

5-1-2011

Pilot Evaluation of an Internet-based Natural Family Planning Education and Service Program

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Abstract

Objective: To evaluate the efficacy, knowledge of fertility, and acceptability of a web-based natural family planning (NFP) education and service program.

Design: A 6-month repeated measure longitudinal evaluation pilot study.

Setting: A university based online website.

Participants: The website was piloted with 468 volunteer women seeking NFP services. Of these participants, 222 used the automatic online fertility charting system to avoid pregnancy. The 222 charting participants had a

mean age of 29.9 years ($SD=5.6$), 2.2 children ($SD=1.9$), 37% were postpartum, and 47% had regular menstrual cycle lengths.

Intervention: Nurse-managed web-based NFP education and service program.

Outcomes: Pregnancies were confirmed by an online self-assessed pregnancy evaluation form. A 10-item fertility quiz and 10-item acceptability survey was administered online.

Results: Among the 222 users avoiding pregnancy, at 6 months of use, there were two correct-use unintended pregnancies that provided a pregnancy rate of 2% and seven total unintended pregnancies providing a typical use pregnancy rate of 7%. Mean knowledge of fertility increased significantly from time of registration (8.96, $SD=1.10$) to 1 month of use (9.46, $SD=.10$), $t=4.60$, $p<.001$). Acceptability increased nonsignificantly from 1 month of use (45.6; $SD=8.98$) to 6 months of use (48.4; $SD=8.77$).

Conclusion: The nurse-managed online NFP system seems to provide adequate knowledge of fertility and help participants meet pregnancy intentions. Acceptability of such a system of NFP is still in question.

Only 64,000 to 124,000 couples in the United States currently use modern natural family planning (NFP) methods to avoid pregnancy (Mosher, Martinez, Chandra, Abma, & Wilson, 2004; Mosher & Jones, 2010). Reasons for low usage of NFP include complexity of NFP methods, lack of access to qualified teachers, actual and perceived ineffectiveness, and lack of credibility of the methods among health professionals and the general public (Fehring, 2009; Fehring, Hanson, & Stanford, 2001). Current NFP delivery systems are teacher and user intensive (Arévalo, 1997; Fehring, 2009). Service delivery of NFP usually entails introductory sessions that last an hour or more, individual follow-up sessions at monthly intervals for up to 6 months (and sometimes longer), and complex charting and instructions (Fehring, 2004). In today's "fast-paced" information and technology age society, couples are often no longer willing or able to attend extensive educational sessions and follow-sessions to learn how to use NFP or to travel long distances to obtain these services (Stanford & Smith, 2002). There is also a need to provide ease of access to family planning services (Arévalo; Barot, 2008). An online NFP service administered by professional nurse NFP teachers with links to medical consultation is one way to meet the need for easier access to NFP services and to service large areas.

Another need is to simplify the teaching and delivery of NFP services. Patient encounters in health care practice last about 10 to 15 minutes to be cost effective. Current NFP services are education based

and counseling intensive and do not fit readily into short episodic-care systems. Arévalo (1997) suggested that more user-friendly NFP methods could be developed by creating simplified version of existing methods, streamlining teaching approaches, and developing new approaches and methods. Researchers at Marquette University have developed a new system of NFP that incorporates use of electronic hormonal monitoring as an aid to learning fertility awareness to avoid or achieve pregnancy (Fehring, 2005). The monitor is accurate, acceptable, simple to use, and can be beneficial to a couple's relationship (Severy, 2001). Access to this new method of fertility awareness or NFP is limited due to the few health professionals that know how to provide this system of NFP. Although there is an online training program for health professionals to learn how to provide what is now called the Marquette Method (MM) of NFP, the professional nurse NFP teachers at Marquette University decided to develop and pilot an online system that provides a simplified NFP method, an online fertility charting system, and online professional consultation (Fehring, 2004). However, the efficacy of the system in helping women and couples to achieve and avoid pregnancy, to understand basic human fertility, and acceptability still require evaluation.

The Internet is the primary source for women seeking information on fertility.

Therefore, the purpose of this pilot study was to evaluate an online NFP education and service program that is administered by professional nurses through a University-based NFP center. Specifically, this pilot study evaluated efficacy of the online NFP service program to help couples to either avoid or achieve pregnancy, knowledge of human fertility and reproduction, and acceptability of the website and the online fertility charting system.

Background

According to the National Center for Health Statistics, 74% of adults in the United States use the Internet and about 64% have accessed the Internet for health information (Cohen & Stussman, 2010). Each month approximately two million more people connect to the Internet (Jain & Barbieri, 2005). Furthermore, women of reproductive age access health information on the Internet more than

men (Cohen & Stussman). There are more than one million websites that provide information on fertility. In fact the Internet is the number one source of information for couples with fertility health problems (Kahlar & Mackert, 2009).

Past studies have sought to determine the characteristics and use of the Internet by infertile couples (Epstein, Rosenberg, Grant, & Hemenway, 2002; Haagen et al., 2003; Weissman, Gotlieb, Ward, Greenblatt, & Casper, 2000), assess the types of information sought on the Internet by infertile couples (Himmel, Meyer, Kochen, & Michelmann, 2005; Marriott et al., 2008), describe the experience (Malik & Coulson, 2008), and assess the quality of information infertility websites provide (Epstein & Rosenberg, 2005; Huang, Discepola, Al-Fozan, & Tulandi, 2005; Okamura, Bernstein, & Fidler, 2002; Weiss & Moore, 2003). However, there have been few studies that have investigated the effectiveness of these websites on satisfaction or other outcomes.

One study investigated the effect of providing online access to personal medical records on the empowerment and satisfaction of couples undergoing in vitro fertilization (IVF) treatments (Tull, Verhaak, Robbe, & Kramer, 2007). The researchers compared the outcome of empowerment with a control group of couples who did not have access to their medical records and found there was no difference in empowerment. Other researchers provided an informational website on infertility for couples with unexplained infertility (Porter & Bhattacharya, 2008). The intent of the website was to provide information on how to achieve pregnancy. They found that only couples who achieved a pregnancy felt empowered. Finally, infertility researchers recently sought to develop and test the effectiveness of a brief web-based education and support system for female infertility patients (Cousineau et al., 2008). The researchers found that those women who were exposed to the online Infertility Source program had significant improvement in the area of social concerns related to infertility and felt more informed about medical decisions in which they were involved. This was the first study to demonstrate the efficacy of an online infertility support and educational system. Similar studies are needed to assess the benefits of online charting and information for family planning purposes. The Cousineau et al. study did not have direct access to health professionals (e.g., professional nurses or

physicians) to answer questions and concerns related to fertility, forums to share concerns with other couples, or an online fertility monitoring system.

Natural Family Planning

Natural family planning is simply the ability to monitor fertility by use of self-detected natural indicators of fertility (Fehring, 2004, 2005). Knowledge of the fertile time in the menstrual cycle allows the woman and couple to modify their behavior to either avoid or achieve pregnancy, for example, avoid intercourse during the estimated fertile time to prevent pregnancy and to have intercourse during the fertile phase to become pregnant. There are only 6 days of fertility during the menstrual cycle, the day of ovulation and the 5 days before ovulation (Wilcox, Dunson, & Baird, 2000). In NFP, the couple uses natural indicators of fertility to estimate the beginning, peak, and end of the 6-day fertile phase. The traditional natural indicators to estimate the fertile phase of the menstrual cycle are the estrogenic changes in the cervix and cervical mucus, the postovulatory progesterone stimulated rise in resting body temperature, and calendar day estimates. Various individuals (usually physicians) have developed methods of NFP that include one or a combination of natural signs of fertility and instructions as to how to monitor and chart these signs of fertility, how to use these signs to avoid or achieve pregnancy, and how to manage special reproductive circumstances such as postpartum breastfeeding and peri-menopause. Generally, these methods are very effective in helping women/couples to avoid pregnancy with correct use (i.e., a 1%–3% unintended pregnancy rate per 100 women over 12 months of use), but the typical or imperfect use unintended pregnancy rate ranges from 12% to 25% (Trussell, 2004).

Marquette University College of Nursing (MUCN) has been providing professional services in NFP since 1985. In 1999 we developed a new method of NFP that incorporates electronic hormonal fertility monitoring along with other traditional markers of fertility. The electronic hormonal fertility monitor is a handheld device that measures estrogen and luteinizing hormone (LH) in the urine and provides the user with three levels of fertility: low, high, and peak (Fehring, 2005). The monitor was developed to indicate the most

fertile days in the menstrual cycle for couples wishing to achieve a pregnancy. However, the information that the monitor provides can be used in reverse along with other markers of fertility, such as the changing patterns of cervical mucus and basal body temperature for those wishing to avoid pregnancy. Our system of NFP includes use of the fertility monitor, a unique fertility charting system, user manual, a slide program for presenting the method in person, and protocols for special circumstances, such as monitoring fertility during breastfeeding, peri-menopause, and posthormonal contraception. We also developed a unique protocol for monitoring fertility while breastfeeding (Fehring, Schneider, & Barron, 2005). The protocol involves creating 20-day "cycles" with the hormonal fertility monitor to detect the estrogen rise and the first ovulation before the first menses.

The objective of this pilot study was to determine efficacy, fertility knowledge, and acceptability of a nurse-managed online natural family planning education and support system.

In 2007 we completed our first prospective efficacy and acceptability study of the Marquette Method of NFP (Fehring, Schneider, Raviele, & Barron, 2007). The 217 couples in this study found the new method to be easy to use and acceptable, and it provided them with confidence in identifying the fertile phase of the menstrual cycle. Since then we have completed a retrospective and comparative efficacy study of the Marquette Method of NFP and found the method to be more effective than traditional single-indicator methods (Fehring, Schneider, & Barron, 2008; Fehring, Schneider, Barron, & Raviele, 2009). However, the professional nurse NFP providers at Marquette can only see in-person couples from a limited geographical area. The Marquette NFP providers receive weekly and daily requests from the lay public and from health professionals for information on NFP, the use of the fertility monitor, and special reproductive protocols. In the past, information on NFP was sent out through e-mail, but this process was rather time-consuming and repetitious. Therefore, a website was developed that has information on NFP, NFP materials, an online fertility charting system, and a process for receiving feedback and consultation that has streamlined the online NFP teaching process.

Method

Design

This was a 6-month repeated-measure longitudinal evaluation pilot study of the efficacy (for avoiding or achieving pregnancy), knowledge of fertility, and acceptability of a nurse-managed NFP website. Volunteer participants were asked to use and evaluate the website (for the purpose of either achieving or avoiding pregnancy) over a 6-month time period. During the first 6 months the participants had their knowledge of fertility measured at registration and 1 month of use. Acceptability measured at 1, 3, and 6 months of use, and all pregnancies were evaluated as being either intended or unintended. For the purpose of this pilot study, unintended pregnancy rates were carried out to 6 months of use.

Participants

All participants were obtained by one announcement of the NFP website and the pilot study on a NFP online discussion forum for NFP health professionals. The participants were not the health professionals nor were the participants accessed directly. The health professionals spread the availability of the website through their own sources, that is, by e-mails, websites, or in-person to potential couples. The availability of the website then spread through online "snowball" means, that is, from one participant to another or by other participants posting the availability of the website in blogs or other websites, such as a breastfeeding support site. Eligibility to be in the pilot study was that the female participant wished to use the site to either achieve or avoid pregnancy or for fertility knowledge. At registration into the website the participants were automatically asked to sign (i.e., click on a "yes" response) on an online consent form that requested that they use the site and charting system and to provide feedback to the developers. Participants were not able to use the website charting system and forums until consent was given. The study received human subject approval through the Marquette University Office of Research compliance. The online website is encrypted through the server system and is accessed only through protected passwords. The personal information of the participants and their fertility charts can be

accessed only by the participants (i.e., only their own charts), the professional nurse NFP teachers, or the designated graduate research assistant at Marquette University.

Description of Website

The Marquette University College of Nursing NFP website (<http://nfp.marquette.edu>) has free information on fertility, downloadable paper or digital charting systems, access to protocols for special circumstances (e.g., using NFP while breastfeeding), and instructions for achieving and avoiding pregnancy. A unique aspect of the information section of the website is a one-page simple Quick Start Instructions that can be read in 5 minutes and allows the user to begin charting and using a NFP method. Women who register on the website are able to access an online electronic charting system, discussion forums, and have consultation from professional nurse NFP teachers, an obstetrician gynecologist with expertise in the use of NFP, and a bioethicist. The online charting system also notifies the user of possible health problems, including unusual bleeding, infertility, pregnancy, and cycle dynamics that are out of the norm. The Marquette online NFP system is offered in English and Spanish languages.

The nurses that manage the online program visit the site everyday to answer questions in the online forums, to provide one-on-one private consultation with participants, and to monitor the site for inappropriate responses. Forum and private questions are answered within 24 hours of being posted. The nurses also notify the website physician consultant or bioethicist when questions are directed toward their expertise. The website is periodically updated by the nurses with research on fertility, suggestions on how to manage health problems like polycystic ovarian disease, and how to optimize fertility.

The online charting system has designated sections for recording the results of either an electronic hormonal fertility monitor (EHFM) or self-observed cervical-vaginal mucus or both (as estimates of the fertile phase of the menstrual cycle) and provides spaces for recording the results as either L=*low*, H=*high*, or P=*peak fertility*. The charting system provides a pop-up window for the user that illustrates the three fertility levels provided by the fertility monitor or the

test. The online system also launches a pregnancy evaluation form that the user is asked to complete. Two professional nurse NFP teachers evaluate all pregnancies that occur among the participants. The NFP teachers review the charting system for the days of fertility, the days of recorded intercourse, and the information on the pregnancy evaluation form. Each participant was asked to record on her fertility chart before each new cycle of charting her intention of either achieving or avoiding pregnancy. A determination is made if intercourse occurred during the fertile time as designated by the online charting system. Each pregnancy was classified (with agreement of the couple) according to the following classification as recommended by Lamprecht and Trussell (1997): (a) pregnancies were classified as intentional only when a couple reports prior to the pregnancy cycle an intention to use the method to become pregnant, (b) all unintentional pregnancies were used in the analysis of pregnancy risk during typical use, and (c) all unintentional pregnancies occurring during cycles in which NFP rules were followed were used in the analysis of pregnancy risk during correct use.

Fertility Knowledge. A 10-item true-false fertility quiz was developed by the professional nurses and physicians who designed the Marquette Method of NFP. The quiz is provided for in-person provision of NFP at the first introductory session on NFP and at the 1 month follow-up. It was originally developed as a teaching tool and a form of assessment. The items include knowledge of life span of egg and sperm, length of the fertile phase, and questions on natural fertility indicators (cervical mucus and basal body temperature) and female reproductive hormones. The internal reliability α of the 10-item quiz for the participants who used the online charting system was .72.

Acceptability. All participants were automatically prompted to complete a 10-item questionnaire on whether the online website was acceptable, easy to use, convenient, and provides clear and objective results. The 10-item survey was a shortened form of an acceptability/ease of use questionnaire developed by Severy for evaluating an EHF (Severy, 2001; Severy, Robison, Findley-Klein, & McNulty, 2006). The 10 items are ranked on a scale from 1 to 7, with bipolar negative and positive adjectives. The range of scores for the survey is from 10 to 70, with the higher score indicating more acceptability and ease of use. This is the same tool that was used in

the prospective efficacy study of the EHFM as an aid to NFP (Fehring, 2008). Internal consistency α 's of the modified version from the 2008 study were .83 to .91. For the current study the internal consistency α 's were .85, .89, and .85 at 1, 3, and 6 months, respectively.

Analysis. Information from the data charts, the online acceptability survey, and the pregnancy outcomes were accessed from the study website by graduate research assistants and entered into a statistical program data file. Survival analysis (Kaplan-Meier) was used to determine correct use and total unintended pregnancy rates. Correct use rates were determined by including in the equation only those menstrual cycles that were used correctly, that is, the women/couples did not have intercourse during the estimated fertile window. Typical or total unintended pregnancy rates included all unintended pregnancies and were based on correct use and incorrect use during menstrual cycles. Descriptive statistics (means and standard deviations) were used to analyze the acceptability levels at 1, 3, and 6 months of use. A one-way repeated-measure ANOVA and paired t tests were used to determine differences between those time periods with a significance level of .05, and corrected to .02 to control for error rate increase.

Results

Participants

Since the website was launched in mid-April of 2008 and up until June 1, 2010, 468 women have registered into the site, of these, 222 have used the online charting system to avoid or achieve a pregnancy. The 468 woman users were between the ages of 18 and 54 (mean age=29.7 years) and had an average of 1.95 children. Most (83%) were non-Hispanic White, married (85%), and Roman Catholic (85%). Only 6% ($n=28$) indicated that they were Hispanic American. Thirty-one percent of the women were postpartum breastfeeding and 50% were experiencing regular menstrual cycles of 25 to 35 days in length. Most (77%) were using the system to avoid pregnancy.

The 222 participants who utilized the online charting system to avoid pregnancy were similar in demographics to those that did not

($n=246$) (see Table 1). The only difference was that the charting participants had on average more children. Eighty-five percent were non-Hispanic White, 87% married, and 88% Catholic. Forty-eight percent listed they had regular length menstrual cycles and 48.6% indicated that they were postpartum breastfeeding at the time of registration.

Table 1. Demographics (Means, Standard Deviations, Percentages) of Registered Participants not Charting ($n=246$) and Online Charting Participants ($n=222$)

Demographics	<i>M (SD)</i>		<i>p</i>
	Not charting	Charting	
Age female	29.4 (5.4)	29.9 (5.6)	.30
Years married	4.6 (5.1)	4.8 (5.1)	.64
Living children	1.7 (1.8)	2.2 (1.9)	.02
Weight female	151.1 (36.8)	150.2 (30.1)	.79
Height female	65.2 (2.7)	65.2 (2.5)	.54
% Ethnicity	77% White	84% White	
% Religion	81% Catholic	78% Catholic	

Since the launch of the website there have been over 1,500 posts in the online forums on 350 plus topics. Typical topical areas include charting questions, protocol questions, unusual bleeding, breastfeeding, menstrual cycle variability, infertility, medications and fertility, vaginal infections, polycystic ovarian syndrome (PCOS), menstrual cramping and pain, and fertility monitor questions.

Pregnancy Outcomes

Among the 222 participants who used the online charting system to avoid pregnancy, there were two unintended pregnancies with correct use, which provided a survival rate of 98% for 100 women at six menstrual cycles of use or a 2% unintended pregnancy rate. There were seven total unintended pregnancies providing a typical use unintended pregnancy rate of 7% (see Table 2). However, the six menstrual cycle correct use unintended pregnancy rate was 0% for the nonbreastfeeding participants ($n=114$) and 3.8% for the breastfeeding participants ($n=108$), that is, they had two unintended pregnancies. The total or typical unintended rate was 9% (four pregnancies) at six cycles of use for the nonbreastfeeding participants and 5% (two pregnancies) for the breastfeeding participants.

Table 2. Typical Use Unintended Pregnancy Rates Per 100 Women Over 6 Cycles of Use ($n=222$)

	<i>n</i>	# Cycles	# Pregnant	Estimate	Std. Error
1 month	222	222	0	.000	.000
3 months	89	288	3	.022	.012
6 months	47	282	4	.071	.027
Total		792	7		

Of the 222 online charting participants, there were 38 participants who indicated a desire to achieve a pregnancy at some time while participating in this online website. In other words, they contributed some menstrual cycles in which they indicated they were avoiding pregnancy and menstrual cycles in which they were trying to achieve pregnancy. Of these 38 participants, they were trying to achieve pregnancy for a mean of 3.12 months before entering the study (range 0–26 months). Of the 38 participants, 19 achieved a pregnancy. Not all were trying for the entire time to achieve a pregnancy. The pregnancy rates (i.e., percentage of those achieving) were 64%, 33%, and 40% for the first 3 months. At 6 months of use the overall pregnancy rate was 60%.

Fertility Knowledge

The website was automatically evaluated online by use of a 10-item true-false fertility knowledge quiz at initial use and at 1 month of use. Mean knowledge of the 96 participants who completed the initial and 1-month 10-item (true false) fertility quiz increased significantly from initial use (8.96, $SD=1.10$) to 1 month (9.46, $SD=0.10$), $t=4.60$, $p<.001$.

Acceptability

Mean acceptability scores were 45.63 ($SD=8.98$) at 1 month ($n=143$), 47.59 ($SD=10.12$) at 3 month ($n=75$), and 48.37 ($SD=8.78$) at 6 months ($n=40$) of use. The one-way repeated-measure ANOVA of the three time periods showed a significant effect, $F(2, 42)=3.76$, $p=.031$. However, follow-up paired t tests revealed no statistical differences in these mean scores of acceptability between the three time periods. The individual item scores ranged from a low of 3.33 with item #6 "decreased anxiety about pregnancy" to a high of

5.17 with item #10="chances of avoiding pregnancy" out of a possible range of 0 to 7 (see Table 3).

Table 3. Acceptability and Ease of Use of Online Fertility Charting

Months and Number Participants	Mean (SD)		
	1 (n=143)	3 (n=75)	6 (n=40)
Ease of including in daily routine	4.04 (1.71)	4.07 (1.86)	4.13 (1.82)
Ease of performing urine test	4.73 (1.52)	4.92 (1.30)	4.63 (1.93)
Understanding monitor information	4.80 (1.23)	5.17 (1.12)	4.63 (1.63)
Overall opinion of charting	5.02 (0.98)	5.12 (1.33)	4.56 (1.15)
Increased ability to avoid pregnancy	4.19 (1.46)	4.63 (1.44)	3.63 (1.71)
Decreased anxiety about pregnancy	3.83 (1.64)	4.03 (1.93)	2.94 (1.77)
Ease of using the CPFM/online chart	5.01 (1.13)	5.12 (1.28)	4.63 (1.71)
How do you like the CPFM/online chart	4.68 (1.15)	4.76 (1.29)	4.63 (1.14)
Compared to other methods, how improved	4.58 (1.27)	4.96 (1.08)	4.52 (1.69)
Chances of avoiding pregnancy	4.04 (1.72)	4.81 (1.53)	5.06 (1.61)
Total	45.6 (8.98)	47.6 (10.13)	48.4 (8.77)

Discussion

Efficacy of Methods to Avoid and Achieve Pregnancy

The correct use efficacy of all participants who were avoiding pregnancy and using the online charting system, whether postpartum breastfeeding or not, was very good i.e., 98% to 100% survival rate (or a 0–2 unintended pregnancy rate per 100 women over 6 months of use). This correct use unintended pregnancy rate compares well with what is found in the literature for NFP methods (97%–99% survival with correct use; Trussell, 2004) and with the previous three efficacy studies of the Marquette Method of NFP—98% to 99% (Fehring et al., 2007, 2008, 2009). The total typical (or total) survival rate of 93% (3% unintended pregnancy rate) also compared well with the past studies on the Marquette Method (86%–89%) and other NFP methods: 83 to 86% (Howard & Stanford, 1999); 88% (Arévalo, Jennings, & Sinai, 2002); 86% (Arévalo, Jennings, Nikula, & Sinai, 2004); and 98% (Frank-Herrmann et al., 2007). However, the methods of most of the other studies of NFP (other than the Howard and Stanford study) do not include women with irregular cycle lengths or those women who are postpartum breastfeeding. So it is remarkable that this online study of NFP had such good rates with this variety of menstrual cycle lengths. The non-post-partum typical use survival rate of 94% is very

good, even when compared to the use of oral hormonal contraception 92% (Trussell) and some of the best studies of NFP 98% (Frank-Herrmann et al.). The non-post-partum participants in this current study included women with long and short menstrual cycles and those discontinuing hormonal contraception.

There are few studies that have investigated the efficacy of using NFP methods to avoid pregnancy during the breastfeeding transition (Brown, Harrison, & Smith, 1985; Hatherley, 1985; Labbok et al., 1991). Most have shown that NFP is not very effective or that NFP even increases the unintended pregnancy rate. Howard and Stanford (1999) reported a pregnancy rate of 33% among postpartum women who used a mucus-only method of NFP. Participants in our study utilized a special breastfeeding protocol as described in an earlier report (Fehring et al., 2005). The 95% survival rate (or 5% unintended pregnancy rate) is very good in comparison to past studies. However, the number of cycles and participants that this study represents is at pilot study level and needs many more participants and cycles of use for more valid results.

There are few studies that have investigated the efficacy of using NFP methods or what is sometimes called focused intercourse during the estimated fertile window as a means to achieve pregnancy. Hilgers, Daly, Prebil, and Hilgers (1992) reported a study in which 49 of 50 couples of normal fertility achieved a pregnancy within 5 months by focusing intercourse on days of good quality cervical mucus. German researchers reported the largest prospective study to estimate the cumulative probabilities of conception among a cohort of 346 couples using the symptom-thermal method (i.e., cervical mucus and basal body temperature monitoring) from their first cycle onwards (Gnoth, Godehardt, Godehardt, Frank-Herrmann, & Freundl, 2003). There were a total of 310 pregnancies among the 346 couples during a maximum of 29 cycles of observation. The cumulative pregnancy rates for cycles 1, 3, 6, and 12 for all couples ($N=340$) were .38, .68, .81, and .92, respectively. In comparison our (small) study had rates of 24%, 48%, and 60% at 1, 3, and 6 months respectively.

Researchers from Unipath Diagnostics completed a study in which they randomized 1,000 women volunteers into two groups, one group of 500 received an EHF, and the control group of 500 women

volunteers were asked to do what they wished to achieve a pregnancy, including the use of pregnancy assist devices (e.g., ovulation test kits and basal body temperature) (Robinson, Waklin, & Ellis, 2007). The volunteers were between the ages of 21 and 40 years and with a partner between the ages of 21 and 50. The pregnancy rate during the first cycle was 15.2% (or 46 of 302) for the EHFM group and 7.8% (27 of 347) for the control group and 22% for the two menstrual cycle rate for the monitor group. In addition, the researchers provided the users of the EHFM with a satisfaction tool and determined that 90% of the users found the device to be easy or very easy to use, and 80% found it to be convenient or very convenient.

Fertility Knowledge

Overall, the participants who completed the online fertility quiz achieved a high level of fertility knowledge. Furthermore, the knowledge of fertility increased significantly after 1 month of fertility charting. Previous studies have shown that couples trying to achieve a pregnancy, college students, and the general population have a low level of fertility knowledge (Lambic, Skoog Svanberg, Karlstrom, & Tyden, 2006; Sydsjo, Selling, Nystrom, Oscarsson, & Kjellberg, 2006). In fact that is one reason that some couples have difficulty in achieving pregnancy (Robinson & Ellis, 2007). The mean fertility knowledge scores of the online participants are very similar to those of our in-person couples.

Acceptability/Ease of Use

The mean acceptability scores in the online pilot study increased from 45.6 to 48.7 from 1 to 6 months of use. However, this was not a significant increase. Furthermore, the number of respondents went from a high of 143 at 1 month and down to 40 at 6 months. So the increase in acceptability could be due to those who were most satisfied with the online charting remained in the study and responded at 6 months of use. Although there was a significant change throughout the three time periods in acceptability, there was also a loss of statistical power to determine significant change from one time period to the next. We suspect that many of the participants went back to a paper charting system or to their previous method of NFP. Younger

participants most likely would prefer to use handheld devices to record the menstrual cycle (Zickuhr & Smith, 2010). A future need is to develop a menstrual cycle charting application for handheld devices that could be linked to the online website, for ease of use and for the ability of health professionals to access the menstrual cycle records.

The highest rated items were items dealing with satisfaction and ease of use with the online charting system. However, at 6 months, the highest rated item was chances of avoiding pregnancy. The lowest rated item of "decreased anxiety about pregnancy" was consistent at all time periods. The increase in satisfaction over time for couples avoiding pregnancy is common for those learning and using NFP methods. Severy (2001) and Severy et al. (2006) found increased acceptance of use with the EHFM that decreased after a time when pregnancy desire was not accomplished. An earlier in-person study of the Marquette Method of NFP generally had higher rated items with the acceptability survey (Fehring, 2008). It is hard to compare these results, however, because the participants in the in-person study only used the hormonal fertility monitor, unlike participants in the online study.

Limitations

Although the intent was to pilot and evaluate the efficacy, knowledge of fertility, and acceptability of a nurse-managed online NFP education and support program, there are limitations to this pilot study that need to be discussed to place the results in context. One of the critical limitations is the large percentage of participants who registered and consented for the study, but failed to chart online, complete the surveys and quiz, and participate for six menstrual cycles. Furthermore, there was a significant drop-off of completing the surveys and quizzes and to charting online for those that did participate. For example, only 222 of the 468 participants charted online, and of these, only 47 were charting at six cycles of use and 140 completed the acceptability survey at 1 month of use and only 40 at 6 months of use. Some of the 468 participants only utilized the website to seek consultation and use the discussion forums. We speculated that although the participants had to register and sign (i.e., click on) a consent form explaining participation, some might have

treated the consent in a cursory manner much the same as when people click on consent for new software. There was no incentive for participating in the study other than having free access to the site, the online charting system, and professional consultation.

The online nurse-managed natural family planning system provided the participants with the ability to meet their family planning intentions.

Since this website was first announced to professional NFP teachers, some of the participants might have been just curious to view the site. However, there was no difference between the mean acceptability scores of the participants who indicated that their current method of family planning was NFP, compared with those who used other methods or none. Another factor to consider is that many of the participants sought the website for help going through the breastfeeding transition and existing health conditions (e.g., PCOS) that might have contributed to irregular menstrual cycles and difficulty in tracking fertility.

Practice Implications

There are a number of practice implications from the findings of this pilot study of an online nurse managed NFP education and support system. First of all, the online provision of the Marquette Method of NFP is effective and efficient. The overall correct use efficacy is 98% to 99% and typical efficacy is 88% to 94% with the combined results and the separate results of the breastfeeding/postpartum participants. These results compare favorably with and maybe somewhat better than in-person teaching of NFP methods. Second, we found that you can efficiently reach and teach many women and couples throughout the United States in how to use NFP through the Internet and Internet-based online charting. And third, health professionals can efficiently provide health consultation and information on women's health problems, menstrual cycle questions, and related health topics through the Internet and web-based forums.

Policy Implications. The implication the findings have on policy is that family planning or women's health clinics (and similar type clinics) could offer NFP services through a nurse-managed

Internet site in an efficient and effective manner. These sites could be managed by two to three professional nurses who are familiar with NFP and ideally with collaboration with women's health nurse practitioners and/or physicians. Other health clinics that do not offer NFP services could be linked into the sites or the clinics could help participate in the NFP services and support by enrolling women/couples and helping to follow those couples online. A similar model could be developed for diocesan NFP programs, that is, each diocese could have their own Internet NFP service or support system or be linked to such service sites in larger diocese or Archdiocesan programs.

Research Implications. We have several research implications from the findings of this pilot study of an online nurse-managed website. First of all, the use of an online system to enroll, obtain consent, survey, and maintain participants is possible and is an efficient way to conduct efficacy research for NFP methods. Second, the use of such an online website and charting system (with slight modifications) could be used to compare other standardized methods of NFP—such as the Standard Days Method—a fixed calendar-based system or the Two Day Method (Arévalo et al., 2002, 2004). There also needs to be studies (cohort and/or randomized comparison) to determine if in-person teaching of NFP methods are more effective and acceptable than online systems of NFP. Furthermore, we recommend the use of a similar online fertility awareness and educational system to determine if use of an online charting system to track fertility enhances the ability to achieve pregnancy among subfertile women. We currently are conducting a federally funded study to compare the efficacy and acceptability of two methods of NFP: electronic hormonal fertility monitor in comparison with cervical mucus monitoring as an estimate of the fertile phase of the menstrual cycle. Preliminary pregnancy rates and acceptability results have been reported in the proceedings of a recent human fertility conference (Fehring & Schneider, in press).

Conclusion

Our preliminary conclusion is that the use of a nurse-managed online web-based fertility education, charting, and support system to

teach a method of NFP can be very effective and efficient. The overall unintended pregnancy rates of those participants who utilized the online automatic charting system are very low. The preliminary results of unintended pregnancy rates for those using the breastfeeding protocol are encouraging. So too are the intended pregnancy rates for those attempting to achieve a pregnancy. Acceptability and ease of use of the online system needs further investigation, especially in references to in-person services.

Acknowledgments

Funded by Our Sunday Visitor Foundation. The authors thank research assistants Teresa Roumonada and Dana Rodriguez.

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