Natural Family Planning
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NATURAL FAMILY PLANNING

Fertile Window Length Varies from Couple to Couple

Pregnancy from a single act of intercourse can occur with high probability on the day of ovulation or the 5 days preceding ovulation. These days with a probability of pregnancy have been referred to as the "6-day fertile window." The probability of pregnancy on the six days of the fertile window can decrease or increase due to behavioral and environmental factors such as smoking, poor nutrition, obesity, the presence or absence of cervical mucus ,and in particular, increased age. What is not known is whether the length of the fertile window varies from cycle to cycle and from woman to woman.

Researchers from the Netherlands sought to determine the variability of the fertile window from couple to couple and to determine if the length of the fertile window was related to the occurrence of spontaneous ongoing pregnancy.[1] These researchers were able to enroll 404 sub-fertile couples who attended a fertility clinic in Tilburg (The Netherlands). To be in the study, the female participants needed to have menstrual cycle lengths from 25 to 35 days. For this study the first day of the fertile window was defined as the day of sexual intercourse resulting in the first normal sperm-to-mucus interaction as determined by a post coital test (PCT) or by the first normal sperm-mucus interaction (SMPT) result. The end of the fertile window was the estimated day of ovulation as determined by ultrasound observation of the dominant follicle and resultant collapse. All of the women in the study had daily or every other day ultrasound exams for follicular dynamics at least 5 days before the estimated day of ovulation as well as cervical mucus aspiration. If couples were able to have intercourse on one of those days, a PCT was performed; if they were not able to collect semen from an act of intercourse, then a SMPT was determined. Of the 404 couples 212 were observed for the entire fertile window. The remaining couples had missing days during the fertile window since the researchers did not collect data on the weekends. For these latter couples only minimum fertile window lengths were calculated.

RESEARCH ON:

The female participants ranged in age from 20-40 (mean 31.2), and the male partners 24-46 (mean 34.3). The duration of sub-fertility was a mean of 1.9 years (range=1-7). The length of the fertile window varied from $\leq$ 1 day to > 5 days. The most frequent complete fertile window length was 3 days (see Figure 1). Based on Kaplan-Meier analysis there was a strong relationship between the length of the fertile window and the percentage of couples conceiving, with the longer length of the fertile window related to the quickest time to conception and an ongoing pregnancy.

The researchers indicated that these findings disproved the maxim that the fertile window is a fixed 5-6 day period ending on the day of ovulation. The mentioned limitations of the study included not controlling for the frequency of intercourse, not measuring the quality of cervical mucus, and not measuring the time between intercourse and the estimated day of ovulation. The researchers concluded that the length of the fertile window varies considerably among sub-fertile couples and is related to the time to pregnancy, i.e., the longer the fertile window, the higher the probability of a spontaneous ongoing pregnancy.

Comments

Ever since the 6-day fertile window was verified by Wilcox et al. in 1995, NFP providers and researchers have wondered about the variability of that fertile window from cycle to cycle and from couple to couple.[2] This study provides some good evidence for the variability of the length of the fertile window between couples with sub-fertility. A repeat study is needed to verify these results among a normal fertility population and to determine the variability of the 6 day fertile widow between cycles in the same woman. (RJF)

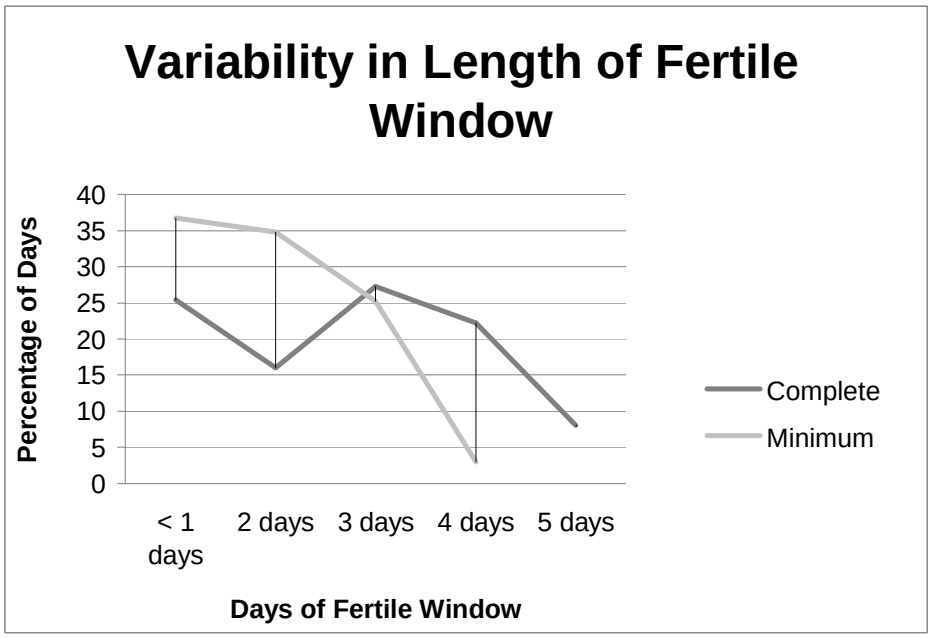

Figure 1. Percentage of Length of Days in the Fertile Window based on Complete (N=212) and Minimum (N=198) Fertile Window Lengths.

1. Keulers MJ, Hamilton CJCM, Franx A, Evers JLH, Bots RSGM. **The length of the fertile window is associated with the chance of spontaneously conceiving an ongoing pregnancy in subfertile couples.** *Human Reproduction*, 2007;22:1652-1656.

2. Wilcox AJ, Weinberg CR, Baird DD. **Timing of sexual intercourse in relation to ovulation**. *New England Journal of Medicine,* 1995;333:1517-1521.

Electronic Fertility Monitoring plus Cervical Mucus Monitoring Investigated as a Method of Natural Family Planning

Researchers and Natural Family Planning (NFP) teachers at Marquette University Institute for Natural Family Planning developed a system of NFP that involved the use of an electronic hormonal fertility monitor along with self-observations of cervical mucus as a double check for the beginning and end of the estimated fertile phase of the menstrual cycle.[1] The electronic fertility monitor is a hand held device that was designed to read dual assay urinary test strips that have antibodies for luteinizing hormone (LH) and a metabolite of estrogen called estrone-3-glucuronide (E3G). The monitor reads the test strips for threshold levels of E3G and LH and provides the user with 3 levels of fertility: low, high, and peak. The monitor was designed for women who are seeking to achieve a pregnancy and not as a method of contraception. The Marquette researchers wished to determine whether use of the electronic fertility monitor along with another marker of fertility could be an effective method of family planning. The Marquette system of NFP uses the presence of cervical mucus or the high reading on the fertility monitor (whichever comes first) as the indication for the beginning of the estimated fertile phase. The end of the estimated fertile phase is determined by the peak reading on the monitor or the peak in cervical mucus, whichever occurs later.

The participants for this study were 195 couples who sought NFP services at 5 clinics in 4 cities (i.e., Atlanta, Madison, Milwaukee, and St. Louis). All 195 couples were taught how to use the monitor, self-observe their cervical mucus, and document their findings on a fertility chart. The participants were asked to avoid pregnancy for 12 months, to record on their charts their pregnancy intention before each menstrual cycle, to record all acts of intercourse, and to return completed charts to their NFP teachers.

The mean age of the female participants was 29.5 years (range 19-42) and the male partners 31.1 (range 18-49). The participants were primarily Catholic, married, and at least high school educated. The study period was between 1999 and 2006 and generated 1,795 documented months of use with a mean of 9.2 months per couple. Survival analysis (Kaplan-Meier) was used to determine correct use and total cumulative unintended pregnancy rates. There were 26 total unintended pregnancies, 3 with correct use. The correct use unintended pregnancy rate was 2.1% per 100 users over 12 months of use, and the total unintended pregnancy rate was 14.2% over 12 months of use. Of the 195 couple participants, 102 remained for the entire 12 months of the study. Of the 93 who discontinued from the study, 30 (15.4%) were lost to follow-up, and 19 (9.7%) left to achieve a pregnancy. The researchers concluded that the use of this dual method of NFP can be as effective as other fertility awareness-based

methods of natural family planning. However, comparative studies are needed to confirm this conclusion.

Comments

This was the first study to evaluate the efficacy of an electronic hormonal fertility monitor along with cervical mucus observations to avoid pregnancy. As such, a new system of NFP had to be developed that included the use of the monitor and a system of providing information to couple users that included introductory sessions, a user manual, and a unique charting system that graphed the cervical mucus observations on a 1-8 scale. It was also necessary to train NFP teachers in this new system. Because it was a new system of NFP, needless to say, there were a number of unknowns.

It is hard to compare the efficacy of this method with other NFP systems. The results of this study were not based on cycles of use such as the European double check study.[2] However, this current study had comparable results to an earlier cervical mucus only method conducted by the same principle investigator.[3] Use of this dual system also has been applied to special reproductive circumstances, e.g., with women who are breastfeeding and not ovulating.[4] A recommended study would be to compare the use of this method with another dual marker system of NFP (i.e., cervical mucus observations plus basal body temperature) or with a cervical mucus only method. (RJF)

1. Fehring RJ, Schneider M, Raviele K, Barron ML. **Efficacy of cervical mucus observations plus electronic hormonal fertility monitoring as a method of natural family planning.** *Journal of Obstetric, Gynecological, and Neonatal Nursing*, 2007;36:152-160.

2. Frank-Herrmann P, Heil J, Gnoth C, Toledo E, Baur S, Pyper C, Jenetzky E, Strowitzki T, Freundl G. **The effectiveness of a fertility awareness based method to avoid pregnancy in relation to a couple's sexual behavior during the fertile time: a prospective longitudinal study.** *Human Reproduction,* 2007; 22:1310-1319.

3. Fehring RJ, Lawrence D, Philpot C. **Use effectiveness of the Creighton model ovulation method of natural family planning.** *Journal of Obstetric, Gynecological, and Neonatal Nursing*, 1994;23:303-312.

4. Fehring, RJ, Schneider M, Barron ML. **Protocol for determining fertility while breast-feeding.** *Fertility and Sterility*, 2005;84:805-807.

Increased Pregnancy Rate Found with Use of Electronic Hormonal Fertility Monitor: A Randomized Control Trial

There is little evidence to show that focused intercourse during the fertile time as estimated by self monitoring of natural biological markers of fertility will increase the pregnancy rate and decrease the time to pregnancy. Only non-comparison clinical trials of using self-indicators of fertility to estimate the fertile phase and timed intercourse exist. In fact, there have been claims in the scientific literature that focused intercourse based on the estimation of fertility is

no better than having intercourse 2-3 times a week.[1] The National Institute for Clinical Excellence (NICE) guidelines specifically state that use of focused intercourse is too stressful and no more effective than having intercourse 2-3 time per week.[2]

Researchers from Unipath Diagnostics recently completed a study in which they randomized 1,000 women volunteers into two groups. One group of 500 received an electronic hormonal monitor called the Clearblue Easy Fertility Monitor (CEFM), 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).[3] The CEFM is a hand held device designed to measure urinary metabolites of Estrone 3 Glucuronide (E3G) and lutienizing hormone (LH) by use of an antibody assay test strip. The electronic monitor reads the test strips and provides the user with three levels of fertility: low (baseline), high, and peak.

The women volunteers were obtained via Internet Web sites that focused on infertility and advertised new aids for conception. The participants were asked to send in self-report diaries of intercourse for 3 menstrual cycles or until they became pregnant. They were also supplied with pregnancy test kits. The volunteers were between the ages of 21-40 years and with a partner between the ages of 21-50. The participants were supplied the monitors through the regular mail system with no instructions on how to use the monitors other than what is supplied in the over-the-counter monitor package. The control group participants were also promised a free monitor after completing the data phase of the study. Useable data was obtained from 305 participants in the CEFM group and 348 women in the control group.

The pregnancy rate during the first cycle was 15.2% (or 46 of 302) for the CEFM group and 7.8% (27 of 347) for the control group. The two-cycle cumulative pregnancy rate was statistically higher for the CEFM at 22.7% compared with the control group at 14.4% ($p=0.006$). They also found that having a previous pregnancy and a younger partner were significant factors for achieving a pregnancy. The researchers also provided the users of the CEFM 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. They concluded that the CEFM helped increase the likelihood of pregnancy during the first 2 cycles of use compared to non-use among women trying to conceive for up to 2 years.

Comments

I was pleased to see a randomized control trial on the use of an electronic fertility monitoring device to help couples achieve pregnancy. A similar study would be helpful among women with normal fertility so that a comparison could be made between normal pregnancy rates with the use of the monitor and a control group. In addition, comparing the use of the monitor with another fertility awareness method (e.g., cervical mucus monitoring) would be of interest. (RJF)

1. Snick HKA. **Should spontaneous or timed intercourse guide couples trying to conceive?** *Human Reproduction*, 2005;10:2976-77.

2. NICE Guideline (2004). Clinical Guidelines 11. **Fertility: assessment and treatment for people with fertility problems.** February 2004. (http://www.nice.org.uk/pdf/CG011niceguideline.pdf)

3. Robinson JE, C.Stat MW, Ellis JE. **Increased pregnancy rate with use of the Clearblue Easy Fertility Monitor.** *Fertility and Sterility*, 2007;87:329-234.

FERTILITY

Optimal Rules for the Timing of Intercourse to Achieve Pregnancy

Women in developed countries, particularly Europe, Canada, and the United States (US) are postponing marriage and childbirth to a later age. Since fertility decreases with age, many women are concerned about achieving a pregnancy soon after they make a decision to achieve. Current practice is for women to wait at least 12 months before seeking expensive assisted reproductive technologies. A less expensive approach would be to have women (and couples) time intercourse for the optimal chance to conceive.

Statisticians from the University of Padua, Italy, and the US National Institutes of Environmental Health Statistics developed a statistical approach (based on Baysian modeling) for developing rules for intercourse with the best chance for achieving pregnancy.[1] The model is based on natural biological markers of fertility -- in particular self-observation of cervical mucus rated on a 1-4 scale, with 4 indicating the highest quality. In a previous study these researchers demonstrated that the probability of pregnancy with a single act of intercourse on days with low rated mucus was near zero, but with good quality mucus, the probability is 40 times higher.[2] The researchers applied this model to an existing data set developed by an Italian ovulation method group and offered probabilities of pregnancy with different intercourse patterns during the middle of the menstrual cycle, i.e., days 6 through 25.

The maximum probability of conception was 0.687 with intercourse everyday between days 6 and 25 (i.e., 20 acts of intercourse). The probability was still at 0.615 with 7 acts of intercourse and no mucus type observed. The lowest probability was 0.347 with 2.42 acts of intercourse on 4 rated mucus days (i.e., on good quality mucus days). They concluded that increasing the threshold of intercourse on days within a mid-cycle interval with good mucus scores have high theoretical effectiveness.

Comments

I am not certain that I agree with the conclusion, if I understand the results correctly. It seems that the higher frequency intercourse yielded the better results, while the low intercourse on high mucus days had the lowest probability. It appears that the best timing of intercourse (so as not to be exhausting for couples) is every 2-3 days. Current NFP methods instruct couples

who wish to achieve a pregnancy to have intercourse on days with the best quality and quantity of cervical mucus. It would be worthwhile to have actual studies to test the best theoretical intercourse patterns. (RJF)

1. Scarpa B, Dunson DB. **Baysian methods for searching for optimal rules for timing intercourse to achieve pregnancy**. *Statistics In Medicine,* 2007;26:1920-1936.

2. Scarpa B, Dunson DB, Columbo B. **Cervical mucus secretions on the day of intercourse: an accurate marker of highly fertile days.** *European Journal of Obstetrics and Gynecologic Reproductive Biology,* 2006; 25 (1): 72-78.

Double-blind Study Shows Sub-fertile Women Who Received a Natural Nutritional Fertility Supplement had Significantly Higher Pregnancy Rates

Researchers from Stanford University School of Medicine (Department of Gynecology and Obstetrics) conducted a study to determine the effects of a nutritional fertility supplement called FertilityBlend on the pregnancy rates of sub-fertile women.[1] The participants were 93 women who tried unsuccessfully to achieve a pregnancy for 6 to 32 months. The FertilityBlend (FB) contained chasteberry, green tea, vitamins, folate, and minerals. The outcome measures were serum progesterone levels, number of days basal body temperatures were above base line, menstrual cycle length, pregnancy rates, and side effects. The study design was double-blind and placebo-controlled. The 53 participants in the FB group had significantly increased progesterone levels above basal treatment, significantly increased basal body temperatures over 98 degrees, and significantly less variability in the menstrual cycle length (i.e., fewer long and short cycles). The control group of 40 women did not show a significant change over time on these outcomes variables. After 3 months of use, 14 of the 53 women in the FB group were pregnant (26%) as compared to only 4 of the 40 women (10%) in the placebo group. This was a statistically significant difference in pregnancy rates between the 2 groups. The researchers concluded that the FB nutritional supplement could be a beneficial alternative or complementary therapy to traditional infertility treatments.

Comments

The rate of young women with functional hypothalamic amenorrhea (FHA) is increasing, and some suggest as high as 55% of secondary amenorrhea is due to FHA, a result of stress, poor nutrition, and being underweight.[2] A nutritional supplement for these women certainly would be beneficial. In addition, supplementing this treatment with targeted intercourse through the use of NFP could be beneficial for women with sub-fertility who are seeking pregnancy. (RJF)

1. Westphal LM, Polan, ML, Trant AS. **Double-blind, placebo-controlled study of Fertilityblend: a nutritional supplement for improving fertility in women**. *Clinical Experimental Obstetrics and Gynecology*, 2006;33:205-208.

2. Bomba M, Gambra A, Bonini L, Peroni M, Neri F, Scagliola P, Nacinovic R. **Endocrine profiles and neuropsychologic correlates of functional hypothalamic amenorrhea in adolescents**. *Fertility and Sterility,* 2007;87:876-875.

Time to Pregnancy Extended for Obese Couples

Recent studies have indicated that both male and female obesity can contribute to sub-fecundity. These studies, however, were conducted by measuring obesity and time to pregnancy with individual males or females and not with couples. Researchers from the United States and Denmark, therefore, conducted a study to determine the association between different combinations of men's and women's body mass index (BMI) on time to pregnancy (TTP) and to determine if a change in weight from one pregnancy to the next correlated with TTP.[1]

The data for this study came from the Danish National Birth Cohort Study (DNBCS). The DNBCS is a large population base study of 100,000 pregnant women who were interviewed during pregnancy and after the birth of their children. The participants for the obesity study involved a sub-group of 47,835 couples who had recorded a TTP, a BMI, and who met the criteria for inclusion in the study. Of the 47,835 couples, 2,478 had at least two births with the father being the same for each child. A BMI of greater than 30.00 kg/m^2 was considered as obese, and a BMI between 25.00-29.99 kg/m^2 was considered overweight. The researchers utilized a regression model to determine odds rations (OR) for sub-fecundity for BMI combinations. Sub-fecundity was defined as having to wait 12 months to achieve a pregnancy and have a live birth.

The researchers found that, when both the man and the woman were either overweight or obese, the adjusted ORs for sub-fecundity were 1.41 and 2.74 respectively compared to normal weight paired couples. They also determined that each 1-kg increase in weight was associated with 2.84 days longer for TTP. However, with each 1-kg loss of weight among those women with a BMI of 25 or higher, the TTP decreased by 5.50 days. The researchers essentially found a higher risk of sub-fecundity related to overweight and obesity for both men and women, particularly when both partners were overweight. The researchers did not control for frequency and timing of sexual intercourse. They concluded that obese couples have a high risk for sub-fecundity, but that losing weight might bring back fecundity to normal levels.

Comments

Determining BMIs for both the man and woman learning NFP/FA to achieve pregnancy should be a part of the normal registration and follow-up process. For couples that have either the man or woman or both with BMIs higher than 25, helping either partner lose weight would be a benefit. (RJF)

1. Ramlau-Hansen CH, Thulstrup AM, Nohr EA, Bonde JP, Sorensen TIA, Olsen J. **Subfecundity in overweight and obese couples.** *Human Reproduction*, 2007;22:1634-1637.

High Intake of Low-fat Dairy Foods Found to be a Risk for Anovulatory Infertility

There are conflicting results in the scientific literature as to whether intake of milk and other dairy products may increase or decrease the risk for infertility due to ovulatory dysfunctions in otherwise healthy women. Therefore, researchers from Harvard University sought to prospectively determine whether intake of low or high fat dairy foods were associated with anovulatory infertility in a large cohort of healthy women.[1]

The participants for this study were a subgroup of The Nurses' Health Study II (NHS II) which is a prospective cohort study of more than 116,000 female registered nurses aged 24-42. The NHS II was initiated in 1989 and involves detailed mailed questionnaires every two years, included in these questionnaires are items on pregnancy, infertility, and dietary assessment. The Harvard researchers identified a subgroup of 18,555 women participants that were married, had no history of infertility, and were attempting pregnancy. Between 1991 and 1999, there were 26,971 pregnancy attempts among this sub-cohort of women. Of these pregnancy attempts 2,165 women underwent medical interventions for infertility, and 438 were diagnosed with anovulatory infertility.

Harvard scientists found a positive association between low-fat dairy food intake (above 5 servings per week) and a risk of anovulatory infertility. They also found an inverse association between high-fat dairy food consumption and the risk of anovulatory infertility. Women consuming one or more servings per week of skim/low-fat milk had a 40% higher risk of anovulatory infertility when compared to women consuming less than one serving per week. Likewise, women who had a high-fat dairy intake of either a daily serving of whole milk or ice cream had a 50% reduction in the risk of anovulatory infertility. The researchers speculated that since high-fat dairy products have a higher concentration of estrogens than low fat products, the increase in estrogen might help to stimulate ovulation. They also mentioned that these results need to be confirmed or refuted. They concluded that high intake of low-fat dairy products may increase the risk of anovulatory infertility and intake of high-fat dairy products may decrease this risk.

Comments

For women attempting pregnancy, including a daily serving of whole milk or ice-cream would not hurt, especially if they are not obese or overweight. Likewise, cutting down on low-fat dairy products would be recommended. This advice could be provided by NFP/FA teachers. (RJF)

1. Chavarro JE, Rich-Edwards JW, Rosner B, Willett WC. **A prospective study of dairy foods intake and anovulatory infertility.** *Human Reproduction*, 2007;22:1340-1347.

MENSTRUAL CYCLE

Artificial Bright Light shown to Increase Follicular Growth and Ovulation Rate

Over the past 40 years studies have shown (and researchers have speculated) that light has a regulatory effect on the menstrual cycle. Light also has been used to treat various rhythmic disorders such as seasonal affective disorder. There is evidence from previous studies that bedside light stimulation will decrease menstrual cycle length. However, these studies were not accompanied by hormonal or follicular development measurement. Therefore, researchers from the Russian Academy of Medical Sciences and the Centre for Chronobiology were interested in determining the influence of artificial morning light on the menstrual cycle and ovarian functioning in women with slightly lengthened menstrual cycles.[1]

The researchers used a cross-over design in which 27 women with lengthened menstrual cycles (i.e., 30-38 days in length) were alternatively placed in either a dim light or bright light group situation. The bright light experience involved 45 minutes of exposure to a light emitting box with a brightness of 4,3000 lux at 41 cm in the morning during 7 days in the follicular phase of the menstrual cycle. The dim light experience involved a 45 minute exposure to a 100 lux or less light for 7 days during the follicular phase. After the first light exposure cycle the women were then switched to the bright or dim light experience for one menstrual cycle. Of the 27 women who entered the study, 22 women with a mean age of 25.2 years (range 19-37) completed the study. These women had serum blood levels of LH, FSH, prolactin (PRL), estradiol (E2), and thyroid stimulating hormone (TSH) drawn and ultra-sound measurements taken of the dominant follicle before and after both 7 day light experiences. Ultrasound exams continued until ovulation was detected.

After conducting a repeated measure analysis of variance, the researchers found a significant increase in the serum PRL, LH, FSH levels and follicular size with the bright light menstrual cycles compared to the low light menstrual cycles. Furthermore, they discovered that the number of ovulatory cycles increased after exposure to bright light compared to low light (i.e., 12 ovulatory cycles during bright light compared to 6 ovulatory cycles during dim light). They did not find a significant increase in E2 or TSH, nor did they find a

significant decrease in mean cycle length. The authors concluded from this small study that exposure to bright light during the follicular phase of the menstrual cycle promotes ovulation among women with slightly lengthened menstrual cycles. They also speculated that this could be a promising method to help couples overcome infertility.

Comments

The use of this bright light treatment also has the potential for regulating menstrual cycle length and regularity. This might be helpful for NFP and fertility awareness methods that are more dependent on menstrual cycle length and regularity. However, I am somewhat skeptical of the results. First of all, there were only 22 women with only one menstrual cycle of exposure to the bright light. Because these women were not randomly distributed into a low light and bright light treatment design the results could be due to menstrual cycle variability or to some other extraneous factor. The researchers failed to demonstrate any change in mean length of the menstrual cycles. Furthermore, the women participants were a rather homogenous group from the same latitude. (RJF)

1. Danilenko KV, Samoilova EA. **Stimulatory effect of morning bright light on reproductive hormones and ovulation: results of a controlled crossover trial**. *PLOS Clinical Trials*, February, 2007.

Menstrual Cycle Irregularity Related to Increased Risk for Cardiovascular Disease

University based researchers from Brazil conducted a case-control study to determine the association between cardiovascular risk factors and disease during the post menopausal years in relation to menstrual cycle irregularity during the reproductive years. The participants were 414 postmenopausal women (mean age 60.4). The variables measured were menstrual cycle characteristics at age 20-35 (as the independent variable) with medical records of hypertension, diabetes mellitus, dyslipidemia, and coronary artery disease (as the dependent or outcome variables).

Participants who reported menstrual cycle irregularity during the reproductive years were associated with an increased risk for some cardiovascular risk factors compared to those women with regular menstrual cycles with an odds ratio (OR) = 2.14. Stratified analysis also identified women with irregular menstrual cycles to have a increased risk for: a) arterial hypertension, OR = 2.74, b) hypercholesterolemia, OR = 2.32, c) hypertriglyceridmia, OR = 2.09, and d) coronary angioplasty, OR = 6.82. The authors emphasized that the association between menstrual cycle irregularity and cardiovascular disease was indicative of polycystic ovarian syndrome.

Comments

The findings imply the health benefit of self-monitoring the menstrual cycle and the use of menstrual cycle charting to help evaluate treatments for polycystic ovary disease, i.e., regular length menstrual cycles as a positive outcome. (RJF)

1. Azevedo GD, Duarte JM, Souza MO, Costa-E-Silva TD, Soares EM, Marandao TM. **Menstrual cycle irregularity as a marker of cardiovascular risk factors at postmenopausal years.** *Brazilian Archives of Endocrinology and Metabolism,* 2006;50:876-882.

Final Menstrual Period can be Predicted within One Year

Peri-menopausal women often ask their health providers or NFP teacher when they will have their final menstrual period (FMP). Being able to predict the FMP can help peri-menopausal women and their health providers make decisions important to their overall health in regards to family planning methods, hormonal replacement, lifestyle changes, and experiences of peri-menopausal symptoms. Women's health researchers from several universities teamed up to investigate whether they could develop a predictive model for determining the FMP based on a number of menstrual cycle and lifestyle variables.[1] They utilized a developing (prospective cohort observational) data set of multiethnic women called the Study of Women's Health Across the Nation (SWAN). The data set began in 1996. The participants that generated data for the data set were 3,302 women 42 to 52 years of age. The current study involved 2,662 peri-menopausal women of which 706 had an observed FMP. The FMP was defined as experiencing 12 months of amenorrhea. Peri-menopause was defined as having experienced increasing variability in menstrual cycle length over the past year. Multiple measures of health (including serum FSH and estrogen levels) were assessed from the participants at baseline and at their annual follow-up visits.

The researchers determined that participants who had experienced menstrual cycles that were farther apart (i.e., longer menstrual cycles) and more variable in length were more likely to experience their FMP within 12 months compared to participants with regular menstrual cycles. They also found that age, smoking, higher levels of FSH and estradiol were predictive of an earlier FMP. However, higher physical activity and educational levels were associated with a later FMP. The authors concluded that by assessing age, smoking, menstrual cycle recall, FSH, and estrogen levels, health professionals can be more precise in predicting the FMP. They also emphasized that as a woman becomes older, the predictive model becomes more precise; for example, if a woman is 54 years or older, is a smoker, and has high FSH and estrogen levels, the FMP will occur within one year. The researchers, however, concluded that the current predictive model is not precise enough for clinical use.

Comments

One of the possible reasons that the predictive model in this study was not precise is because menstrual cycle length was by recall and was recorded in grouped data intervals. A more precise model would entail having actual menstrual cycle history, such as would be available for NFP/FA users. For example, Taffe et al. provided a predictive model based on actual menstrual cycle length, which essentially stated that when the running range (between the longest and shortest menstrual cycle) is 42 days or more, there is a 93% chance that there will be fewer than 20 remaining menstrual cycles.[2] (RJF)

1. Santoro N, Brockwell S, Johnston J, Crawford SL, Gold EB, Harlow SD, Matthews KA, Sutton-Tyrrell K. **Helping midlife women predict the onset of the final menses: SWAN, the Study of Women's Health Across the Nation.** *Menopause*, 2007;14:415-424.

2. Taffe, JR, Dennerstein, L. **Menstrual patterns leading to the final menstrual period**. *Menopause*, 2002; 9 (1):32-40.

Women Smokers with Irregular Menstrual Cycles have Increased Risk for Acute Myocardial Infarction

Researchers from Milan, Italy, conducted a case control study to determine endogenous risk factors for acute myocardial infarction (AMI).[1] The study included 609 women with non-fatal AMI and 1,106 women controls who had been hospitalized for acute conditions. They found that there was an increased risk for AMI among women with irregular menstrual cycles compared with women who experienced regular menstrual cycles. They also discovered a greater risk among irregular cycling women with children compared to irregular cycling women who were childless. In addition, pre- and peri-menopausal women with irregular menstrual cycles who smoked had an even higher risk for AMI as well as those women who smoked and were childless. There was no increased risk for AMI among those women who experienced an abortion or who had menopausal status. They concluded that women who experience irregular menstrual cycles and pregnancy, especially if they are smokers and peri-menopausal, have an increased risk for AMI.

Comments

I can understand the increased risk due to irregular menstrual cycles, especially if they are due to polycystic ovarian syndrome and insulin resistance. I am not sure why there is an increased risk for those women who were pregnant. Obviously, a healthy lifestyle of not-smoking will decrease the risk. The risk for AMI among women with irregular menstrual cycles and pregnancy was only 45%, whereas when they smoked, the risk increased to 477%. Providing help in smoking cessation to women would have the biggest health impact. (RJF)

1. Bertuccio P, Tavani A, Gallus S, Negri E, La Vecchia C. **Menstrual and reproductive factors and risk of non-fatal acute myocardial infarction in Italy**. *European Journal of Obstetrics, Gynecologic, and Reproductive Biology,* Feb, 13, 2007 (Epub ahead of print).

CONTRACEPTION

Meta-analysis Demonstrated Increased Risk of Breast Cancer with Use of Oral Hormonal Contraceptives before First Full Term Pregnancy

Researchers recently produced a meta-analysis of case-controlled published studies to determine the risk of premenopausal breast cancer with use of oral contraceptives (OCs).[1] The studies were those published after 1980. The rationale was that early OCs had higher levels of estrogens than the more modern versions, and, therefore, studies published before 1980 would not capture the time delay for the development of observable breast cancer. Furthermore, women today are more likely to begin use of OCs at a younger age and before the first full-term birth. The theory behind the increase in breast cancer is that breast tissue is still in development before the first full-term birth and, therefore, more susceptible to the influence of a carcinogen. Furthermore, if the OC acts by preventing the implantation of an embryo, the breast tissue under the hormonal influence of a beginning pregnancy will increase this susceptibility. This is due to the increased differentiation of breast tissue during this time period.

The 34 studies that met the inclusion criteria for the analysis demonstrated an increased risk of 19% for premenopausal breast cancer with use of OCs (OR = 1.19). The risk for nulliparous women who ever used OCs was 24%, and the risk for nulliparous women who used OCs for 4 years or more was 29%. Among parous women the increased risk from ever use of OCs was 29%, but the risk was 52% if parous women used OCs for 4 or more years. The risk of breast cancer for those women who used OCs before a first full time pregnancy (FFTP) was 44% and higher than the 15% risk of those who used OCs after a FFTP. The conclusion of the researchers was that this increased risk is consistent with the classification of estrogen in OCs as a group I carcinogen and that the meta-analysis demonstrated an increased risk of breast cancer especially among women who used OCs before a FFTP.

Comments

The risk of breast cancer among women < 35 years is estimated to be about 10 cases per 10,000 women.[2] The risk with the use of OCs increases this rate to about 13-15 per 10,000. Is this small increase in risk enough to have young women not use OCs and switch to NFP or FA methods? Not likely, especially since there is no over the lifetime increased risk with use of OCs and the fact that the risk disappears after 10 years from stopping use of OCs.[2] (RJF)

1. Kahlenborn C, Modugno F, Potter DM, Severs WB. **Oral contraceptive use as a risk factor for premenopausal breast cancer: a meta-analysis**. *Mayo Clinic Proceedings*, 2006;81:1290-1302.

2. The Practice Committee of the American Society for Reproductive Medicine. **Hormonal contraception: recent advances and controversies.** *Fertility and Sterility*, 2006;86(Suppl):S229-S234.

Pregnancy Rate Only Slightly Delayed in First 3 Months Post Oral Contraceptive Use

Researchers from Goethe University, Germany, stated that there was no conclusive evidence for a post-hormonal contraceptive delay in fertility.[1] They also stated that recent surveys have demonstrated that there is a fear of impairment of fertility among women as a result of oral contraceptive (OC) use. They admitted (from past research) that there is a transitory reduction in fertility

post OC use but indicated that within the first 7 weeks after stopping OCs 90% of women will have a spontaneous ovulation. They also cite a study providing evidence that there is no difference in menstrual cycle length among women stopping OCs compared to women who have not used OCs.[2] The purpose of the current study was to determine the pregnancy rate after the termination of an OC containing 30 micrograms of ethinyl estradiol and 2 mg of dienogest (EE/DNG). EE/ENG is one of the most used and prescribed OCs in Germany.
The researchers sent out 1,180 questionnaires to the private practices of obstetricians and gynecologists throughout Germany asking them to follow women in their practices that discontinued EE/DNG and who wished to achieve a pregnancy. They received a return of 706 surveys but, of these, 54 were lost to follow-up (without reason) within the first year. Therefore, they had complete data on 652 women participants. These women were between the ages of 16 – 41, with a mean age of 26.8 years (SD= 4.3), and most of the women (45.8%) were between the ages of 19-26 years.

The 1 year pregnancy rate for the 652 participants was 94%. The worst case scenario, when they included the 54 participants who were lost to follow-up (and they assumed that they did not achieve a pregnancy) was a pregnancy rate of 86.8%. Analyzing further the 652 participants, 17% achieved pregnancy within the first cycle of trying, and more than 50% within the first 3 cycles. The mean time to pregnancy was 3.5 cycles (2.4 cycles for women 16-18 and 3.9 for women 30-34). They also found that there was only a slight increase in time to pregnancy with duration of use of EE/DNG.

In comparison to a study of NFP users and time to pregnancy, these researchers found a decrease in pregnancy rates only in the first 3 cycles of use.[3] The first 3 cycles of use in the present study were 56% compared to 68% of the

NFP study, the 6th cycle pregnancy rate for the current study was 81% versus 83% for the NFP study, and for the 12th cycle a 94% pregnancy rate for the current study and 92% for the NFP study.

The researchers concluded from this comparison that there was only a slight delay in time to pregnancy with use of EE/DNG during the first 3 cycles post termination. After the first 3 cycles there is no difference in the pregnancy rate compared to those who never used OCs.

Comments

The authors admitted that there were several limitations to their study in that there was no information on the partners' age or fertility, there was no documentation of the frequency of intercourse, no documentation of reasons for loss to follow-up, and no information on the type and length of use of other forms of contraception after cessation of EE/DNG. Furthermore, the comparisons that the authors give with the NFP users is not a randomized comparison but rather a comparison with another cohort clinical trial. They also contend that there is no evidence for an ovulatory delay in fertility during the first 3 months post termination of OCs. (RJF)

1. Wiegratz I, Mittmann K, Dietrich H, Zimmermann T, Kuhl H. **Fertility after discontinuation of treatment with an oral contraceptive containing 30 micrograms of ethinyl estradiol and 2 mg of dienogest**. *Fertility and Sterility*, 2006;85:1812-1818.

2. Duijkers IJM, Engels L, Kippling C. **Length of the menstrual cycle after discontinuation of oral contraceptives**. *Gynecologic Endocrinology*, 2005;20:74-79.

3. Gnoth C, Godehardt D, Godehardt E, Frank-Herrmann P, Freundl G. **Time to pregnancy: results of the German prospective study and impact on the management of infertility**. *Human Reproduction*, 2003;189:1959-1966.

No Increased Risk of Depressive Symptoms Found Among Young Oral Contraceptive Users

There is a common belief among the public and NFP teachers that use of hormonal oral contraceptives (OCs) causes depression among users. One of the reasons for an increase in depression that has been provided is due to a decrease in vitamin B6. However, there is little research to show that this is so. In fact, a study by Oddens has shown that there are higher levels of depression among NFP users.[1] Researchers from the University of Newcastle, Australia conducted a study for the purpose of determining if there was an association between use of OCs and depression among young Australian women.[2] A unique aspect of the study was that they also wanted to control for confounding factors of depression, such as life changes, stress, limited social support, and previous depressive illness.

The subjects for this study were women who were participants in the Australian Longitudinal Study on Women's Health that involved 3 surveys, one in 1996, the next in 2000, and the 3rd survey in 2003. The current study involved 9,688 women between the ages of 22 and 27 from survey 2 and 9,081 women in survey 3. The survey items included a depressive symptoms scale, current use of OCs, a measure of health status, life events, and over all perceived stress.

Before adjusting for confounders, 23.3% of the OC users and 30.3% of the non-OC users reported depressive symptoms. This proportion was statistically significant by Chi square statistics. The odds ratio (OR) of a non-user experiencing a depressive symptom being 1.43 (95% CI=1.28-1.58) times that of the OC users. After adjusting for confounders of depression, there was no significant increased likelihood of the non-OC users reporting depressive symptoms compared to the OC users, OR = 1.05 (95% CI = 0.90-1.21). However, in comparison with women who were using OCs for contraceptive purposes, the odds ratio for depressive symptoms was significantly increased among women who used OCs for non-contraceptive purposes, i.e., the OR was 1.32 (95% CI = 1.07-1.62. The researchers also found that the amount of depressive symptoms decreased among the OC users as the number of years of use increased. They concluded that there was no evidence for the association between OC use and depression among young Australian women.

Comments

Based on the evidence from this Australian study and the European study, it would not be recommended that NFP teachers mention an association between OC use and depression. This was a large population based, longitudinal study with a representative sample of women. However, as the author points out, this was not a randomized controlled trial of OC users versus non-users, which would be a better (but not necessarily feasible) research design to determine cause and effect. (RJF)

1. Oddens BJ. **Women's satisfaction with birth control: a population survey of physical and psychological effects of oral contraceptives, intrauterine devices, condoms, natural family planning, and sterilization**. *Contraception*, 1999;59:277-286.

2. Duke JM, Sibbritt DW, Young AF. **Is there an association between the use of contraception and depressive symptoms in young Australian women?** *Contraception*, 2007;75:27-31.

Significant Weight Gain found among DMPA Users

Obesity and associated health risks such as diabetes, hypertension, heart disease, and stroke, are a major concern in developed, affluent societies. Weight gain is also a common reason that women provide for discontinuing hormonal contraception. Furthermore, weight gain can exacerbate common health risks associated with hormonal contraception use, such as deep vein

thrombosis. There have been mixed results on the effects of hormonal contraception and, in particular, the intramuscular (IM) or subcutaneous (SC) use of depot medroxyprogesterone acetate (DMPA) on weight gain. Therefore, researchers were interested in determining the influence of DMPA-IM and DMPA-SC on weight gain by analyzing data from existing efficacy trials of these methods and in determining if age and baseline BMI are modifying factors.[1]
The participants for this retrospective research study came from clinical trials of DMPA-SC in North/South America (N=722) and in Europe/Asia (N=1065) and a randomized comparison trial of DMPA-SC (N=266) users with DMPA-IM (N=150) users. The weights of the participants were taken at baseline and every 3 months for the first year and over 3 years for the participants in the comparison trial. The mean 12 month weight gain for the participants in the American trial was 1.7 kg (SD=4.5) and for the participants in the European/Asian trial 1.4 kg (SD=3.6). After 3 years of use the DMPA-SC participants had a mean weight gain of 5.8 kg (SD=8.7) and the DMPA-IM group a mean gain of 4.5 kg (SD=8.5). There were no significant differences in the mean weight gains among subgroups of age or baseline BMI. The authors concluded that the use of DMPA-SC may be associated with a modest weight gain over time.

Comments

The authors did point out a weakness of this study was that there were no comparison groups of women who were not on hormonal contraception. Since women tend to gain weight over time naturally, we cannot be sure that the weight gains in this study were due solely to the use of DMPA. Furthermore, there were many women in each group that lost weight. However, I disagree with the authors when they claim that a mean gain of 4-5 kg is insignificant. On the contrary, it should be investigated. A comparison study of weight gain with women using natural methods of family planning as the comparison group would be of interest. (RJF)

1. Westhoff C, Jain JK, Milsom I, Ray A. **Changes in weight with depot medroxyprogesterone acetate subcutaneous injection 104 mg/0.65 mL**. *Contraception*, 2007;75:261-267.

UNDER THE MICROSCOPE

Sterilization among Roman Catholic Women in the United States

Female sterilization is the second most frequently used method of family planning among women between the ages of 15-44 in the United States (US). If you include the use of sterilization of the male partner in the equation, then sterilization becomes the number one method of family planning in the US, even exceeding the use of oral contraception. The pattern of sterilization use among Roman Catholic (RC) women in the US is not much different than the total population of US women. According to data from the 2002 National Survey of Family Growth (NSFG), the rate of ever use of female sterilization among US women was 15% and among RC-US women 14%, whereas male partner sterilization among US women and US-RC women was about 4%.[1]

In 2002, researchers from Marquette University analyzed trends in contraception use among RC-US women (using NSFG data) and found that from 1988 to 1995 the ever use of sterilization almost doubled.[2] Marquette researchers recently analyzed the influence of religiosity on the use of contraception among US-RC women based on the data from the latest (2002 – Cycle 6) NSFG.[3] Religiosity in this study was measured by self-report of importance of religion and frequency of church attendance. The researchers hypothesized that RC women with high religiosity would report a higher use of NFP and lower use of other contraceptive methods and in particular sterilization. There were 7,365 women participants in the 2002 Cycle 6 of the NSFG and a sub-group of 2,250 Catholic female respondents. The mean age of the US women was 29.50 (SD = 8.43), and the mean age of the US RC women was 29.44 (SD = 8.35). The mean parity for US women was 1.22 living children, while the mean parity for US RC women was 1.29 living children. A slightly higher percentage of US RC women were married (43.0%) compared to US women in general (39.1%). Relative risk odds ratios (OR), i.e., likelihood to use a method of contraception (based on 95% confident intervals) were calculated with the RC sample dichotomized by: 1) frequent church attendance versus not frequent attendance, and 2) religion is very important versus not important.

When compared to those RC women with low church attendance, RC women with high church attendance were 38% more likely to be sterilized (OR = 1.381, CI = 1.092-1.745) and 51% more likely to have a male partner who was sterilized (vasectomy) (OR = 1.505; CI = 1.084–2.096). However, women with high church attendance were 188% more likely ever to have used NFP compared to low attendance women. When compared to those who reported religion as not very important, RC women who reported religion as very important were 68% more likely to be sterilized (OR = 1.689, CI = 1.337-2.135). There was no statistical difference in frequency of having a male partner who has been sterilized. Those women who reported religion as very important were 164% more likely ever to have used NFP.

What is startling in these findings is that RC women who have frequent church attendance and who view their religion as very important had more frequent (38-69%) "ever use" of female sterilization. The use of sterilization might reflect the completion of the family size, an older population of women, and the decline of female fertility as women reach the age of 35-40. Women in this age range no longer wish to be using hormonal contraception and are probably tired of managing their fertility. Women at this age are also often confused by irregular cycles and are fearful of an unwanted pregnancy in this stage of their life.

One reason that RC women who have frequent church attendance and believe that their religion is very important had more frequent use of sterilization could be because sterilization is a one-time event. Couples can have the sterilization surgery, confess to a priest, and then be back in the grace of God and the church. The constant use of the pill and/or condoms, on the other hand, requires either frequent confession or a guilty conscience. The sterilization and one-time forgiveness process was first speculated by Leslie Woodcock Tentler in her book *Catholics and Contraception; An American History.*[4]

Another reason for the use of sterilization among Catholic couples might be a lack of understanding of the Church's teaching on family planning and sexual ethics. This reason is somewhat supported by findings showing that the subset of women with orthodox sexual ethics did not have a higher frequency of male (partner) or female sterilization. So too others have pointed out that there is an ignorance of the tenets of the faith system and/or a rejection of the Church teaching on moral issues altogether. [5] Another possible reason is that, although RC couples know the Church's teachings on contraception and sterilization, they view themselves as "autonomous" adults, and downplay or ignore the role of the church's official teachings in forming their consciences on the issue of family planning.[7]

Although there seems to be some influence of religion on the family planning choices of RC women, it is still quite apparent that RC women and (men) have difficulty in either living with or accepting their fertility and that of their spouse. This is evident from the fact that their most frequent ways of dealing with fertility are to either suppress it with hormones or destroy it with surgery. Another implication is that although women and couples view their faith as very important, they may not have a good understanding of the faith and what it teaches, especially in the area of sexuality and contraception. This is further exacerbated by the lack of support from clergy and Catholic health professionals and Catholic health institutions in the area of family planning. Relatively few physicians, professional nurses, nurse midwives, and Catholic health facilities offer and promote the use of NFP.[6-9]

The findings of this study are encouraging in that there is a higher use of NFP in women who attend church services frequently and in those who report religion as very important, but discouraging that there is also a frequent use of surgical sterilization among this same group. This would seem to indicate a need for better catechesis, perhaps at a younger age, for Catholic men and women. However, further research would be helpful in determining whether religious beliefs enter into the decision of women who are choosing a method of family planning at all.

Another factor that might hold more influence in a woman's or couple's contraception decision making is the effects of sterilization on health and/or the marital and conjugal relationship. A recent study showed that women who have been sterilized had a greater likelihood of reporting that stress was interfering with sex and to have seen a physician for sexual problems.[10] The authors of this study speculated that somehow sterilization is interfering with the emotional bond between the partners. So too there is speculation that sterilization disrupts the woman's self-esteem and body image, i.e., feeling less feminine and less a woman. Discussing these dynamics with physicians and other health professionals before a woman (or man) is sterilized would be important. In conjunction with discussing the possible effects of sterilization on the marital relationship is a discussion of God's true design for marriage, the Theology of the Body, and strategies for living with one's fertility. Hopefully, this would lead more women to reconsider sterilization and develop a newfound interest in living with fertility in accordance with God's plan.

1. Mosher WD, **Use of contraception and use of family planning services in the United States: 1982-2002.** *Adv Data*, 2004; 10 (350):1-36.

2. Fehring R, Schlidt AM. **Trends in contraceptive use among Catholics in the United States: 1988-1995.** *The Linacre Quarterly*, 2001;69(2):170-185.

3. Ohlendorf J, Fehring RJ. **The influence of religiosity on contraceptive use among Roman Catholic women in the United States.** *The Linacre Quarterly*, 2007; 74 (7).

4. Tentler LW, *Catholics and Contraception: An American History*. Ithaca, New York: Cornell University Press, 2004.

5. Prothero S. **Worshipping in ignorance**. *The Chronicle Review*, March 16, 2007: B6-B7.

6. Fehring R. **Physician and nurses' knowledge and use of natural family planning**. *The Linacre Quarterly,* 1995; 62: 22-8.

7. Fehring R, Hanson L, Stanford J. **Nurse-midwives' knowledge and promotion of lactational amenorrhea and other natural family planning methods for child spacing.** *Journal of Midwifery & Women's Health*, 2001; 46 (2), 68-73.

8. Stanford JB, Thurman PB, Lemaire JS. **Physicians' knowledge and practice regarding natural family planning**. *Obstetrics and Gynecology,* 1999; 94, 672-678.

9. Fehring R, Werner C. **Natural family planning and Catholic hospitals: A national survey**. *The Linacre Quarterly*, 1993; 60 (4), 29-34.

10. Warehime M, Bass L, Pedulla D. **Effects of tubal ligation among American women**. *The Journal of Reproductive Medicine,* 2007; 52: 263-272.

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The purpose of this newsletter is to serve the Roman Catholic diocesan Natural Family Planning programs of the United States through providing them with up to date information on research within the fields of Natural Family Planning, human fertility and sexuality, family planning, and related issues. The diocesan NFP teacher should be equipped with the latest information on the various methods of NFP as well as understand current research on related topics.