
 - Laccational Amenhorea Method
 - Standard Days Method
 - Two Day Method
 - Other (please specify): _____
 - I do not currently use a method of family planning
 - None of these methods
-

Q1.14 Which of the following have you **ever** used but discontinued using? Please indicate all that apply, and provide a reason for discontinuation for each method that you have previously used in the associated text box. Please provide as detailed of description as you are able to.

	How long did you use this method?	Reason for discontinuation
Condom		
Withdrawal ("pulling out"); reason for discontinuation:		
Birth control pill; reason for discontinuation:		
Birth control patch; reason for discontinuation:		
Vaginal ring (e.g., NuvaRing); reason for discontinuation:		
The shot (Depo Provera); reason for discontinuation:		
Spermicide foam/jelly/cream/film; reason for discontinuation:		
Hormonal IUD (e.g., Mirena, Skyla); reason for discontinuation:		
Non-hormonal IUD (e.g., Paragard); reason for discontinuation:		
Hormonal implant (e.g., Implanon, Nexplanon); reason for discontinuation:		
Diaphragm; reason for discontinuation:		
Emergency contraception (e.g., "Plan B"); reason for discontinuation:		
Female tubal sterilization (e.g., tubes tied)		
Male sterilization (e.g., vasectomy)		
Calendar Rhythm		
Billings Ovulation Method (cervical mucus method)		
Creighton Model (cervical mucus method)		
Sympto-Thermal Method		
Sympto-Hormonal: Marquette Method		

Lacational Amenhorea Method		
Standard Days Method		
Two Day Method		
None of these methods		
Other (please specify):		

Q97 Do you use a period tracking OR fertility tracking app?

- Yes
- No

Skip To: Q100 If Do you use a period tracking OR fertility tracking app? = No

Display This Question:
If Do you use a period tracking OR fertility tracking app? = Yes

Q98 Which app or apps dd you use?

Display This Question:
If If Which app or apps dd you use? Text Response Is Displayed

Q99 What is your purpose(s) for using a period tracking or fertility tracking app? Check all that apply.

- To prevent pregnancy
 - To achieve a pregnancy
 - To monitor timing of menses
 - To monitor cycle health
 - To predict the start of my menses (my period)
 - Other _____
-

Display This Question:

*If What is your purpose(s) for using a period tracking or fertility tracking app? Check all that apply. =
To prevent pregnancy*

*Or What is your purpose(s) for using a period tracking or fertility tracking app? Check all that apply. =
To achieve a pregnancy*

*Or What is your purpose(s) for using a period tracking or fertility tracking app? Check all that apply. =
To monitor timing of menses*

*Or What is your purpose(s) for using a period tracking or fertility tracking app? Check all that apply. =
To monitor cycle health*

*Or What is your purpose(s) for using a period tracking or fertility tracking app? Check all that apply. =
To predict the start of my menses (my period)*

*Or What is your purpose(s) for using a period tracking or fertility tracking app? Check all that apply. =
Other*

Q48 What is your commitment to the period tracking or fertility tracking app?

- Downloaded app(s) but do not use the regularly
 - Downloaded app(s) and use it regularly for period tracking
 - Downloaded app(s) and use it regularly for fertility tracking
 - Downloaded app(s) and use it regularly for period and fertility tracking
 - Other _____
-

Q100 Have you ever made a decision about whether to have intercourse (or whether to use a condom or withdrawal method), based on whether you thought it was a fertile day or not?

- Yes
- No
- I do not recall

Skip To: Q51 If Have you ever made a decision about whether to have intercourse (or whether to use a condom or wi... = No

Skip To: Q51 If Have you ever made a decision about whether to have intercourse (or whether to use a condom or wi... = I do not recall

Display This Question:

If Have you ever made a decision about whether to have intercourse (or whether to use a condom or wi... = Yes

Q101 If yes, was that decision about whether to have intercourse (or whether to use a condom or withdrawal method) based on information you gained from your fertility tracking or period tracking app(s)?

- Yes
 - No
-

Q51 **Natural or fertility awareness based methods (FABMs)** are modern methods of family planning that can be used by females to monitor their reproductive health and by females and

their partners to achieve or prevent pregnancy. FABMs are based on the external observation and tracking of various biological markers (for example: cervical fluid discharge, basal body temperature, monitoring of urinary hormones). FABMs can be used by women with REGULAR and IRREGULAR cycle patterns FABMs use NO chemicals, NO internal devices, and have ZERO medical side effects.

When couples use modern FABMs correctly, they are 95-99.5% effective at preventing pregnancy. With typical use, which includes women or couples that may make mistakes in using the methods, the effectiveness rates for avoiding pregnancy is 78-98%.

In addition, in 2015 the American College of Obstetricians and Gynecologists, in collaboration with the American Academy of Pediatrics, encourage ALL adolescent females to monitor their menstrual cycles (timing of menses, patterns of cycles, and associated symptoms- pain, discomfort, etc...). [Read here for more information.](#)

Q66 Please check below **ALL** Fertility Awareness Based Methods (FABMs) that you are at all **FAMILIAR** with even if you have never used an FABM.

- Calendar rhythm
- Creighton Model Method (Cervical Fluid)
- Billings Ovulation Method (Cervical Fluid)
- Sympto-thermal
- Sympto-Hormonal (Marquette Method)
- Laccational Amenhorea Method
- Standard Days Method
- Two Day Method
- Family of the Americas (Cervical Fluid Method)
- FEMM (Fertility Education and Medical Management)
- Justisse Method
- Ecological Breastfeeding
- Taking Charge of Your Fertility
- I have never heard of fertility awareness based methods (FABMs)
- Other (please specify): _____

Q1.12 Please check below **ALL** Fertility Awareness Based Methods (FABMs) that you have **EVER** used **TO MONITOR YOUR REPRODUCTIVE/MENSTRUAL CYCLE HEALTH ONLY.**

This does NOT include using FABMs for the purposes of trying to achieve or avoid pregnancy.

- Calendar rhythm
- Creighton Model Method (Cervical Fluid Method)
- Billings Ovulation Method (Cervical Fluid Method)
- Sympto-thermal
- Sympto-Hormonal (Marquette Method)
- Laccational Amenhorea Method
- Standard Days Method
- Two Day Method
- Family of the Americas (Cervical Fluid Method)
- FEMM (Fertility Education and Medical Management)
- Justisse Method
- Ecological Breastfeeding
- Taking Charge of Your Fertility
- I have never used an FABM to monitor or treat my reproductive health
- Other (please specify) _____

Display This Question:

If Please check below ALL Fertility Awareness Based Methods (FABMs) that you have EVER used TO MON... = Calendar rhythm



Q110 You marked that you have used the Calendar Rhythm Method to monitor your reproductive/menstrual cycle health.

Please explain what the Calendar Rhythm Method is.

Q2.14 When would you consider using an FABM?

- For monitoring my health
 - For family planning (achieving pregnancy only)
 - For family planning (avoiding pregnancy only)
 - For family planning (achieving and avoiding pregnancy)
 - For family planning (achieving pregnancy only) and health monitoring
 - For family planning (avoiding pregnancy only) and health monitoring
 - For family planning (achieving and avoiding pregnancy) and health monitoring
 - I would not use FABM for monitoring my health or for family planning, even if I was confident in reliability, it was easy to learn and acceptable to my partner
-

Q71 This question is to make sure you are truly reading and answering the questions. If you are reading and answering questions please choose, "I am reading and answering questions," as your answer choice.

- I am not really reading
- I don't care
- I am reading and answering questions

Skip To: End of Survey If This question is to make sure you are truly reading and answering the questions. If you are readi... = I am not really reading

Skip To: End of Survey If This question is to make sure you are truly reading and answering the questions. If you are readi... = I don't care

Q2.12 Please check below **ALL** fertility awareness based methods (FABMs) that you and your partner have EVER used **TO TRY TO PREVENT PREGNANCY**.

- Calendar rhythm
- Creighton Model Method (Cervical Fluid Method)
- Billings Ovulation Method (Cervical Fluid Method)
- Sympto-thermal
- Sympto-Hormonal (Marquette Fertility Monitor)
- Laccational Amenhorea Method
- Standard Days Method
- Two Day Method
- Family of the Americas (Cervical Fluid Method)
- FEMM (Fertility Education and Medical Management)
- Justisse Method
- Ecological breastfeeding
- Taking Charge of Your Fertility
- I have never used an FABM to prevent a pregnancy
- Other please specify): _____

Q102 Please check below **ALL** fertility awareness based methods (FABMs) that you and your partner have EVER used **TO TRY TO GET PREGNANT**.

- Calendar rhythm
- Creighton Model Method (Cervical Fluid Method)
- Billings Ovulation Method (Cervical Fluid Method)
- Sympto-thermal
- Sympto-Hormonal (Marquette Fertility Monitor)
- Laccational Amenhorea Method
- Standard Days Method
- Two Day Method
- Family of the Americas (Cervical Fluid Method)
- FEMM (Fertility Education and Medical Management)
- Justisse Method
- Ecological breastfeeding
- Taking Charge of Your Fertility
- I have never used an FABM to achieve a pregnancy
- Other _____

Q2.17 Please mark other females that you think might be interested in learning more about FABMs for **health monitoring.**

Mother

Sister

Daughter

Other family member

Friend

Other

I do not think females are interested in learning or using FABMs

Q103 Please mark other females that you think might be interested in learning more about FABMs for **family planning**. Mark all that apply.

- Mother
 - Sister
 - Daughter
 - Other family member
 - Friend
 - Other
 - I do not think females are interested in learning or using FABMs
-

Q55 You can find more information about fertility awareness based methods (FABMs) by visiting the following websites:

Fertility Awareness Based Methods (FABMs):

Marquette Method (Sympto-hormonal)
Lactational Amenorrhea Method
Standard Days Method
Two-Day Method
Sympto-thermal Method**
Creighton Model Method
Billings Ovulation Method
Justisse Method

***There are multiple methods that teach using the Sympto-thermal approach. This is linked to one organization of educators. Below in 'Other Resources' you will find another, FEMM Health. On the FACTS page you can find even more resources.

Other Resources:

FEMM Health
Fertility Appreciation Collaborative to Teach the Science (FACTS)

End of Block: Fertility Monitoring Question

Appendix C



To: Amylynn Smith
From: Douglas James Adams, Chair
IRB Committee
Date: 03/28/2018
Action: **Exemption Granted**
Action Date: 03/28/2018
Protocol #: 1803106676
Study Title: Female Interest in Fertility Awareness Based Methods (FABMs): For Health Monitoring and Family Planning

The above-referenced protocol has been determined to be exempt.

If you wish to make any modifications in the approved protocol that may affect the level of risk to your participants, you must seek approval prior to implementing those changes. All modifications must provide sufficient detail to assess the impact of the change.

If you have any questions or need any assistance from the IRB, please contact the IRB Coordinator at 109 MLKG Building, 5-2208, or irb@uark.edu.

cc: Heather D Vinti, Investigator