

# Chapter 14

## Behavioral Methods of Contraception

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### Contents

Introduction.....	247
Behavioral Method Options: Methods Independent of the Menstrual Cycle.....	248
General Overview.....	248
Abstinence.....	248
Coitus Interruptus.....	249
Behavioral Method Options: Methods Dependent on the Menstrual Cycle.....	251
Candidates.....	251
Effectiveness and Continuation Rates.....	251
Specific Methods to Detect Ovulation: Natural Family Planning.....	252
Specific Methods to Detect Ovulation:	
Fertility Awareness Methods.....	255
Newer Technologies.....	256
Benefits.....	257
Training.....	258
Postpartum Women: Lactational Amenorrhea.....	258
Summary.....	260
References.....	260

### Introduction

A large proportion of couples rely on behavioral methods of contraception, at least intermittently or at some point in their lives. These methods rely on knowledge about male and female reproductive physiology and the menstrual cycle rather than medications, herbs, devices, or barriers to prevent pregnancy. Behavioral methods can be

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divided into two categories: methods that do not rely on the menstrual cycle (i.e., abstinence or coitus interruptus) and methods that rely on the menstrual cycle. Methods that rely on the menstrual cycle can be further subdivided into Fertility Awareness Methods (FAM) and “Natural” Family Planning (NFP). FAM includes methods that rely on women to monitor physiologic changes during their menstrual cycle whereas NFP relies on the menstrual calendar to distinguish likely fertile from non-fertile days.

All behavioral methods of contraception require the couple to modify their sexual behavior in some way. Many couples use a variety of different menstrual cycle-dependent or menstrual cycle-independent techniques such as avoiding sex (also known as “periodic abstinence”) or using withdrawal with coital acts. Barrier methods (Chap. 11) are also commonly used in combination with FAM. Behavioral methods of contraception are critically important for many couples for whom this is the only religiously, culturally, or socially acceptable way to prevent pregnancy. This chapter provides information about techniques that can enhance the success of each of these methods.

## **Behavioral Method Options: Methods Independent of the Menstrual Cycle**

### *General Overview*

Abstinence and coitus interruptus are the two methods that do not rely on the menstrual cycle, medicines, devices, or barriers to prevent pregnancy. They may be used as the exclusive method to prevent pregnancy or in conjunction with other methods.

### *Abstinence*

Worldwide, it has been estimated that 200 million reproductive-aged women use abstinence as their method of birth control, where abstinence is defined as the avoidance of penile-insertive vaginal intercourse. For some women and men, this is a permanent choice, but for others it may be a temporary one. This latter situation accounts for the variable success rate of abstinence. If practiced, abstinence should be 100 % effective, but when used as a method at one point of time but not practiced consistently, “abstinence” carries with it a measurable risk of pregnancy, with failure rates as high as not using any method at all.

### **Candidates and Counseling**

Individuals who find sexual pleasure through means other than penile-vaginal intercourse and feel empowered to negotiate the type of sex they have are good candidates for abstinence to prevent pregnancy. However, circumstances may change in

a sexual relationship making abstinence no longer appropriate. Moreover, individuals may have other considerations besides pregnancy prevention such as sexually transmitted infection (STI) prevention. Individuals who abstain from penile-vaginal intercourse but engage in penile-oral, vaginal-oral, anal-oral sex or penile-anal sex are at risk for STIs. It is important for physicians to be aware of these practices so that they can advise patients appropriately about possible health implications and prevention strategies and can test more successfully for STIs.

### **Adolescents and Abstinence Programs**

Considerable effort has been invested in developing programs to encourage abstinence among adolescent men and women, usually referring to abstinence from all sexual activity (including oral and anal intercourse). The benefits are obvious: total abstinence provides the only truly effective way to prevent pregnancy and possibly STI prevention, depending on the individuals' specific sexual practices. Abstinence can help promote self-esteem and maintain a young person's options for self-growth and financial self-sufficiency. In the USA, about 30 % of adolescents initiate sex between the ages of 15 and 16 and the percentage rises to 50 % for adolescents between the ages of 17 and 18 [1]. The majority of younger adolescents practice abstinence and the occurrence of sexual activity among adolescents less than 12 years old is likely to be nonconsensual [1].

Experience with a wide variety of abstinence-promoting programs has provided important insights. Programs based on a "just say no" approach or that threaten young women with STIs or unintended pregnancies if they engage in sexual activity ("scare them straight" approach) have been shown to have no effect on either sexual behavior or contraceptive use [2]. On the other hand, comprehensive sexual education programs that combine abstinence, condom and contraceptive education do not encourage promiscuity among adolescents and have positive behavioral effects such as a delay in initiation of sex, reduction in number of sexual partners of frequency of intercourse, and an increased use of condoms and contraception [3].

### ***Coitus Interruptus***

*Coitus interruptus*, or withdrawal, requires that the penis be removed from the vagina and directed away from the external genitalia of the woman before ejaculation to prevent sperm from entering the upper reproductive tract and fertilizing an ovum. Historically, *coitus interruptus* has been an important method. In the United States, official estimates from the 2006–2008 National Survey of Family Growth are that 5 % of women rely on this method for contraception [4]. This practice is more common among younger women as 31 % of women 15–24 years of age reported using withdrawal method [5].

## Effectiveness

*Coitus interruptus* is more effective than is generally perceived; it is roughly equivalent to typical use of some female barrier methods. It may have some protective effect in HIV transmission but is not a substitute for condoms.

Clinical trial data are not available to calculate the failure rates for consistent and correct use, although some experts have estimated that the failure rate should be approximately 4 % with perfect use. Typical-use first-year rates have been measured to be 18 % [4]. The benefits of this method are obvious: it requires no drugs or devices; it does not interfere with foreplay or pre-coital spontaneity; and it is readily portable and available.

## Candidates

*Coitus interruptus* relies on the male partner to be able to sense impending ejaculation, resist the involuntary urge for continued deep thrusting and withdraw before ejaculation. Coital positioning is also important. Unless the couple is effectively able to communicate in time to permit the woman to move, the male superior position or at least a male-controlled coital position is necessary.

## Noncontraceptive Benefits

*Coitus interruptus* may have some protective effect in lowering HIV transmission among HIV-discordant heterosexual couples [6]. Nevertheless, HIV can be in pre-ejaculatory fluid, making condoms a more effective way to prevent HIV than *coitus interruptus*. Withdrawal does not appear to protect against other sexually transmitted infections and ulcerative lesions, in particular, increase the risk of HIV transmission.

## Drawbacks

With *coitus interruptus*, the dynamics of intercourse are disrupted. Researchers have reported mild to extreme clouding of consciousness just before ejaculation; deep thrusting motions are involuntarily triggered in many men with impending ejaculation [7]. Interruption of penile-vaginal contact at this phase of the sexual response curve may decrease the intensity of the male orgasm. Similarly, for the woman who may be at another phase of sexual arousal, complete cessation of all penile stimulation may not only diminish pleasure but also result in frustration.

## **Patient Education**

Minimal instructions are necessary, but the man should know to urinate and wipe of the tip of his penis before intercourse to remove any sperm lingering from a recent ejaculation. Most importantly, he must learn how to completely withdraw his penis and direct it away from the woman's genitals before ejaculation.

As with any barrier or behavioral method, emergency contraception should be provided to the couple to have readily available should the woman have an accidental exposure to sperm.

## **Behavioral Method Options: Methods Dependent on the Menstrual Cycle**

Fertility awareness (FAM) and natural family planning (NFP) methods all depend on determining when a woman is fertile, as depicted below, and avoiding the possibility of fertilization on those days, either by not having penile-vaginal intercourse, practicing withdrawal, or using a barrier. Between 2006 and 2008, it was estimated that 25 % of women had used one of these methods as contraception at some point in their lives [4]. Successful use of these methods depends on a couple's understanding of reproductive physiology. The National Campaign to Prevent Teen and Unplanned Pregnancy surveyed unmarried 18–29 year olds in the USA and found that 40 % of those relying on behavioral methods of contraception did not know when a woman's most fertile time of the month was [8]. Furthermore, the fertile window can be variable, even in women who have regular menstrual cycles, making it difficult to be certain when one is at risk for pregnancy [9].

## ***Candidates***

Only women with regular menstrual cycles may be appropriate candidates for contraceptive methods that rely on timing with the menstrual cycle. Women who should be offered more effective methods are those with polycystic ovary syndrome or transitioning to menopause or use medications or herbs that affect their menstrual cycle. Success requires that both members of the couple agree to abstain or use protection during the data collection periods and during the at-risk days. In clinical trials, the greatest source of failures has been that couples decide to have intercourse despite clear indications of ovulation [10]. Given such realities, users should be extensively counseled about emergency contraception and ways to obtain it.

## ***Effectiveness and Continuation Rates***

Typical use failure rates are reported to be 25 %. The typical use failure rates vary little among the currently available methods, mostly because of routine violation [11]. However, failure rates associated with consistent and correct method use do

**Table 14.1** Calculation of fertile period

Shortest cycle (days)	First fertile (unsafe) day	Longest cycle (days)	Last fertile (unsafe) day
21	3	21	10
22	4	22	11
23	5	23	12
24	6	24	13
25	7	25	14
26	8	26	15
27	9	27	16
28	10	28	17
29	11	29	18
30	12	30	19
31	13	31	20
32	14	32	21
33	15	33	22
34	16	34	23
35	17	35	24

Day 1 = First day of menstrual bleeding (adapted from ref. [11] Hatcher)

vary, depending on whether pre-ovulation intercourse is permitted or excluded. The calendar method has a 9 % failure rate with correct and consistent use, compared with 3 % for ovulation detection, 2 % for symptothermal method, and 1 % for post-ovulation method [12]. Continuation rates with FAM/NFP methods in well-supported programs after 1 year range between 52 and 74 % [12].

### ***Specific Methods to Detect Ovulation: Natural Family Planning***

#### **Calendar or Rhythm Method**

Several techniques have been developed to identify fertile days by using a calendar and physiologic changes women experience during the menstrual cycle. For the “calendar” or “rhythm” method, it is assumed that sperm last 1–3 days in the genital tract and an egg is vulnerable to fertilization up to 24 h after ovulation. The fertile window includes, at least, the 5 days before ovulation and the day after (total of 6 days). To use this method using traditional approaches, it is necessary to obtain information about the woman’s spontaneous menstrual cycling for at least 6 months. The first day of abstinence is calculated by subtracting 18 from the number of days in the woman’s shortest cycle. The latest day of her fertile period is calculated by subtracting 11 from the number of days in her longest cycle. Tables such as Table 14.1 can be consulted to confirm the calculations. For example, a woman whose 6-month data showed that her cycle length varied between 26 and 30 days

would be required to abstain from coitus between days 8 and 19 each month; the couple may engage in intercourse on cycle days 1–7 and from day 20 to menses.

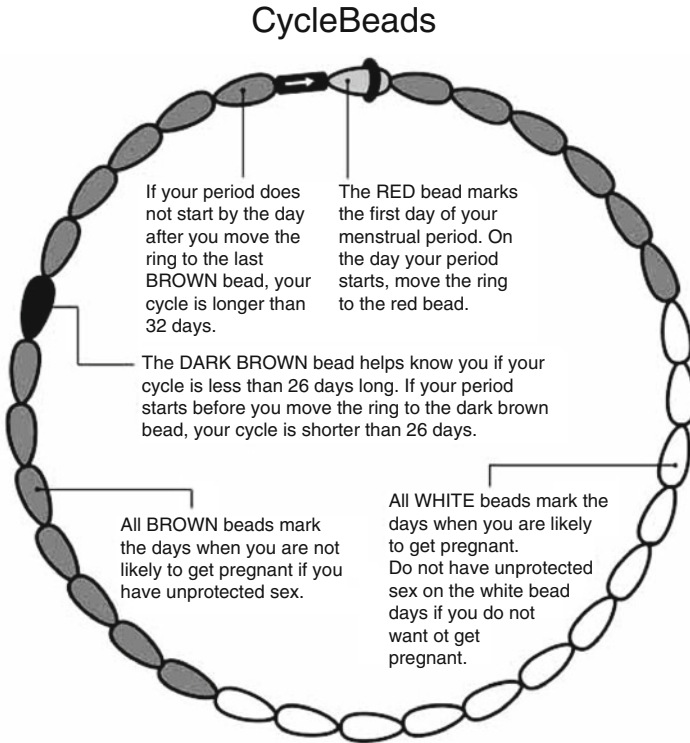
The need to document cycle lengths was highlighted in a prospective study of low-literacy Mayan women who were self-declared to be “regularly cycling.” Quite surprisingly, only 46 % of these women were found to have regular cycles (26–32 days), even for 3 consecutive months [13]. Clearly, approaches such as blanket days 9–19 of abstinence will result in higher than expected failure rates when such dramatic inherent variation in cycle length exists. The traditional calculation requires an average of 13 days of abstinence a month for the general population and provides 67.8 % coverage of peak risk days [14]. Even when women have regular cycles, they may ovulate earlier or later than expected using these calculations. In one study of 221 health women attempting to conceive, 10 % of women with regular cycles were in their fertile window on any given day between days 6 and 21 [9].

### Standard Days Method Using CycleBeads (NFP)

The standard days method was developed by Georgetown University investigators particularly for women desiring to start a simple method immediately and for those with low literacy [15]. It is designed for women who have cycle lengths lasting 26–32 days. Women are given CycleBeads (Figs. 14.1 and 14.2), a device designed

**Fig. 14.1** CycleBeads™  
(Courtesy of Cycle Technologies; [www.cyclebeads.com](http://www.cyclebeads.com))





**Fig. 14.2** CycleBeads™ (Courtesy of Cycle Technologies; [www.cyclebeads.com](http://www.cyclebeads.com))

to assist women in monitoring their cycles and determining their fertile days. The first bead is red, which represents the first day of menses. The next six beads are brown, representing non-fertile days. Fertile days are represented by the following 12 white beads, which are followed by another 13 brown “infertile” beads. The patient advances a moveable ring one bead a day to determine her fertility. The at-risk white beads even glow in the dark. There are two black beads at days 27 and 32. If the woman’s menses starts before she reaches the first bead, then she learns that her cycle length is too short to rely on the CycleBeads. Similarly, if she reaches the 32nd (black) bead without having started her menses, her cycle is too long to use the standard days method. A back-up calendar is provided to allow for the woman to record that she has moved the elastic band every day as directed. CycleBeads can be purchased online or users can get a phone application instead of the physical beads. One study of women using this technique in the Philippines, Peru, and Bolivia found a first-year pregnancy rate of 4.8 % with correct use, meaning no intercourse days 8–19 of the cycle. Of the participants in this study, 28 % had two cycles out of the 26- to 32-day range and were excluded from the results. The probability of pregnancy was 12 % with typical use [16].



## ***Specific Methods to Detect Ovulation: Fertility Awareness Methods***

### **Basal Body Temperature Method**

Other techniques are available to predict ovulation. Basal body temperature (BBT) measurements are used to detect ovulation and, more importantly, to indicate when the risk of pregnancy has passed for a given cycle. Patients are instructed to measure their temperatures at the same time each day before arising. There are dedicated thermometers on the market to measure BBT. Ovulation is identified by an average temperature increase of about 0.4–0.8 °F (usually following a slight dip in BBT). Studies have shown that ovulation occurs within 48 h of either side of the temperature shift. Inaccuracies in measurements may be introduced if the woman gets out of bed at night, has an infection, or varies the time of day the temperatures are taken. Intercourse is not allowed for at least 3 days following the temperature rise. However, this does not protect against exposure to semen when intercourse immediately precedes the BBT rise. In practice, only 80 % of women have interpretable BBT patterns. Therefore, the best use of BBT is as a post-ovulatory method or in combination with some other technique that can better predict ovulation.

### **Cervical Mucus Methods**

#### **Billings Technique**

The Billings technique of ovulation detection relies on changes in cervical/ vaginal secretions that reflect the hormonal swings of the menstrual cycle. Each day, the woman touches a piece of paper or her finger against her vaginal opening before urination to test the quantity and character of those secretions. During the days following menses, cervical mucus is scant and the vaginal testing will be negative. As the follicular phase advances, the secretions increase slightly, but they are still viscous. The pre-ovulatory estrogen surge dramatically increases the amount of these secretions and makes them clearer and more elastic (creating the maximal finger-to-thumb Spinnbarkeit sign) [17]. After ovulation, the mucus again thickens under the influence of progesterone, and coitus may be permitted only after 3 days of dry secretions.

A woman wanting to use the Billings method must first learn about her cycles. Data are best gathered during a period of 6–9 months of abstinence. After a woman learns how to interpret her mucus patterns, the couple should forego coitus at least every other day to permit a woman to assess her fertility without having her measurements confused by seminal fluid or vaginal secretions resulting from the woman's own sexual arousal. Other external factors can also confound these measurements. A woman's vaginal moisture may be changed by vaginal infections or vaginal therapies. Douching may result in misreading, either directly—by eliminating important evidence—or indirectly, by disrupting her vaginal defense system and inducing vaginal infections.

## Two-Day Method

A simpler technique using cervical secretions, called the two-day method, has also been proposed. A woman relies on the presence or absence of cervical secretions to determine whether or not she is fertile each day, asking herself, “Did I note secretions today?” and “Did I note secretions yesterday?” She considers herself fertile if she notices cervical secretions of any type on that day or the day before, avoiding intercourse on these days. The first-year pregnancy rate in one study using this method was 3.5 % with correct use of the method and 13.7 % with typical use, with 96.4 % of participants saying that they had no difficulty in detecting secretions after the third cycle. The mean number of days with secretions was 12.1, which is comparable with the standard days method [18]. This method can be started at any time in the cycle as opposed to the first 7 days of the cycle as was first assumed [19].

## Symptothermal Technique

A more effective method of ovulation detection is the symptothermal technique, which combines at least two of the above techniques and may add other potential signs and symptoms to detect ovulation. Experienced patients may check the cervix for changes in texture, dilation, and position (at ovulation the cervix softens, moistens, dilates, and elevates in the vagina). In addition, clues about ovulation may come from changes in libido or the discomfort of *Mittelschmerz*. Effectiveness of this method has been 2–3 % failure among perfect users and as high as 20 % failure among typical users [15].

Having used any of these methods to detect ovulation, couples may use different strategies to prevent pregnancy. Intercourse can be permitted only after all risk of ovulation has passed (i.e., the post-ovulatory approach) or it may also be permitted at times when the risk of impending ovulation is minimized (e.g., the dry, scant mucus days immediately after menses). Sperm have been noted to survive in the vagina for 7 days. None of the available methods can anticipate ovulation 1 week in advance.

## *Newer Technologies*

### **Fertility Detection Monitors**

Handheld fertility detection monitors, also known as electronic hormonal fertility monitors (EHFM) are available in several European countries and the USA to provide ongoing analysis of a woman’s vulnerability to pregnancy. These devices were originally designed for women to use to achieve pregnancy but can also be used with the opposite intent. Each day a woman uses the fertility monitor to check her fertility status. Different monitors employ different mechanisms to differentiate between fertile and non-fertile days such as detecting urinary metabolites of luteinizing hormone and estrogen (estrone-3-glucuronide), basal body temperature via

body-worn sensors (including vaginal sensors), electrolyte composition in the saliva, and other data inputted by the user.

An example of a monitor designed to prevent pregnancy is the Persona™, which is only available to US consumers via the Internet. It is the counterpart to the fertility monitor available in the USA, ClearBlue™, designed to be used by couples desiring to become pregnant and not approved as a contraceptive. Both monitors instruct the woman to start using test strips that detect LH and estrone-3-glucuronide in her urine. The test strip is inserted into the monitor, and the monitor determines whether there is low, high or peak fertility (Clearblue™) or presence or absence of fertility possibility (Persona™). Use of monitors designed to help achieve pregnancy results in a period of abstinence shorter than those recommended with cervical mucus or calendar methods, which may result in higher failure rates because they may not provide enough time before ovulation to avoid intercourse. Alone, monitors are effective 94 % of the time at preventing pregnancy [20]. It has been postulated that, if used in conjunction with cervical mucus screening and/or basal body temperature, they might be more effective at preventing pregnancy. The Marquette method, combining a fertility monitor with cervical mucus and basal body temperature, has been studied and this approach is feasible and improves efficacy [20, 21]. The cost of a fertility monitor and monthly supply of test sticks may be cost-prohibitive to use for a prolonged amount of time. A similar technology, ovulation predictor kits detect LH urinary metabolites and turns positive during the LH surge. A pilot study has compared using an ovulation predictor kit plus FAM to a FAM-only method to aid users in identifying infertile post-ovulation phase of the menstrual cycle [22]. The combined use of both methods appeared to help women identify the luteal phase more accurately.

The OvaCue™ fertility monitor is an alternative to urine-based methods that measures electrolyte changes in salivary and cervical mucus and uses an oral and vaginal sensor to determine degree of fertility during the cycle. It detects ovulation with 98 % accuracy and appears to predict ovulation more in advance compared to urine-based methods. Lastly there are ovulation saliva tests (Fertile-Focus™ and several others) that require the user to put her saliva on a glass slide and look at the pattern using a small microscope. A distinct ferning pattern of the saliva, influenced by rising estrogen levels, predicts ovulation in the next 72 h. A comparison of microscopes and home fertility monitors found neither to be as effective as the symptothermal method; microscopes had a high false-negative rate for fertile days [23].

## ***Benefits***

Advantages of FAM/NFP are wide ranging: no exogenous devices or drugs are routinely used, most couples learn a great deal about their own reproductive physiology, and it may be the only method accepted by various religious and cultural groups. The same techniques for identifying at-risk days can be used by couples seeking pregnancy to conceive. There are no direct medical side effects from use of the method, although the psychosocial implications of avoiding and planning

**Table 14.2** Behavioral methods of contraception resources for advice, charts, teaching plans, and referrals

Billings Ovulation Method Association, BOMA-USA Website: <a href="http://www.boma-usa.org">http://www.boma-usa.org</a>
The Couple to Couple League International Website: <a href="http://www.ccli.org">www.ccli.org</a>
Fertility Awareness Center Website: <a href="http://www.fertaware.com/">http://www.fertaware.com/</a>
The Global Library of Women's Medicine Chapter: Fertility Awareness Methods of Family Planning for Achieving or Avoiding Pregnancy Website: <a href="http://www.glowm.com/">http://www.glowm.com/</a>
Fertility Instructor Website: <a href="http://www.fertilityinstructor.com/">http://www.fertilityinstructor.com/</a>
Institute for Reproductive Health Website: <a href="http://irh.org/">http://irh.org/</a>
Marquette University Natural Family Planning Website: <a href="http://nfp.marquette.edu/">http://nfp.marquette.edu/</a>

intercourse for significant periods of time should be taken into account by couples considering use of these methods.

### ***Training***

With the exception of the standard days method with CycleBeads™, couples need extensive formal training to effectively practice periodic abstinence or fertility awareness. There are many community resources available to provide more detailed education. The organizations listed in Table 14.2 can provide advice, charts, and teaching plans.

### ***Postpartum Women: Lactational Amenorrhea***

During the postpartum period, the hypothalamic-pituitary-ovarian axis is temporarily suppressed. Lactation temporarily raises prolactin, which blocks activation of the axis. Amenorrhea induced by breastfeeding in the first 6 months postpartum is a relatively accurate clinical marker of ovulation suppression. During the first 6 months postpartum, the first menses a woman experiences (if she has a period) is usually anovulatory bleeding; menstrual bleeding usually precedes ovulation. Being forewarned, a woman can utilize other contraceptive methods to protect herself after such a menses against future, probably ovulatory, cycles. After 6 months of postpartum amenorrhea, however, the first cycle is usually ovulatory. This places the woman at risk for an unannounced return of fertility if she relies exclusively on the lactational amenorrhea method (LAM) beyond 6 months.

The criteria for lactational amenorrhea have changed over time. Early World Health Organization studies included only women who were amenorrheic, breastfeeding on demand, and offered no other source of suckling to the infant. Women were still considered amenorrheic if uterine sloughing occurred within 56 days postpartum as bleeding during this time does not correlate with return to ovulation [24]. Exclusive breastfeeding was defined as an infant receiving at least 90 % caloric intake via breast milk. Later studies abandoned the need to exclude pacifiers. Most recently, studies have clarified the two most important predictors of protection from pregnancy: amenorrhea and time since delivery. In amenorrheic women who were fully or partially breastfeeding, pregnancy rates were 1 % in the first 6 months. However, pregnancy rates rose to 4–7 % by 12 months. Interestingly, there was no difference in pregnancy rates between partially or fully breastfeeding women [25]. All the studies demonstrated the need to provide added protection after 6 months, even if the woman remains amenorrheic while breastfeeding.

### **Candidates**

Breastfeeding women who remain amenorrheic may use LAM as their only method for up to 6 months postpartum. However, some women may not be able to breastfeed for medical or social reasons. An HIV-infected woman should avoid breastfeeding if other sources of nutrition are available to her infant. Similarly, women taking drugs that cross into the breast milk and may harm the baby should not breastfeed. Breastfeeding requires privacy and continuous accessibility of the mother to her child. Working mothers may not have that opportunity, although breast pumping and milk storage for later consumption is a possibility for some women.

### **Noncontraceptive Benefits**

Breast milk is best suited to meet the nutritional requirements of the human infant. Breast-fed children have fewer gastrointestinal problems and decreased rates of allergies and asthma later in life. The mother–child bond reinforced by breastfeeding is also very important. The convenience of the temporary protection offered by LAM in women already dedicated to breastfeeding can be very attractive at this busy time in a woman's life. Epithelial ovarian cancer rates are reduced in women who breastfeed before age 30 years [26]. Breast cancer rates are not affected by lactation unless it is continuous for at least 2 years.

### **Drawbacks**

Breastfeeding may be perceived as embarrassing or inconvenient by some women. Cracked nipples, mastitis, and even breast abscesses are possible complications of breastfeeding. The hypoestrogenic state induced by LAM may decrease vaginal

lubrication and cause dyspareunia. Most of these side effects, however, result from breastfeeding alone. The decision to use LAM for birth control can be viewed as an independent decision not adding any additional side effects. It must be remembered that LAM does not offer any protection against STIs. This is particularly important during the first week postpartum, when an STI could easily result in upper tract infection. The hypoestrogenated vagina may also be more vulnerable to HIV infection.

## Summary

Total sexual abstinence is the most effective method of birth control, but incomplete commitment can result in high rates of unintended pregnancies. *Coitus interruptus* has failure rates similar to the female barrier methods. Periodic abstinence and fertility awareness methods rely on menstrual calendars, CycleBeads, BBT, changing cervical mucus, or the symptothermal method to detect at-risk fertile days. LAM is very effective for up to 6 months postpartum. All of these methods rely on a highly motivated couple who understand reproductive physiology and are willing to modify their sexual behavior to prevent pregnancy.

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