

A COMPREHENSIVE LITERATURE REVIEW

Fertility Awareness across the Life Course

What people know, what they *don't* know, and how it influences their attitudes and behaviors related to sexual and reproductive health

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The Institute for Reproductive Health (IRH) is part of the Georgetown University Medical Center, an internationally recognized academic medical center with a three-part mission of research, teaching and patient care. IRH is a leading technical resource and learning center committed to developing and increasing the availability of effective, easy-to-use, fertility awareness-based methods (FAM) of family planning.

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Introduction

The term *fertility awareness* appears frequently in the literature, but definitions and terminology vary across studies and programmatic approaches. Some literature considers fertility awareness as very basic knowledge of a woman's ability to conceive during several days mid-cycle. For example, the Demographic and Health Surveys (DHS) ask women if there are certain days when pregnancy is more likely (see box). Women who respond "halfway between two periods" are considered to have fertility awareness, although this response does not indicate that they actually know which days they are potentially fertile. Other studies also ask about knowledge of the fertile days of the menstrual cycle, using slightly different questions (Bloom 2000; Singh 1998), but the correct answers do not reflect accurate knowledge of the fertile window, which spans from the beginning to the end of the fertile days.

In the literature many studies address multiple aspects of knowledge and beliefs about fertility throughout the life course and during different life circumstances, as well as some associated attitudes and behaviors (often without a precise fertility awareness definition). Within this context, the term fertility awareness broadens to also include information about:

- body changes during puberty and on-set of fertility (for girls and boys);
- postpartum or post abortion/miscarriage return to fertility;
- pregnancy risk for both breastfeeding and non-breastfeeding women; variable fertility and fertility risk during the menstrual cycle;
- observable changes throughout the menstrual cycle including signs of a woman's fertility;
- male fertility;
- mechanisms by which family planning (FP) methods affect likelihood of pregnancy;
- possible side effects of FP methods; and
- circumstances associated with infertility/subfertility and aging.)

Among the various examples of studies addressing multiple and broader elements of fertility awareness, Polis (2012) included knowledge of the fertile period, pregnancy risk, and infertility risks when exploring perceived infertility among young adults in the United States, in addition to associations with attitudes and behaviors related to contraceptive use. Sommer (2009) captured knowledge of the fertile period, of menstruation, and of normal cervical secretions when exploring how the onset of menses and puberty may affect school participation among girls in Tanzania. In a Canadian study, undergraduate students' awareness of human reproduction and age-related fertility also reflect a broader definition of fertility awareness (Bretherick 2010). A study assessing fertility awareness among women seeking to conceive (Blake 1997) used a definition that included knowledge of fertility indicators, understanding what the symptoms meant, and ability to use this information to enhance conception.

According to more comprehensive definitions, fertility awareness also includes the ability to apply this information to one's life, requiring individual knowledge, personal experience and skills. A review in FHI Network pointed out that:

"Fertility awareness is often narrowly defined as a basic understanding anatomy and physiology. But many experts emphasize that fertility awareness is more than the ability to detect physical changes related to the menstrual cycle. Fertility awareness also involves understanding how

Fertility Awareness in the Demographic and Health Surveys

Question 1: From one menstrual period to the next, are there certain days when a woman is more likely to become pregnant?

Question 2: Is this time just before her period begins, during her period, right after her period has ended, or halfway between two periods?

emotions, behaviors and cultural factors relate to fertility. Many experts have expanded the definition to include a couple's ability to use and apply this basic information in their everyday lives and the ability to discuss the information with sexual partners and with health providers."

FHI Network, 17, 1996

The Institute for Reproductive Health (IRH), which focuses on fertility awareness interventions ranging from those aimed at very young adolescents to fertility awareness-based methods of FP (FAM) (e.g., Standard Days Method®, TwoDay Method®, Lactational Amenorrhea Method), proposes that:

"Fertility awareness is actionable information about fertility throughout the life course and the ability to apply this knowledge to one's own circumstances and needs. Specifically, it includes basic information about the menstrual cycle, when and how pregnancy occurs, the likelihood of pregnancy from unprotected intercourse at different times during the cycle and at different life stages, and the role of male fertility. Fertility awareness also can include information on how specific FP methods work, how they affect fertility, and how to use them; and it can create the basis for understanding, communication about and correctly using FP."

How fertility awareness is defined—what it includes and what it does not—is important because of potentially different influences on sexual and reproductive health (SRH) behaviors and outcomes, including FP use. A comprehensive definition of fertility awareness encompasses the factors across the life course that shape behavior: cognitive, social, environmental and developmental factors (NIH 2009). Theories of behavior change including the social learning theory/ social cognitive theory describe how many of these factors affect one another and influence behavior change, along with the importance of self-efficacy which is strengthened by observational learning and practice (Bandura 1997). Viewing fertility awareness within this context, a girl or woman with fertility awareness not only gains knowledge about her fertile time, but can also see and feel changes in her own body or circumstances that confirm and elucidate this knowledge, linking knowledge to personal, observed experiences and meaningful/relevant action. The Health Belief Model (Rosenstock 1988) addresses perceived susceptibility to a health issue, the severity of potential consequences, and barriers as well as benefits of change. Relating this to fertility awareness, for example, increased awareness of susceptibility to unintended pregnancy, and the ability to use fertility awareness information to reduce this risk, is also influenced by social and environmental factors that may be facilitated and/or constricted. Additionally, empowerment theories address how perceptions of power affect behaviors, and how power can be generated in social interactions (Gutierrez 2000). This is particularly relevant to fertility awareness, especially when the resulting knowledge, attitudes and behaviors may increase individual and collective power regarding reproductive life planning, communication about this with others, and resulting action.

A comprehensive literature review was conducted with these conceptual theories and a broad definition of fertility awareness in mind. We identified the literature on fertility awareness and analyzed findings and trends regarding how fertility awareness knowledge, or *lack* thereof, appears to influence sexual and reproductive health attitudes and behaviors across the life course. Findings and lessons learned from interventions and programs that have incorporated a fertility awareness component were also documented.

By searching the literature for the evidence of fertility awareness knowledge across the life course and its possible influences on attitudes and behaviors, this paper aims to document the potential relevance, or value-added, of fertility awareness as an empowering intervention and foundation for good sexual and reproductive health.

This literature search was guided by the following research questions:

- What do people know, or believe they know, about fertility?
- How does fertility awareness (or lack thereof) affect sexual and reproductive health attitudes or behaviors (including FP) across the life course?
- What is the effect of interventions/programs that have incorporated fertility awareness on attitudes, behaviors, and sexual and reproductive health outcomes (including use of FP)?

Methodology

The search strategy and selection criteria were broad, including articles on puberty and adolescence, schooling of girls, reasons for not using FP, beliefs about postpartum and post miscarriage/abortion return to fertility, the role of aging on fertility, as well as additional male-focused articles on these and other related topics. Initially a literature search of all existing abstracts was conducted using data bases such as PubMed, JSTOR, Google Scholar. Two researchers independently conducted additional, extensive database and online searches. Key informant interviews were conducted with leading reproductive health researchers to solicit their recommendations for studies to review. Reference lists and key journals were also searched.

Inclusion Criteria

The following inclusion criteria were used during the review of the abstracts and subsequent review of promising articles and reports:

- published between 1990-2013;
- peer-reviewed journals and 'grey' (non-peer-reviewed) literature;
- unpublished reports as available; and
- findings included a component of fertility awareness or had any association with fertility awareness.

These were relative few studies whose findings demonstrated a change in knowledge, attitudes, or behaviors due to an intervention that included fertility awareness. Efforts were made to include studies conducted around the globe and to reflect varying life stages and circumstances of both women and men.

Data Collection, Quality Assessment and Analysis

Two researchers reviewed all the identified articles and collaborated on preparing a detailed description of each article. Article descriptions included documentation of evidence regarding fertility awareness knowledge or lack thereof, associated attitudes and possible linkages to behavior. Lessons learned from programmatic integration of fertility awareness messages, often in combination with other health-related messages and approaches for communicating these messages, also were documented. A summary section highlighted relevant evidence and/or case building findings regarding the research questions posed by this review. Key findings from the article descriptions were then summarized in the tables included as an appendix to this report.

A study strength score, on a scale of 1 to 8, was determined for each article. The criteria were different for qualitative and quantitative studies. For quantitative studies, the following criteria were applied: whether the study was part of an intervention, had intervention and control groups or control sites, had baseline

and end line data, documented an acceptable response rate, included multivariate analysis with regard to fertility awareness, demonstrated significance levels, had an appropriate sample size, and appeared in a peer-reviewed journal. Qualitative study score was based on: whether the study was part of an intervention, had acceptable sample size, had written transcripts, had inter-coder reliability, specifically explored fertility awareness, included an adequate description of the study participants, explained the analytical process and theoretical framework, and had appeared in a peer-reviewed journal. Studies with both qualitative and quantitative components relevant to fertility awareness received a separate score for each. A review or summary report based on more than one study was not assigned a study strength score.

The quality assessment of the study and resulting score was specifically designed to assess the strength of the fertility awareness evidence or case building aspects of the article. As a result, a study – even a very strong study – with a cross-sectional survey design would receive a lower score for our purposes, as it would not be an intervention and would not have control and intervention groups. Without multivariate analysis specific to a fertility awareness component of the study, the score would be even lower. A few of the studies were based on the analysis of the same data set, which is noted at the end of each table in Appendix A.

Data analysis included identification, coding, and content analysis to identify key themes, contrasts and relationships. Tables and matrices were used to facilitate analysis and presentation of results. In collaboration with co-authors, trends were identified, conclusions were confirmed, and quotes were selected as exemplars.

Study Characteristics

A total of 83 studies met the inclusion criteria, representing research in North America, Africa, Asia, Latin America, Europe and Australia as indicated in Figure 1. Half of the studies were surveys, 16% were qualitative studies, 19% interventions, and 14% other (non-peer-reviewed reports). One was a literature review on reasons for unprotected intercourse among adult women (Figure 2).

Figure #1: Geographic Regions Represented by the Included Studies

Note: Two studies use data from more than one region

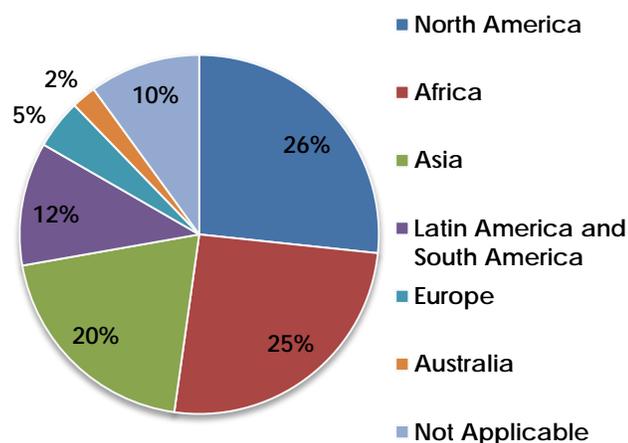
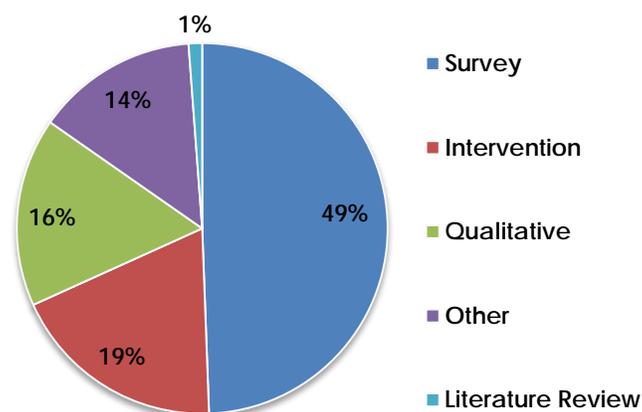


Figure #2: Methodologies of the Included Studies

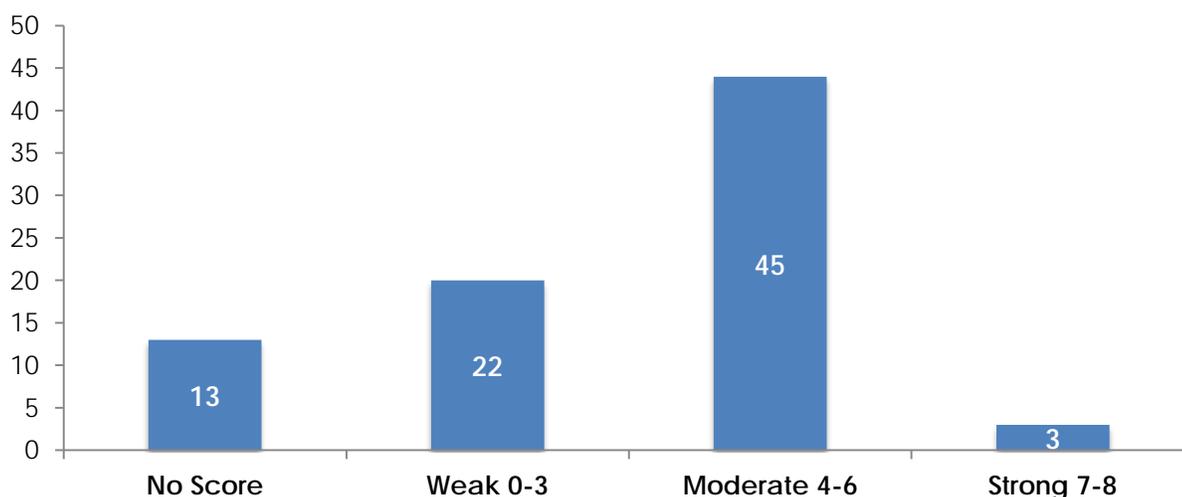
Note: Three studies combined qualitative and quantitative methodologies. These three studies were included in both the survey and qualitative studies categories in these calculations.



Although the authors actively searched for studies that included an intervention with a fertility awareness component, only 16 intervention studies were found. About half the total studies reviewed involved research on women only, 30 (36%) reported results for both women and men, and 7 (8%) included research on men only.

Regarding the study design rigor related to fertility awareness (see figure 3), 45 (54%) of the studies scored in the moderate range with a fertility awareness rigor score of 4-6 points out of a possible total score of 8 points. Only three of the studies (4%) had a strong study score of 7-8 points, which was partly due to the fact that so few of the studies had an identifiable fertility awareness component and were also interventions with experimental and control groups. Although 22 (26%) of the studies had a weak score of 2 or 3 points, the findings and conclusions of these 20 weaker studies confirmed findings and trends documented in the stronger studies.

Figure #3: Study design rigor in regard to fertility awareness



Results

We present our findings according to the research questions that guided our literature review:

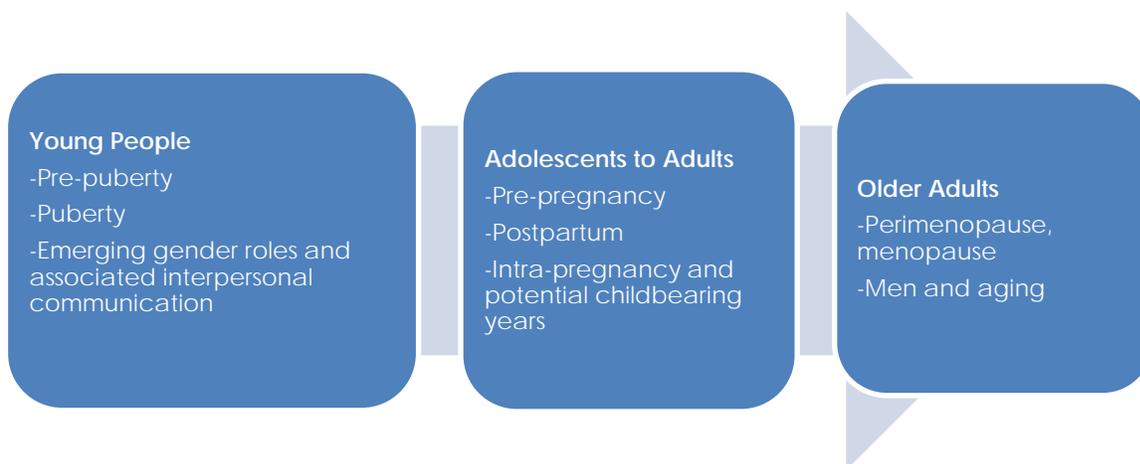
- What do people know, or believe they know, about fertility?
- How does fertility awareness (or lack thereof) influence sexual and reproductive health attitudes or behaviors (including FP) across the life course?
- What is the effect of interventions/programs that have incorporated fertility awareness on attitudes, behaviors, and sexual and reproductive health outcomes (including use of FP)?

We also considered the life course of the study participants, as fertility awareness has different components for people at different stages or circumstances.

CHART 1: What do people know, or believe they know about fertility? Key Results

- Lack of knowledge of puberty, menstruation and conception, menstrual cycle and fertile days, fertility indicators like cervical secretions, postpartum/post-abortion return of fertility, aging and fertility
- People know less than they think they do about fertility awareness
- Better fertility awareness among women, people with education, wealth, and previous knowledge of NFP/FAMs and some user-directed methods
- Widespread concerns about FP use reflect a lack of fertility awareness

Fertility Awareness: Life Course Perspectives



What do people know and believe about fertility?

Lack of knowledge about puberty, menstruation and conception

Studies from Bangladesh, India, Senegal, and Tanzania indicate that adolescents have low knowledge of puberty, menstruation, and the transition to being fertile (Agrawal 2007; Sommer 2010; Uddin 2008). Formative research conducted by the Institute for Reproductive Health to guide development of fertility awareness interventions for youth, as well as evaluations of these programs, also revealed limited fertility awareness among youth and their parents in Madagascar, Rwanda, Uganda, Brazil and Guatemala (IRH2011, IRH 2013b, IRH 2013g). Adolescent girls in a study in Pakistan were significantly less knowledgeable than adolescent boys about nocturnal emissions, and the boys were significantly less knowledgeable than girls about menstruation and menstrual hygiene (Shaikh 2006). In a survey of adolescent girls in Bangladesh, 23% had never heard about puberty, and only 24% knew that a girl who experienced menstruation might get pregnant if she only has sex once. Additionally, 18 of 20 married adolescent girls in this Bangladesh study who had given birth said that they did not understand why they became pregnant during their first pregnancies (Uddin 2008). A qualitative study with post-pubescent young women ages 16-19 in Tanzania indicated that girls often felt dismay over menstruation, attempted to keep menses a secret, and experienced harassment from boys and men related to menstruation (Sommer 2010).

On the other hand, in a survey of adolescent schoolgirls in India, 75% had awareness of the physical signs of puberty and over 80% knew that pregnancy was preventable (Agrawal 2007). In this study, over 80% had had sex education, with media listed over friends as a source of SRH education.

Lack of knowledge about menstruation and the fertile days

Multiple studies provide evidence that men and women lack specific knowledge of the beginning and end of the fertile days of the menstrual cycle or the "fertile window" (Ajayi 1991; Aneblom 2002; Berger 2012; Blake 1997; Bloom 2000; Byamugisha 2006; Dube 2006; Katz 2002; Kaye 2009; Makinwa-Adebusoye 1992; Ortayli 2005; Parasuraman 2009; Polis 2012; Sinai 2004 (unpublished); Singh 1998; Sommer 2009; Sommer 2010; Uddin 2008; Witt 2013; Witte 1997).

DHS conducted in countries around the world (IRH, 2013e) show considerable variation in responses to the question of when during a women's menstrual cycle she is fertile. While as many as 62% of married women of reproductive age in Congo-Brazzaville recognize that there is a fertile window half way between two periods, the proportion is significantly lower in all other African countries (less than 30% in 25 African countries). Rates in Asian countries in which DHS was conducted ranged 15%-57%, and rates in South America ranged 18%-39%.

In a study of 6549 married men ages 15-59 living in five districts in the northern state of Uttar Pradesh, India, men were asked to identify the period of the menstrual cycle when women are most likely to become pregnant. Between 14-20% of participants correctly identified the fertile period as approximately two weeks after the beginning of the menstrual cycle (Bloom 2000; Singh 1998).

In a study of 1824 adolescents and young men and women in Zimbabwe, of which the majority were orphans and vulnerable youth, 87-90% said that they did not know or gave inaccurate responses regarding the fertile period (Dube 2006). Among a random sample of adolescents and young men and women ages 15-24 in Senegal, 38% (n=1005) of young women and 32% (n=936) of young men had correct knowledge of the fertile period (Katz 2002).

Based on a nationally representative sample in the United States of 1800 unmarried men and women ages 18-29, only "34% knew there is a certain time in a woman's menstrual cycle when she is most likely to become pregnant and could identify that time as roughly halfway between her two periods" (Berger 2012).

In a recent study in India, in which the Standard Days Method, a fertility-awareness based method, was integrated into public health services in twelve districts (one half of districts) in the State of Jharkhand, community surveys showed that fertility awareness based method of FP (% who recognized that there is a fertile window half way between two periods) increased among all married women of reproductive age from 16.3% to 50.3% over the four-year study period (63.9% among women who had ever used the Standard Days Method) (IRH 2013d). In a similar study in three districts in Guatemala, fertility awareness increased from 8.3% to 16.1% (IRH 2013c).

Even women and men dealing with subfertility issues and actively seeking advice and support for infertility lacked knowledge of the fertile days in a women's menstrual cycle (Blake 1997; Dyer 2004; Hampton 2012; Zinaman 2012). Among 204 women seeking fertility assistance in Australia, less than 25% could identify cervical secretion changes indicative of fertility (Hampton 2012).

Lack of knowledge of fertility indicators like cervical secretions

A very few qualitative studies noted that women did observe cervical secretions but appeared to have little or no knowledge of secretions as a reliable indicator of fertility, and many worried that normal secretions were a sign of illness or infection (Bro 1993; IRH 2013h; Scorgie 2011; Sommer 2009). A young woman in a qualitative study conducted in Tanzania asked (Sommer 2009):

"Having vaginal discharge (white, watery, like milk, heavy, from the vagina)? Is it a disease?" (IDI rural, in-school, Karina)

In an efficacy study of the TwoDay Method, a FAM that relies on the identification of the presence or absence of secretions, participants were asked about their secretions before they were taught the method. The majority (88.4%) had noted secretions before, but they did not associate it with their fertility (IRH 2004). Some women interviewed during formative research for a community-based study of this method did associate secretions with fertility, but had had previous fertility awareness education (IRH 2013h). Another

qualitative study with rural and urban men and women in South Africa documented observation and concern about what appears to be normal cervical secretions (Scorgie 2011):

“By and large, the aim of hygiene practices was to remove unwanted vaginal fluids or ‘discharge’. Focus-group discussions with young rural women revealed intense anxieties about ‘white discharge’ they believed signaled illness. Their descriptions suggested that what they were referring to, however, was normal, viscous fluid produced during ovulation. One woman, Thembi, explaining how she used a tampon to remove excess vaginal secretions, said:

There is some discharge that comes out with it when you remove the tampon. This indicates that you’ve removed the dirt and therefore by the time I arrive at my boyfriend’s, I feel cleansed.” (urban FGD, Thembi, 25-34 years)

Women in some African countries also use drying agents that they insert into their vagina. In some settings this is because they perceive secretions to be dirty (Scorgie et al., 2009); in other communities it is because they believe excessive vaginal secretions are a sign of recent infidelity. These women also do not recognize secretions as a natural symptom of their fertility (Aksel 2012). In the community-based TwoDay Method study, women who used vaginal drying agents indicated they were willing to modify this behavior to use the TwoDay Method (IRH 2013h).

Lack of knowledge about postpartum/post-abortion return to fertility

Misinformation about the return to fertility in the postpartum period has two possible effects. On the one hand, it is important to recognize that breastfeeding can delay the return to fertility. On the other hand, it is important to understand that breastfeeding alone is not sufficient to prevent pregnancy. Women and men generally viewed breastfeeding as a way to delay the return of fertility and often considered postpartum return of menses as a marker of fertility return, but usually without recognizing they could still become pregnant while breastfeeding.

In a nationally representative sample of 233,426 men and women in India, the percentage of men who believed (incorrectly) that a breastfeeding woman cannot get pregnant increased with age (28-56%). Similarly, only one third of women knew that they could get pregnant during breastfeeding (Parasuraman 2009). In another study in India (four Districts in the state of Jharkhand, n=1809, IRH 2013d), only about half of married women of reproductive age recognized that a woman can become pregnant when she is breastfeeding. In contrast, in a study in three districts in Guatemala (n=504), over two thirds of women knew that they can become pregnant while breastfeeding (IRH 2013c).

In a study in Mali in two villages in which all women of reproductive age and men married to women of reproductive age were surveyed to identify reasons for unmet need for FP, 16.7% of women in one village and 20.4% of women in the other were not using a method of FP, despite a desire to avoid pregnancy, because they were in postpartum amenorrhea, and/or breastfeeding, and believed they could not become pregnant (IRH 2013j)

In a survey conducted in Jordan, 3,183 post-partum women were interviewed at child health centers. Although 7.1% of participants were knowledgeable of the 3 criteria for the Lactational Amenorrhea Method (LAM) (transition to a complementary method of FP at 6 months postpartum, or before if menses returns or if the woman is no longer fully breastfeeding), many LAM users appeared to wait past 6 months postpartum for return of menses, to begin using a complementary method (Bongiovani 2005).

Women are similarly unaware of the risk of pregnancy post-abortion. In a survey of post-abortion women at a hospital in Egypt, over 75% of the respondents either did not know how soon a woman could get pregnant following the procedure, or gave incorrect responses (Mahmoud 2013). In a survey conducted in four government hospitals in Ethiopia, only 26.7% of the 401 participants responded that fertility would

likely return soon, within two weeks post-abortion. Most participants in the Ethiopian study (81.8%) indicated they did not wish to become pregnant within the next three months (Melkamu 2003).

Lack of knowledge and lack of research on fertility awareness and aging

Few studies were found that addressed perceptions of fertility and aging. In an article by Sherman (2005), a Medline search examining women's knowledge of pregnancy risk during the peri-menopausal years found nothing. Studies that asked younger women and men about fertility and aging found lack of knowledge of the rapid decline of fertility for women, and lack of knowledge of the role of sexually transmitted infections (STIs) in reducing fertility potential (Bretherick 2010; Bunting 2008; Daniluk 2012; Daniluk 2013; Peterson 2012; Quach 2008).

In another study of men and women attending a four-year university in the United States, only 24% of women and 14% of men correctly identified that there is a considerable decrease in a woman's ability to become pregnant between the ages of 35 and 39. Sixty-seven percent of women and 81% of men overestimated this age range (Peterson 2012).

People know LESS than they think they do about fertility awareness.

Although women and men generally lacked knowledge of the fertile time of the menstrual cycle, they often perceived that they had more comprehensive and more accurate information than they actually did have (Ajayi 1991; Kaye 2009; Makinwa-Adebusoye 1992; Witt 2013). Among 465 low-income women in the United States attending a FP clinic, "only 40% of participants who believed they knew when the fertile time of their cycle was actually had the correct response to this question" (Witt 2013). In a study of unmarried youth in Kenya ages 12-19, while over 60% of participants stated that they had knowledge of the fertile period, less than 11% displayed accurate knowledge (Ajayi 1991).

In a study of sub-fertile women trying to conceive over 68% believed they had timed intercourse to match the fertile window. However, only 12.7% were able to do so with precision, and another 24% had accurate knowledge without demonstrated ability as evidenced by accurately completed fertility charts (Hampton 2012).

On another fertility awareness related topic, people also know very little about the effect of sexually transmitted infections on fertility. In a survey of 772 male and female high school students in Canada, more than 94% did not know that chlamydia and gonorrhea could increase the likelihood of infertility (Quach 2008).

Better fertility awareness among women, people with education, wealth, and previous knowledge of NFP/FAMs and some user-directed methods

Although specific knowledge of the fertile days was very low in general, many studies showed slightly higher fertility knowledge among women when compared to men, with schooling, age and previous use of natural FP or FAM, condoms or withdrawal (Berger 2012). In a nationally representative study of 1800 unmarried young adults in the United States, there were significant differences in accurate knowledge of the fertile period by gender, race, education level, age of women, and previous use of withdrawal or natural FP. Some 42% of females, compared to 27% of males, could accurately identify a woman's fertile period ($p < 0.05$) (Berger 2012). However in Zimbabwe, in a study of 1824 13 to 21 year old rural young people, while knowledge of the fertile days was consistently low, slightly more boys (13%) than girls (9.9%) responded that this was half-way between periods" (Dube 2006). In Senegal, men were more likely than

women to know that a girl or woman could get pregnant the first time she had sex while women were more likely to have knowledge of a fertile time of the menstrual cycle (Katz 2002).

Berger (2012) also found more education was significantly associated with an increased percentage of respondents ages 22-29 who had accurate knowledge of the fertile period. Some 25% of participants with high school or less, 40% of participants with some college, and 47% of participants with a college degree or more could accurately identify a woman's fertile days. Accurate knowledge of the fertile period increased with age for women between 18 and 29. Some 33% of females ages 18-19, 41% of females ages 20-24, and 50% of females ages 25-29 could accurately identify a woman's fertile days. (Berger 2012)

There was also a significant association between knowledge of the fertile days and previous use of withdrawal or FAM. Some 53% of sexually active males reported that they had ever used withdrawal, and 29% of those who had ever used withdrawal had more accurate knowledge. Eight percent of the sexually active females reported that they had ever used natural FP. Unsurprisingly, (given that fertility awareness education is typically included in method instruction for the FAMs), 58% of those who had ever used natural FP had more accurate knowledge while 41% of those who had never used natural FP has less accurate knowledge (Berger, 2012).

A study of men in Uttar Pradesh, India found that older men had more knowledge of the fertile days than younger men (14% of men ages 15-24 compared to 22-24% in men ages 25-44). Additionally men in urban areas, rural men with more assets, and men with more education tended to have more knowledge of the fertile days (Bloom 2000).

An analysis of DHS data from six countries (Philippines, Democratic Republic of Congo, Morocco, Azerbaijan, and Cameroon and Bolivia) show that more educated women, and wealthier women, are more likely to respond "halfway between two periods" when asked when a woman is most likely to be fertile. While this association is not always statistically significant, the relationship is consistently in the same direction and holds true in the multivariate analysis in all countries except Azerbaijan, which might be explained by the highly educated sample of women in Azerbaijan (IRH 2013f). The multivariate analysis of fertility awareness indicates that as age increases fertility awareness also increases while controlling for other background characteristics, though this association was statistically significant only in the Philippines, Bolivia, and Cameroon. As the number of living children increases, fertility awareness decreases in Bolivia and Cameroon, suggesting that a previous birth experience does not necessarily influence fertility awareness. There appears to be linear increase in fertility awareness as wealth quintile increases in the Philippines, Morocco, Azerbaijan and Cameroon. Urban and rural residential differences are not a factor in fertility awareness except in Azerbaijan.

Widespread concerns about FP use reflect a lack of fertility awareness

Several studies noted that women and men overestimated the risk of side effects or possible negative health outcomes from the use of FP methods (Dyer 2004; Kaye 2009; Witt 2013; Witte 1997). Sedge et al. (2007) used DHS data to examine women with unmet need for FP in 53 countries. Women with unmet need are those who wish to avoid pregnancy, and are married and sexually active, yet are not using a method of FP. In most countries the most common reasons these women give for not using contraception are side effects and health concerns. Between 20%-50% of married women at risk of an unintended pregnancy cited these reasons in 26 of the 36 countries that had information on this question. Women who cite these concerns may base their responses on personal experience with contraception, on the experiences of women they know, or simply on their perceptions of FP. The authors concluded that where these reasons for non-use prevail, women likely have not obtained services of sufficient quality to help them understand contraception methods and use.

A small study in Mali that used qualitative methodologies to interview women and men with unmet need for FP also found many misconceptions about contraceptive methods (IRH 2013j). For example:

“My close friends and family have the same opinions as me... During our chats, we talk about FP methods and their harmful side effects on women... and how that can prevent a person from having children...”

Another qualitative study with 21 teen mothers in the United States synthesized the young women’s concerns about the side effects of long-acting reversible contraceptives:

“For the most part, the teen mothers had dismal attitudes toward birth control, mostly due to the unpleasant side effects...(including)...weight gain...mood swings... and nausea.” (Witte 1997)

In a nationally representative study of 1800 unmarried young adults in the United States, the perception of the negative side effects of FP methods was very common (Kaye 2009).

- “Among those who have relied on birth control pills, nearly half (44%) incorrectly believe that you should take a break from the pill every few years.”
- “27% of unmarried young women believe that it is *extremely* or *quite likely* that using birth control pills or other hormonal methods of contraception for a long period of time will lead to a serious health problem like cancer.”
- “Half of unmarried young women believe that cancer or other serious health risks due to the pill are at least *somewhat likely* and report that this concern reduces their likelihood of using birth control pills or other hormonal methods.”
- “30% say it is extremely or quite likely that using an IUD will cause an infection.”
- “36% say it is likely that the pill will cause them to gain weight and 40% say it will likely cause severe mood swings *and* that these concerns reduce the likelihood of their using the pill.”

Concern that contraceptives might negatively affect fertility was also cited (Daniluk 2012; Quach 2008). In a study of mostly educated, white women in Canada, over 50% (n=3345) did not know that taking oral contraceptives for more than 5 years does not negatively affect a woman’s fertility (Daniluk 2012).

This general lack of accurate, actionable knowledge about fertility and FP led us to the following question:

How does *LACK* of fertility awareness appear to influence sexual and reproductive health attitudes or behaviors (including FP) across the life course?

Although very few of the studies reviewed were designed to show a direct link between fertility awareness and associated attitudes or behaviors that support FP and other health outcomes, the following findings about attitudes and behaviors highlight possible trends and lessons learned that may be extrapolated when considering the

Chart 2: Is *LACK* of fertility awareness related to:

- Perceptions of low risk of pregnancy?
- Concern about method side effects?
- Misuse of user-directed methods when attempting to combine these with “safe days” without fertility awareness knowledge?
- Unprotected sexual intercourse?

potential influence of fertility awareness or lack thereof on attitudes and behavior. For example, it appears that “lack” of fertility awareness may contribute to non-use of FP, delayed method use postpartum or post abortion, method discontinuation and/or inaccurate attempts to use methods only during the fertile days. Lack of fertility awareness may also contribute to behaviors such as increased days of missed school for girls without puberty and fertility awareness education and support, poor vaginal health, such as douching to remove normal, healthy secretions, or lack of fertility awareness regarding the male role in sex determination of a child, leading to unjust blame and even gender-based violence against women.

Perceptions of low risk of pregnancy (including perceived low fertility) and resulting non-use of FP

An often cited reason for non-use of FP is low perceived risk of pregnancy. Among US women who had recently given birth after an unintended pregnancy (n= 7856), 41% reported that they had not used a method of FP because they either believed they would not get pregnant at the time they had had intercourse, or they considered themselves or their partners to be infertile (Nettleman 2007). Similarly, in a review of 16 studies of reasons for unprotected intercourse among adult women, perception of low risk of pregnancy was a commonly reported reason as specifically noted in seven of the studies reviewed by Ayoola (2007). In these seven studies, US women reported that they had had unprotected intercourse—perceiving that they had a low risk of pregnancy – because they thought that they or their partners were “infertile” (Coggins 2003; Foster 2004; Jones 2002; Killion 1998, Moos 1997; and Woodsong 2004), they considered themselves to be on a day of the menstrual cycle with low pregnancy risk (Moos 1997) and/or they believed that older age, breastfeeding status or infrequent sex (Foster 2004, Sable 1997) meant that they were at low risk of pregnancy.

Perceptions of subfertility or infertility also resonate through many of the studies in this review. Polis (2012) analyzed survey data from US unmarried women and men ages 18-29 (n=1699, and noted that 90% overestimated the risk of pregnancy from one act of intercourse, and 67% incorrectly estimated the chance of pregnancy during a year of unprotected sex. Regarding personal concerns about infertility, 19% of women and 13% of the men surveyed perceived themselves to be “very likely” infertile. Among women’s reasons for perceived infertility, over 1/3 mentioned not getting pregnant after having had unprotected sex. In this study, perception of infertility was associated with women overestimating the chance of pregnancy from unprotected sex, and with men indicating that they would likely have sex without contraception in the next three months. In a Canadian survey of 772 high school students (Quach 2008), girls were significantly more in agreement than boys with statements regarding concern about possible infertility and desire to protect their fertility.

Among single and married youth (male and female) in Senegal, less than 50% knew a woman could get pregnant the first time she had sex. Among the males who had had premarital sex, less than 80% used contraception, and 16% reported that they did not think pregnancy was possible (Katz 2002). Similarly, in a Nigerian study of 5599 adolescents, the belief that a woman could not become pregnant the first time she had sex was a top-rated reason for not using FP (Makinwa-Adebusoye 1992).

For 5677 women seeking abortions in China (ages 15-48), non-use of emergency contraception was correlated with less knowledge of fertility and a lower rate of contraceptive use. “The main reason for non-use (of EC) was lack of awareness of the risk of pregnancy and the subsequent need for protection” (Meng 2009).

Concern about method side effects/misinformation about FP and fertility and non-use or discontinuation of FP methods

An often-stated reason for *not* using a FP method and method discontinuation is concern about possible side effects and/or possible negative health effects – including effects on fertility -- associated with some methods (Ayoola 2007; Makinwa 1992; Sedgh 2007; Singh 2012). In over 50% of the US studies reviewed by Ayoola, side effects and health concerns such as “sterility, cancer, irregular bleeding, weight gain, headaches, nausea, vomiting, hair loss, dizziness, weight loss, breast enlargement, acne, leg pain, varicose veins, bloated feelings, low energy, depression, stress, and mood changes” were among reasons women did not use FP. In addition, a survey of 1800 unmarried men and women in the US ages 18-29, found that expecting negative side effects of hormonal/LARC methods was associated with a decreased use of these methods (Frost 2012). “Better knowledge of side effects is needed and could contribute to young adults’ propensity to use hormonal and LARC methods” (Frost 2012). Among low-income women attending FP clinics in the United States, “39.6% [n=465] strongly agreed/agreed that no chemicals or hormones were important considerations in their contraception decision-making” (Witt 2013).

A vast body of literature about reasons for non-use or discontinuation of contraceptive use in developing countries shows similar findings. For example, a 2012 analysis of DHS data from 60 countries looked at reasons for contraceptive discontinuation. They found that about a quarter of pill and injection users who discontinue their method in the first 12 months do so because of side effects or health concerns. The authors conclude that high discontinuation due to perceived or real side-effects requires counseling services and informed choice to be strengthened and method mix expanded (Ali 2012).

A broad definition of fertility awareness includes understanding of the menstrual cycle and a woman’s awareness and anticipation of her typical menstrual bleeding pattern. Given that the contraceptive injectable (DMPA) has a very common side effect of changing a woman’s bleeding pattern (Hatcher 2011), it is not surprising that women cite changes in their menstrual bleeding pattern as a reason for method discontinuation (Tolley 2005). However, a study of 350 intra-pregnancy and postpartum women conducted in Mexico found that anticipatory counseling and guidance regarding menstrual cycle changes associated with use of the injectable contraceptives resulted in significant increases in method continuation (Canto de Cetina 2001), suggesting that appropriate counseling about expected menstrual side effects can mitigate the effect of actual side effects on method continuation.

Menstrual changes are not the only side effects of hormonal contraceptives that may affect method use. A South African study of injectable contraception users (n=187) found a concern among users about increased vaginal wetness when using progestin injectable FP (Smitt 2002). Despite the fact that vaginal secretions are natural symptoms of fertility, a possible increase was observed as a negative side effect for this study population. This underscores the importance of appropriate counseling, and suggests the potential importance of anticipatory guidance and counseling around normal menstrual bleeding and healthy secretions, along with common method-related side effects, to address any concerns about these observable changes.

Inaccurate identification of fertile days, associated misuse of user-directed methods and unprotected intercourse

In studies about withdrawal use in Turkey (Orayli 2005) and Lebanon (Myntti 2002) the authors report that withdrawal users combined withdrawal with a variety of fertility awareness strategies, including using withdrawal during the woman’s perceived fertile days and having unprotected sex on perceived infertile days. Another strategy was using condoms or abstaining from sexual intercourse on perceived fertile days

and then using withdrawal on “less risky” days. However, Orayli described men learning about withdrawal “in bits and pieces” until you “guess or figure it out” with increasingly successful use over time. Additionally, only 3% of the men in this study could accurately describe the fertile days. False perceptions regarding the ability to identify “safe and unsafe” days for sexual intercourse may increase the risk of unintended pregnancy for many withdrawal users who combine this method with inaccurate knowledge of the fertile days. Both studies also noted that concern about method side effects was a common reason for withdrawal use over other method options.

Unintended pregnancy

We turn again to the analysis of DHS data from six countries (IRH 2013f). In four countries (Philippines, Bolivia, Morocco and Azerbaijan) correctly responding “halfway between two periods” was negatively associated with having an unintended pregnancy. That is, these women were less likely to have an unintended pregnancy (controlling for demographic characteristics). However this relationship was statistically significant only in Cameroon, and the effect was reversed in Morocco and DRC. In explaining their findings, the authors acknowledge that the definition of fertility awareness drawn from the DHS is weak and does not adequately capture respondent’s actual understanding of when in the cycle a woman can become pregnant. They further point out that even women who understand when (in general) in a cycle a woman is more likely to become pregnant may not necessarily know how to apply this information to their own bodies, and do not translate this knowledge into the actions required to use a FP method or to avoid unprotected sex on the days they are fertile.

A study by Wilcox (2004) documents that those *without* fertility awareness information, may experience increased prevalence of sexual intercourse during the fertile window (as occurred in his study among IUD users and women who have had a tubal ligation, n=69), suggesting that biological influences may increase sexual intercourse during the fertile days, without couples being aware of this. Fortunately, we know that those *with* fertility awareness can effectively use fertility awareness-based methods to successfully avoid unprotected intercourse on the fertile days without reducing monthly coital frequency (Sinai 2006). However, given the significant lack of fertility awareness knowledge in the general population, and with many people who think they have more fertility awareness than they actually do (and then use their own self-styled-version of fertility awareness strategies), the potential benefit of increased fertility awareness knowledge worldwide and related attitudes and behaviors is very promising.

In a poster *Fertility Awareness Method Use Among Young Adult Low-Income Minority Women* (Guzman 2013), the authors conclude: “The vast majority of women are abstaining or using another method of birth control during what they perceive to be their fertile period. These findings are encouraging because it suggests that the behavior components of accurate FAM use are already present. What is lacking is knowledge of their fertile period.”

These very different studies just described do not specifically document the influence of fertility awareness on behaviors such as unprotected intercourse or other health outcomes. Still, they do exemplify how “lack” of fertility awareness may contribute to false perceptions of infertility and false perceptions of low risk of pregnancy on an individual and community level and subsequent unprotected sex, concern about method side effects and resulting non-use of methods, misuse of user-directed methods when combined with inaccurate fertility awareness and possible increase in unintended pregnancy. Exploring other health outcomes possibly influenced by fertility awareness was beyond the scope of this review, but there are indications that the effect of fertility awareness may have implications beyond FP to broader SRH issues and beyond.

What is the effect of interventions/programs that have incorporated fertility awareness on attitudes, behaviors, and sexual and reproductive health outcomes (including use of FP)?

While direct evidence of the effect of fertility awareness on behavior is limited, findings (cited in the previous section) suggest that lack of fertility awareness contributes to unintended pregnancy, non-use of FP and other negative health outcomes. With this in mind, we reviewed studies that examined – directly or indirectly – the effect of fertility awareness interventions on attitudes, behaviors and outcomes. Although we specifically looked for intervention studies with an identifiable fertility awareness component, only 16 such studies were found, 8 of which targeted adolescents.

For example, in a Rwanda study, six youth-serving organizations at 10 sites integrated the “CycleSmart Kit” into their programs to help girls and boys learn about menstruation, puberty, their fertility, and “staying safe.” This Kit consists of Cycle Beads (color-coded beads used with the Standard Days Method of FP which can also be a visual and tactile way of teaching adolescents about menstruation and fertility), a calendar, a weekly diary, washable/reusable sanitary pads, and a brochure on puberty and fertility awareness. With the support of program guidelines and a brief orientation for implementers, the Kit was integrated into programs over a five week period, through a weekly session with adolescents (n=198). Statistically significant increases in knowledge were observed for 19 of 20 knowledge indicators. All questions showed an increase in the frequency of correct responses from baseline to endline. Focus group findings and program log reports further indicate that girls did use CycleBeads to learn about and keep track of their menstrual cycles, and were better prepared for their next menstruation. Adolescents and parents report that the CycleSmart Kit facilitated useful puberty discussions between adolescents and their parents, teachers, peers and friends. Interest among young boys was also generated, and CycleBeads were described as a useful tool for teaching boys about puberty and fertility (IRH 2013a).

Another fertility awareness intervention in Rwanda and Guatemala involved exposure to the My Changing Body curriculum (IRH 2012), which includes 5 educational sessions for adolescents (n=268) along with an educational session for parents (n=117). Key themes of the curriculum include: puberty, body image, fertility awareness, hygiene, gender roles, and communication with parents and peers. Pre and post intervention measures revealed significant increases in adolescent knowledge of puberty and

Results of Interventions that Included an Element of Fertility Awareness

- Increased knowledge of fertility awareness (IRH 2013a; Brieger 2001, Danielson 1990; IRH 2013a; IRH 2013b; IRH 2013g; Lavoie 2009; Roth 1993)
- Ability of young girls to track their menstrual cycle and prepare for next menses as well as talk more openly with parents about SRH issues (IRH 2013a; IRH2012)
- Increased use of FP methods or abstinence, and reduced pregnancies (Brieger 2001; Cabezon 2005; Virgil 2005)
- Fewer days of missed school as a result of a hygiene and puberty education, with and without sanitary pad distribution (Scott 2009)
- Increased male belief in pill safety and increased partner pill use (Danielson 1990)
- Increased couple communication and women’s empowerment (IRH 2008c; Léon 2013)
- Increased method continuation when FP is informed by fertility awareness.

fertility awareness as well as self-reported confidence to act on this knowledge (discuss fertility awareness topics with parents, share information about puberty with peers, or intervene when peers are teased about puberty-related issues). Statistically significant shifts towards more gender equitable norms were also noted. Regarding the results for parents, there was a significant increase in parents' fertility awareness knowledge, and improved parental accessibility for discussing topics about fertility and romantic relationships with their children. (IRH 2013g)

For most of the other intervention studies in this review, however, fertility awareness was not analyzed separately from other SRH messages and strategies, and the potential value-added of the fertility awareness component (separate from other elements of the intervention) is unknown.

For example, in Ghana, Nigeria, Chile and the US, interventions that included fertility awareness elements resulted in increased use of FP, increased abstinence or return to abstinence, and reduced pregnancies. In Nigeria and Ghana, a peer-education intervention with 3585 girls and boys included educational messages on reproductive anatomy and function along with education on FP, STIs, and HIV/AIDS prevention and successfully increased perceived self-efficacy in FP use, willingness to buy condoms, awareness of local youth-serving programs and FP use in the intervention groups (Brieger 2001). However, attitudes regarding concerns about the effect of FP methods on fertility and overall health, and pressure to demonstrate fertility before marriage continued post intervention. This further suggests that additional fertility awareness information on broader topics, including observable fertility indicators, and anticipatory guidance on the effect of methods on fertility and overall health, may further increase method uptake and/or continuation.

In Chile, the TeenStar school-based, abstinence-focused curriculum included fertility awareness topics such as human anatomy and physiology, puberty, male and female fertility, and charting of fertility indicators along with various abstinence-focused topics. The Teenstar intervention studies show reduced rates of self-reported initiation of sexual intercourse, increased discontinuation of sex, (Vigil 2005) and reduced pregnancies in the intervention groups (Cabezon 2005). In Fremont, CA, while testing a community-based health center approach to incorporate FAMS and enhance male involvement in FP, counselors at the teen clinic and school-based educators described CycleBeads as a helpful visual and tactile tool for teaching adolescents about the menstrual cycle and as a segue into conversations about fertility awareness, partner communication and risk reduction behaviors (Lavoie 2009).

In Ghana, a puberty and hygiene educational intervention for in-school girls (with and without sanitary pad distribution) was compared to a control group. Although specific details regarding the puberty and hygiene education provided were not documented in the report, girls in the intervention groups (n=183) experienced fewer days of missed school and an increase in girls' well-being measures. "Across both pads and education sites, girls agreed that 'I am less ashamed about menstruation now than I was before being in this study' (64.6%)" (Scott 2010).

Additionally, an intervention study in Oregon and Washington targeting male adolescents included a 30-minute slide presentation and a 30-minute interaction with a clinician. Fertility awareness messages and visuals on reproductive anatomy and fertility were included along with other topics such as hernia, testicular self-exam (TSE), STIs/HIV/AIDS, FP and abstinence, couple communication and access to services. The results of this study indicate that increased knowledge was strong only among those not sexually active at baseline, and effects on knowledge were seen at one-year follow-up. There were also reduced sexual coercion and sexual impatience responses among those in the intervention group who had not been sexually active at baseline (Danielson 1990). (Other studies in this review also document the benefit of educating youth before sexual debut, Ancheta 2005). A greater proportion of boys in the intervention groups practiced TSE and knew the contraceptive pill was safe. There was also increased partner pill use for those not sexually active at baseline, but who were sexually active at follow-up (Danielson 1990).

There is limited information on the effects of a fertility awareness intervention on adults' behavior. The Canto de Cetina study on anticipatory counseling on menstrual cycle changes associated with DMPA injectable use was described earlier. A study of women attending a peri-menopausal workshop resulted in increased knowledge and self-reported changes in behavior including initiating dialogue with a provider about mid-life health issues, exercise and nutrition (Stenger 2007).

In addition to these intervention studies, several studies show evidence of the effect of a fertility awareness intervention on behavior of adults. These studies were conducted in the context of assessing the integration of FAM into services. In Guatemala (IRH 2008b), users were interviewed when they first started using the Standard Days Method, and six months later. Results show significant increases in scale values for couple communication and women's empowerment. In India and Peru (IRH 2008a; León 2013), the Standard Days Method was integrated on a large scale in an entire community. Community surveys showed improvements from baseline to endline in couple communication and women's empowerment at the community level, with largest improvements among women who had ever heard of or ever used the method. Focus groups in the DRC with Standard Days Method users (IRH 2008c) confirm that using FAM improves couple communication as well as male-involvement in FP use.

What may contribute to relating fertility awareness knowledge to one's own body or circumstance and subsequent behavior?

Some studies suggest that accurate information about fertility may not necessarily be equated to one's own body or circumstance. Within the theory of the Health Belief Model, perceived susceptibility to a health issue and relating to the severity of the consequences contributes to behavior change. In the social learning theory, behavior change is facilitated by observing and practicing the new behavior. In a few studies in this review personal perception of risk of pregnancy remained low, even within the context of accurate information. In a Swedish study, for example, although 81% (n=518), of teens/women seeking abortion actually knew the fertile days of the menstrual cycle were between two menstrual periods and had high awareness of emergency contraception 83%, few women had used emergency contraception as an attempt to prevent unintended pregnancy. When those who had used emergency contraception in the past were asked why they did not use it this time, the main reason reported was "unawareness of pregnancy risk" (Aneblom 2002). It appears that even with basic awareness regarding the fertile time and awareness of EC, the women did not recognize or internalize "risk of pregnancy" at an individual and personal level. In a study in Tanzania, Sommer (2009) noted that girls knew vaguely about mid-cycle fertility but lacked details to understand the risk of pregnancy or apply this information to their own bodies. In a US study that includes teaching fertility awareness and tracking of fertility indicators to adolescents, Roth (1993) suggests that, "Lack of fertility awareness and lack of association of this with a girls' own body contributes to contraceptive risk-taking."

In another example, breastfeeding women who had participated in a LAM intervention in Bangladesh were interviewed to ascertain their knowledge and use of the LAM criteria. Although women knew all three criteria, they often did not transition to another FP method by six months postpartum, but rather waited until menses returned or beyond before considering themselves at risk of pregnancy (Bongiovani 2005; Kouyate 2010). Postpartum women and the general population often considered breastfeeding to be protective much longer than it is. The "lived experience" of women who had previously breastfed and not conceived until after first postpartum menses may have contributed to common views of return of fertility after return of postpartum menses (Kouyate 2010).

"Knowledge of return to fertility does not equate to beliefs of personal susceptibility to pregnancy." (Kouyate, USAID meeting summary quote)

The importance of personal, “lived experiences” is reported in a few additional studies. A qualitative study of 37 men in the US documented men’s lived experiences as shaping their “procreative consciousness” This included: personal experiences during puberty; revelations through peer experiences; personal experiences with first sex, first pregnancy scare, partner’s miscarriage or abortion; perceptions influenced by the relationship with a partner and her beliefs, issues and/or concerns as well as perceived fertility or infertility based on direct sexual experiences with women (including perceived infertility based on unprotected sex not resulting in pregnancy) (Marsiglio 2001). Interestingly, in a very different study on women’s positive and negative experiences with menses (McPherson 2004), university women who rated their periods as negative (including debilitating periods or negative mood swings) were better able to predict onset of menses. Their “lived experience” with these preceding body changes appeared to heightened awareness of associated events, such as onset of menses.

It is possible that associating fertility awareness to one’s own body is instrumental in enhancing one’s personal perception of risk of pregnancy and in influencing SRH attitudes and behaviors, including FP. Pyper (1997) summarizes key elements of fertility awareness, including, “personal involvement...to observe changes that occur in [our] own bodies. This involves observing changes that are related to significant reproductive events, for example puberty, menstruation, pregnancy, breastfeeding or the menopause.”

Conclusion

With the lack of fertility awareness knowledge worldwide, and the potential to build on what is known with accurate information and supportive attitudes, there appear to be untapped opportunities to contribute to sexual and reproductive health behaviors and outcomes through improved fertility awareness. Evidence-based research on empowerment interventions has demonstrated strengthened self and collective efficacy, increased autonomy and authority, reduction of gender inequities, adoption of healthy behaviors and use of services, and improved child and family health outcomes (Wallerstein 2006). Whether fertility awareness is a “gateway” empowerment intervention that creates pathways to broader health outcomes and gender transformation or provides a foundational pillar for overall sexual and reproductive health could not be verified with this literature review. More research is needed to test different approaches and determine whether a fertility awareness component, specific to different stages across the life course, provides significant value-added to basic sexual and reproductive health education in a personal and meaningful way, and whether there is a significant positive impact on health behaviors and outcomes.

We look forward to discussing these topics related to fertility awareness and how to integrate them into research and programs.

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Adolescence to young adults

Study	Design	Country	Population	Fertility Awareness Evidence	Comments and Case Building	Study Design Strength with Regard to Fertility Awareness
Agrawal (2007)	Cross-sectional survey	India	Adolescent girls, ages 15-19, attending English and Hindi schools. 2.8% sexually active n=500	<u>Knowledge of puberty.</u> 75% had awareness of the physical signs of puberty and over 80% knew that pregnancy was preventable.	Over 80% had had sex education and media was listed over friends as a source of SRH education.	2
Ajayi (1991)	Cross-sectional survey	Kenya	Unmarried adolescent boys and girls ages 12-19. 81% students n=3316	<u>Lack of knowledge of the fertile time of the menstrual cycle.</u> 11% or less could identify this and less than 50% knew that pregnancy could occur at first sex, without orgasm, with use of withdrawal, despite douching or urination after sex. <u>Attitudes, personal perception of more knowledge</u> about the fertile time than they actually had. Over 60% stated they had this knowledge, but the proportion of correct responses was very low.	Older youth were more likely to know that pregnancy could occur despite douching or urination after sex. Schooling and increased age may be associated with increased fertility awareness. <u>Behavior.</u> Although high sexual activity and stated positive attitude toward FP, there was a lack of method use and high pregnancy rate. Among the reasons for non-use of FP were lack of information and concern about side effects. <u>Program implications.</u> Fertility awareness education and anticipatory guidance regarding possible FP method side effects may support FP use and continuation. SRH intervention with a fertility awareness component at earlier ages may be beneficial. Parents were not cited as a source of information, and involving parents may be supportive.	2
Brieger (2001)*	Intervention Peer educators conducted one-to-one and group SRH activities to provide information, create awareness of services and make referrals.	Nigeria and Ghana	Adolescent girls and boys targeted by individual youth-serving organizations. Secondary, post-secondary, and out-of-school youth (those in the workplace under age 25) n=3585	<u>Attitudes regarding concern about infertility.</u> Post intervention, girls continued to be concerned about the effect of FP methods on their fertility and overall health, as well as social pressure to demonstrate their fertility before marriage. <u>Behavior. Use of a FP method reportedly increased</u> from 47.2% at baseline to 55.6%	As the influence of the fertility awareness messages was not analyzed separately, the potential impact or value added is unknown. Fertility awareness education, including knowledge of fertility signs like cervical secretions and better understanding of when during the menstrual cycle pregnancy can occur, may help address misinformation and concerns about fertility, infertility and related attitudes and behaviors. <u>Program implications.</u> In this study, peer education was an effective model for increasing SRH knowledge and promoting attitudinal and behavior change among adolescents; it is possible that further integrating fertility awareness into this approach may enhance SRH knowledge and related supportive attitudes and behaviors.	5

<p>Cabezon (2005)</p>	<p>Intervention: About 4 of the 14 educational sessions focus on fertility awareness and recording fertility signs. Educational sessions were weekly for 45 minutes, for an entire school year.)</p>	<p>Chile</p>	<p>Female high school students who participated in the TeenSTAR program. Age at beginning of intervention was 15-16. n=1259</p>	<p><u>Behavior. Self efficacy to refuse sex (or use FP)</u> when fertility awareness with recording of fertility signs is part of an abstinence-focused curriculum. Intervention group girls were 17-19% less likely to become pregnant compared to the control group.</p>	<p>The influence of the fertility awareness messages was not analyzed separately from the other messages. <u>Program implications:</u> The amount of content and number of educational sessions is an important factor to consider regarding feasibility of replication in other settings.</p>	<p>7</p>
<p>Danielson (1990)*</p>	<p>Intervention Some fertility awareness information along with SRH, STI, testicular self-exam (TSE) content in a 30 minute slide-tape & 30 minute clinician interaction.</p>	<p>United States</p>	<p>Adolescent boys ages 15-18 who received ambulatory care at participating medical offices associated with the Portland, Oregon and Vancouver, Washington service areas of Kaiser Permanente. n=971</p>	<p><u>Increase in knowledge and improved retention.</u> Effects of fertility awareness messages in combination with SRH knowledge was strong only among those not sexually active at base line, effects on knowledge were seen at 1 year follow-up.</p>	<p>The influence of the fertility awareness messages was not analyzed separately from other SRH messages. <u>Knowledge about pill safety.</u> Greater proportion of boys in the intervention groups knew the pill was safe. <u>Attitudes. Reduced pressure to engage in sex,</u> reduced sexual coercion responses, and reduced "sexual impatience" among those in the intervention group who had <i>not</i> been sexually active at baseline. "Sexual impatience" (score from several questions) was the strongest indicator of intention to have unprotected sex. Increased male confidence in the safety of the pill observed among those who had been sexually active at baseline. <u>Behaviors. Increased partner pill use</u> for those not sexually active at baseline, but who were at follow-up. The intervention group also had <u>increased testicular self-exam.</u> <u>Program implications.</u> Benefit of educating youth before sexual activity begins, and of using a multi-media/provider-interaction combined approach. Potential for fertility awareness education of men to also support positive attitudes and behaviors in their partners.</p>	<p>8</p>
<p>Diaz (2006)</p>	<p>Background article</p>	<p>N/A</p>	<p>Young women pre-puberty and puberty</p>		<p><u>Program implications.</u> Menses as a "vital sign" could help girls, parents and providers know what girls should expect at first menses including: normal and not normal amount and duration of flow, and cycle length range. (Secretions could also be added to this "vital sign", emphasizing knowledge and observation of both menses and secretions.) A table to facilitate identification of menstrual conditions that may require evaluation is available, and may be adapted to include secretions. Tools for girls to track their menstrual cycles could include CycleBeads.</p>	<p>N/A</p>

<p>Dube (2006)</p>	<p>Report (cross-sectional survey)</p>	<p>Zimbabwe</p>	<p>Young men and women ages 13-21, from rural areas. Orphans and vulnerable youth (OVA) included. 34.6% of young women postpartum. n=1824</p>	<p><u>Lack of knowledge of the fertile time of the menstrual cycle.</u> Only 9.9% of girls, and 13% of boys, responded this was "half-way between periods." 87-90% said they did not know or gave inaccurate responses.</p>	<p><u>Program implications.</u> OVA girls had increased premarital sex, unsafe sex, more STIs, and reported being less able to refuse sex, and more likely to have had a child than non-OVA girls. The potential "value added" with fertility awareness knowledge and skills may support and reinforce healthy behaviors.</p>	<p>2</p>
<p>IRH (2013a)</p>	<p>Intervention Used the CycleSmart Kit for 5 weeks CycleSmart Kit included the CycleSmart Brochure, CycleBeads, sanitary pads, diary, and calendar.</p>	<p>Rwanda</p>	<p>Female adolescents ages 12-14, post-pubescent, and not sexually active. n=198</p>	<p><u>Increase in knowledge of puberty, fertility and staying safe</u> as indicated by pre/post measures. <u>Behavior. Girls track their menstrual cycle and report being better prepared for their next period.</u></p>	<p><u>Program implications.</u> The CycleSmart Kit was easily offered through a variety of programs for youth. Although not a stand-alone kit, the programs were able to integrate the fertility awareness tool with the support of simple program guidelines and a few complementary educational activities.</p>	<p>6</p>
<p>IRH (2013g)</p>	<p>Intervention: Exposure to the My Changing Body, curriculum Key themes: puberty, body image, fertility awareness, hygiene, gender roles, and communication with parents and peers Guatemala: 3 sessions, each session approximately 4 hours Rwanda: 6 weeks, 1 session per week</p>	<p>Guatemala and Rwanda</p>	<p>Adolescent girls and boys ages 10-14 and their parents. n=268 adolescents n=117 parents</p>	<p><u>Increase in young people's knowledge of fertility awareness and puberty</u> was documented in pre/post intervention measures as well as self-reported confidence to act on this knowledge (discuss fertility awareness topics with parents, share information about puberty with peers, or intervene when peers are teased about puberty-related issues). There were slight increases in awareness about gender roles and norms. <u>Increase in parents' knowledge of fertility awareness and some increase in parent/child communication about this.</u> There was a significant increase in parents' knowledge, and "slight improved accessibility to discuss topics around fertility and romantic relationship with their children."</p>	<p>Given the positive results of the My Changing Body curriculum, additional research would be helpful to assess the effect of the curriculum on young people as they become older adolescents, as well as to identify any additional fertility awareness-related messages for the older youth.</p>	<p>IRH (2013g)</p>

<p>Katz (2002)*</p>	<p>Cross-sectional survey</p>	<p>Senegal</p>	<p>Single and married girls ages 15-24, single boys ages 15-19 n=2909</p>	<p><u>Lack of knowledge of the fertile time of the menstrual cycle.</u> Fewer than 50% the respondents knew this. "Women between ages 20-24 were the most likely to respond correctly, while men were the least likely." Less than 50% of women knew that a woman could get pregnant the first time she had sex. Men were more likely than women to respond correctly, yet fewer than 50% of all respondents gave a correct response.</p> <p><u>Behavior.</u> Low use of FP among those who had had premarital sex, 80% of the men did not use contraception; 16% reported they did not think pregnancy was possible.</p>	<p>Knowledge of the fertile time was used as a proxy for measuring SRH knowledge.</p> <p><u>Program implications.</u> As education, age and participation in a family life education session were significantly associated with SRH knowledge; inclusion of fertility awareness in educational sessions may add value, especially if these sessions occur before young people become sexually active.</p>	<p>4</p>
<p>Kirk and Sommer (2005)</p>	<p>Background article – literature review</p>	<p>Sub-Saharan Africa and Asia</p>	<p>Adolescent girls, pre- and post-pubescent</p>		<p>Documentation of: 1) the general lack of fertility and body awareness as well as lack of menstrual management information and support among girls, boys, parents, teachers and community; and 2) school-based challenges including lack of access to sanitary pads, safe latrines with running water and locking doors, resulting missed days of school by menstruating girls, untrained (many male) teachers—negatively impacting school access and education for girls and contributing to gender inequities. Emphasis on the importance of incorporating girls' lived experiences and their voiced recommendations for changes to the school structure and environment.</p> <p><u>Program implications.</u> Girls recommendations included: 1) creating a comfortable and welcoming school environment for girls with adequate sanitation facilities including girl-only toilets and free sanitary pads; 2) providing relevant and participatory fertility and body awareness, menstrual care educational sessions; 3) raising awareness and understanding among boys, teachers, parents, etc. possibly through open distribution of menstrual kits for all to see; 4) including menstrual cycle management in "life skills" clubs; and 5) strengthening linkages with parent-teacher organizations and the links between schools and local factories producing menstrual sanitary supplies.</p>	<p>N/A</p>

Lavoie (2009)*	Intervention: Incorporation of a male-involvement/couple-focused approach and SDM into a community-based health center	United States	Adolescents Women and men of reproductive age	<u>Fertility awareness educational tool. CycleBeads were a useful tool for helping adolescents understand the menstrual cycle.</u>	<u>Program implications. Counselors, educators, and outreach staff use CycleBeads to counsel and education patients attending the teen clinic and school-based family life educational sessions.</u>	5
Makinwa-Adebusoye (1992)*	Cross-sectional survey	Nigeria	Young men and women ages 12-24, pre-puberty through postpartum, from urban areas n=5599	<u>Lack of knowledge of the fertile time of the menstrual cycle. 33% of females and 17% of males reported knowing this, but only 13% could correctly identify this on a calendar, indicating perception of more knowledge than they had.</u> <u>Attitudes. Perceptions of low risk of pregnancy were linked to nonuse of FP methods.</u> Belief that a girl could not get pregnant the first time she had sex was a top-stated reason for not using FP. Fear of side effects was another reason often reported.	<u>Program implications.</u> Increased fertility awareness knowledge regarding risk of pregnancy may support increased FP use or delay of sex. Very few parents were reported as a source of knowledge regarding fertility awareness, FP or SRH. Efforts to support and encourage parental and school-based education of youth on these topics may help reduce risky behaviors.	2
Roth (1993)	Intervention 2-hour fertility awareness session as part of a longer SRH course, with opportunity to record fertility signs and meet with an instructor for follow-up	United States	Male and female adolescents, ages 13-16, in-school. n=51	<u>Knowledge gain.</u> Pre and posttest results reflect a mean fertility awareness knowledge gain of 45% and a median knowledge gain of 55%.	<u>Program implications.</u> Fertility awareness knowledge can be increased as a result of a short educational session. Roth builds a theoretical case and suggests that lack of fertility awareness, and lack of association of this with a girl's own body, contributes to contraceptive risk-taking.	5
Scott (2009)	Unpublished paper, Oxford University Intervention School-based puberty and hygiene education for girls, with and without	Ghana	Post-pubescent girls from poor communities, ages 12 and older. n=183	<u>Behavior. Decreased number of missed days of school for girls</u> (from 21% to about 9%) and an increase on girls' well-being measures, as a result of puberty and hygiene education for girls (both with and without pad distribution).	The details of the puberty/hygiene and fertility awareness educational messages were not documented in this paper. <u>Program implications.</u> Puberty/hygiene education enhanced with fertility awareness knowledge and skills may further benefit girls as well as boys. The potential to partner with sanitary pad distribution companies, offer the fertility awareness-enhanced puberty education and assess the outcome could be explored. Possible delivery agents of this information and product include parents, teachers, peers and	4

	sanitary pad distribution compared to a control group				others. Future studies should be long enough to assess effects over time. (A 2010 press release on sanitary pad study also describes this project.)	
Shaikh (2006)	Cross-sectional survey	Pakistan	Young men and women ages 17 and older from 20 villages near Lahore, Pakistan. n=400	<u>Lack of knowledge about puberty and fertility awareness.</u> Although young men were more knowledgeable about some areas of SRH, young women (60%) were more knowledgeable about a pubescent girl's ability to conceive after intercourse, compared with young men (36%). Young women were significantly less knowledgeable than young men about nocturnal emissions, and young men were significantly less knowledgeable than young women about menstruation and menstrual hygiene.	<u>Program implications.</u> Strategies for increasing fertility awareness in relation to one's own body, with regard to individuals of the opposite gender, and combined fertility appear to be indicated.	4
Sommer (2009) ¹	Qualitative: individual interviews and group participatory activities	Tanzania	Post-pubescent young women ages 16-19, urban and rural, in-school and out-of-school. n=16 for qualitative interviews n= ~100	<u>Lack of knowledge of the fertile time of the menstrual cycle.</u> Girls knew vaguely about the fertile window, but lacked details to understand the risk of pregnancy or to apply this knowledge to their own bodies. <u>Lack of knowledge about secretions.</u> Girls noticed (what appeared to be) normal cervical secretions and wondered if this was a disease.	<u>Program implications.</u> The importance of documenting girls' voiced experiences was emphasized. This echoes other themes surfacing in this review regarding the need to recognize and appreciate the "lived experiences" of youth, women and men. These "lived experiences" (often in the context of lack of, or incomplete information about fertility) appear to shape attitudes, beliefs and behaviors—that can be hard to change even when new, accurate fertility information is available by a trusted source. Personal "lived experiences" also provide a starting point or springboard for building on existing fertility awareness knowledge (or lack of knowledge) and related attitudes and behaviors.	5
Sommer (2010) ¹	Qualitative: individual interviews and group participatory activities	Tanzania	Post-pubescent young women ages 16-19, urban and rural, in-school and out-of-school. n=16 for qualitative interviews n= ~100	<u>Attitudes regarding menses and pressure from males.</u> Girls described dismay over menstruation, the desire to keep menses secret from teachers, pressure to demonstrate their fertility, and harassment from boys and men.	<u>Program implications.</u> Girl-voiced recommendations for addressing challenges of puberty include school-structured and curricular reform: 1) access to no-cost sanitary pads; 2) girls' toilets with clean water, adequate locks on doors and supplies to clean oneself with; 3) receiving lessons on growing up at earlier ages, including menstruation/pad information and not to have relations with boys, 4) addressing issues regarding learning about puberty from male and/or "shy" teachers, for example have puberty trainers that go from school to school for added confidentiality.	5
Uddin (2008)	Cross-sectional survey	Bangladesh	Rural, adolescent girls mean age 14.4 (range 10-19) n=819	<u>Lack of knowledge about the fertile time of the menstrual cycle.</u> Only 7% (44/630) were able to correctly identify the fertile days of a woman's menstrual cycle (13% had incorrect knowledge, 80% did	<u>Program implications.</u> In this study knowledge of puberty and the fertile window increased with age, education, and being from a high-performing area. Knowledge of puberty also increased with exposure to media. This has implications for the design of fertility awareness components of a comprehensive SRH	3

				<p>not know). Only 24% (197/819) knew a girl could get pregnant if she had sex only once.</p> <p><u>Lack of knowledge about puberty.</u> 23% had never heard about puberty. 24% knew that a girl who experienced menstruation might get pregnant if she only has sex once.</p> <p><u>Lack of knowledge about conception.</u> 18 of 20 married adolescent girls who had given birth said that they did NOT understand why they became pregnant during their first pregnancies.</p>	<p>program, including the need to provide fertility awareness and puberty-related SRH education at younger ages.</p>	
Vigil (2005)	<p>Intervention</p> <p>12 in-school TeenStar fertility awareness and abstinence-focused sessions including: understanding and relating fertility signs to one's own body, respect for others, intimacy, decision-making and responsibility, FP and STIs</p>	Chile	<p>Adolescent boys and girls ages 12-18 (pregnancy status unknown), in-school, who participated in the TeenSTAR program.</p> <p>n=740</p>	<p><u>Behavior. Reduced rates of self-reported initiation of sex</u> (intervention 6%, control 15%)</p> <p>Increased rates of discontinuation of sex among previously sexually active youth (intervention 20%, control 9%)</p>	<p>The influence of the fertility awareness messages was not analyzed separately from other educational messages.</p>	6

Key for articles with the same data source

- 1=Articles with the Sommer data
- 2=Articles with the Fog Zone data
- 3=Articles with the Bloom and Singh data

Young adult/adult – Perceptions of risk of pregnancy and family planning

Study	Design	Country	Population	Fertility Awareness Evidence	Comments and Case Building	Study Design Strength with Regard to Fertility Awareness
Ancheta (2005)	Cross-sectional survey	United States	Pre-pregnancy young women under the age of 24. Patients at an urban, adolescent clinic, diagnosed with an STD. n=113	<u>Behavior. Increased condom negotiation skills</u> associated with SRH education from both parental and formal education sources (school and program-based). <u>Behavior. Fewer number of lifetime sexual partners</u> associated with receiving SRH formal education earlier, in relation to first coitus.	SRH education included menstrual cycle changes, pregnancy, STIs and family planning. The influence of fertility awareness messages was not analyzed separately. Parents more often discussed menstrual cycle topics, while formal (school or religious) education sources more often addressed STIs. <u>Program implications.</u> Equipping parents and formal education sources to provide fertility awareness in conjunction with other important SRH topics may enhance condom negotiation skills and other health practices. Fertility awareness before sexual debut may be protective.	5
Ayoola (2007)	Literature review of 16 studies	United States	Women, sexually active, ages 18 and older	<u>Attitudes. Perceived low risk of pregnancy</u> was a common reason for unprotected intercourse. <u>Attitudes of concern about FP method side effects</u> and concerns about long and short-term health effects of contraception were other often stated reasons for unprotected sex.	<u>Program implications.</u> Given the lack of fertility awareness knowledge and concern about method side effects, it may be beneficial to systematically assess fertility awareness among new FP method users, and provide anticipatory guidance regarding possible side effects and potential observable body and/or menstrual cycle changes associated with the user's selected method.	N/A
Berger (2012) ²	Report (cross-sectional survey) Fertility awareness knowledge: Knowing a woman can get pregnant during several days of her cycle, and that is typically half-way between 2 periods.	United States	Unmarried men and women ages 18-29. Pre-pregnancy and postpartum. Nationally representative. n=1800	<u>Lack of knowledge of the fertile time of the menstrual cycle.</u> 66% lacked this knowledge, and men had less knowledge than women. For women, this knowledge increased with age, but not for young men. Formal sex education was not linked to knowledge of the fertile time. <u>Knowledge of the fertile time increased with the number of years of schooling.</u> White/Caucasian young adults had more fertility awareness knowledge than Black and Latino youth. <u>Knowledge of the fertile time was higher in young adults who had ever used "NFP" or withdrawal.</u> However	<u>Program implications.</u> Including fertility awareness in school-based education, clinic-based counseling and other programs for young adults may increase fertility awareness, improve perceptions of risk of pregnancy, and support other health benefits of associating fertility awareness with one's own body or circumstance. Improving fertility awareness knowledge among withdrawal and FAM users may increase success and satisfaction with these methods.	4

				40% of study participants, who report ever-use of "NFP," could not accurately identify the most fertile time of the cycle.		
Bloom (2000) ³	Cross-sectional survey	India	Married men ages 15-59 living in five districts of the northern state of Uttar Pradesh, India. n=6549	<u>Lack of knowledge of the fertile time of the menstrual cycle.</u> Younger men had less knowledge than older men (14 % of men ages 15-24 vs 22% -24% of men ages 25-44) Men in urban areas, rural men with more assets, and men with more education tended to have more knowledge of the time when pregnancy was likely. <u>Attitudes. Men who believed that pregnancy could be prevented</u> were more likely to have correct knowledge of the fertile time and knowledge of 2 or more STIs.	Men who believed it was <i>not</i> possible to prevent pregnancy were more likely to name 2 or more serious maternal health conditions.	5
Brieger (2001)*	Intervention Peer educators conducted one-to-one and group SRH activities to provide information, create awareness of services and make referrals.	Nigeria and Ghana	Adolescent girls and boys targeted by individual youth-serving organizations. Secondary, post-secondary, and out-of-school youth (those in the workplace under age 25) n=3585	<u>Attitudes regarding concern about the effect of FP methods on fertility and overall health, as well as social pressure to demonstrate their fertility before marriage continued post intervention.</u> <u>Behavior. Increased proportion reported using a FP method</u> from 47.2% at baseline to 55.6%	The influence of the fertility awareness messages was not analyzed separately; the potential impact or value added is unknown. <u>Program implications.</u> Fertility awareness, including knowledge of fertility signs like cervical secretions and better understanding of when during the menstrual cycle pregnancy can occur, may help address misinformation and concerns about fertility, infertility and related attitudes and behaviors. <u>Program implications.</u> In this study, peer education was an effective model for increasing SRH knowledge and promoting attitudinal and behavior change among adolescents. It is possible that further integrating fertility awareness into this approach may enhance SRH knowledge and related supportive attitudes and behaviors.	5
Bro (1993)	Mixed methods: cross-sectional survey combined with results of a pelvic exam and individual qualitative interviews	Denmark	Women who visited a general practitioner because of vaginal discharge (mean age 31) and women who had routine pelvic exams without this reason for visit (mean age 34). n=700	<u>Attitudes regarding concern about secretions.</u> 111 out of 417 Danish women (27%) receiving a routine pelvic exam, (for reasons other than complaints about "vaginal discharge") reported being bothered by their "usual" cervical secretions, and had varying levels of concern about this. A greater % of women 179/283 (68%) seeking medical care <i>with</i> complaints of vaginal discharge, also reported	<u>Program implications.</u> With women bothered and worried about their usual secretions, basic knowledge about the normal appearance, purpose, and importance of secretions (for vaginal health and fertility) may help women develop attitudes and skills to: 1) apply fertility awareness information to their own bodies with regard to personal hygiene, vaginal care and fertility potential; 2) identify secretion changes that may signal the need to seek medical care; and 3) experience reduced anxiety or concern about normal, healthy secretions.	Quantitative score: 5 Qualitative score: 5

				being bothered by their "usual" secretions.		
Canto de Cetina (2001)	Intervention: Anticipatory counseling on menstrual cycle changes associated with injectable (DMPA)	Mexico	Women, mean age 34, and intra-pregnancy and postpartum. n=350	<u>Knowledge and behavior supporting method continuation.</u> Increased knowledge of menstrual cycle changes (associated with injectable hormonal method use) was significantly associated with increased method continuation.	<u>Program implications.</u> Systematic provision of fertility awareness information, including anticipatory counseling on side effects of users' selected FP method may support method satisfaction and reduce discontinuation. The availability of all method options increases options for those concerned about method side effects.	5
Danielson (1990)*	Intervention Some fertility awareness information along with SRH, STI, testicular self-exam (TSE) content in a 30 minute slide-tape & 30 minute clinician interaction.	United States	Adolescent boys aged 15-18 who received ambulatory care at participating medical offices associated with the Portland, Oregon and Vancouver, Washington service areas of Kaiser Permanente. n=971	<u>Increase in knowledge and improved retention.</u> Effects of fertility awareness in combination with SRH knowledge was strong only among those not sexually active at base line, effects on knowledge were seen at 1 year follow-up.	The influence of the fertility awareness messages was not analyzed separately from other SRH messages <u>Knowledge about pill safety.</u> Greater proportion of boys in the intervention groups knew the pill was safe. <u>Attitudes. Reduced pressure to engage in sex,</u> reduced sexual coercion responses, and reduced "sexual impatience" among those in the intervention group who had not been sexually active at baseline. "Sexual impatience" (score from several questions) was the strongest indicator of intention to have unprotected sex. Increased male confidence in the safety of the pill observed among those who had been sexually active at baseline. <u>Behaviors. Increased partner pill use</u> for those not sexually active at baseline, but who were at follow-up. The intervention group also had <u>increased testicular self-exam.</u> <u>Program implications.</u> Benefit of educating youth before sexual activity begins, and of using a multi-media/provider-interaction combined approach. Potential for fertility awareness education of men to also support positive attitudes and behaviors in their partners.	8
Esimai (2010)	Cross-sectional survey	Nigeria	Female college students mean age 21.1 n=400	<u>Lack awareness of menstrual abnormalities/irregularities,</u> with 29% of students indicating awareness of this, and even less awareness among younger girls.	<u>Program implications.</u> Increased knowledge of normal and not normal menstrual cycle patterns may help girls identify and cope with cycle irregularities, as well as identify early on when medical care is needed and how to access this. Increased awareness among school teachers, staff and parents may help support girls to miss less days of schooling due to menstrual irregularities.	2

<p>Frost (2012)²</p>	<p>Cross-sectional survey</p> <p>About 17% of the questions on the knowledge scale addressed return to fertility or impact on fertility</p>	<p>United States</p>	<p>Unmarried men and women ages 18-29. Pre-pregnancy and postpartum. Nationally representative.</p> <p>n=1800</p>	<p><u>Low scores on FP knowledge</u> among over 50% of men and 25% of women.</p> <p><u>Attitudes regarding concern about FP methods.</u> 60% underestimated the effectiveness of OCs; fear of side effects was common.</p>	<p>Within the FP method knowledge scale, there were a few fertility awareness-related questions, not analyzed separately.</p> <p><u>FP knowledge</u> (with some fertility awareness knowledge included) was associated with the strongest and most consistent <u>behavior</u> in terms of use of a "medical" FP method. (Withdrawal and NFP were not considered medical methods.)</p> <p><u>Attitudes related to expecting negative side effects of hormonal/LARC methods</u> were associated with decreased use of these methods. What "friends think" about method use had a strong association with FP behaviors for women.</p> <p><u>Program implications.</u> If young adults better understand possible FP method side effects and related fertility awareness knowledge, this may contribute to better use of hormonal/LARC methods as well as better use of other, user-dependent, methods including condoms, FAM and withdrawal.</p>	<p>3</p>
<p>IRH (2004)</p>	<p>Admission interview for a clinical trial of a new family planning method</p>	<p>Guatemala, Peru, Philippines</p>	<p>Married women ages 18-45</p>	<p>Most participants were aware that they have cervical secretions, before they were taught the secretion-based TwoDay Method. They did not associate secretions with fertility.</p>	<p>Additional analysis provided for this report.</p>	<p>2</p>
<p>IRH (2008a)</p>	<p>Intervention</p> <p>SDM introduction: This was a study to test differences between women who use CycleBeads vs. a paper version.</p>	<p>Guatemala</p>	<p>Married women ages 18-49</p> <p>n = 556</p>	<p><u>Behavior.</u> Significant improvements in couple communication and women's empowerment.</p>		<p>5</p>
<p>IRH (2008b)⁴</p>	<p>Intervention</p> <p>Large scale, community-level SDM introduction</p>	<p>India & Peru</p>	<p>Married women of reproductive age</p> <p>Baseline n = 2079 Endline 1 n = 3092 Endline 2 n = 1800</p>	<p>Impact study of the SDM – the method was introduced on a large scale in three countries. In India & Peru there were community interviews at baseline and endline, which included a module on couple communication and women empowerment. There were</p>		<p>5</p>

				improvements in couple communication at the broad community level		
IRH (2008c)	Qualitative: focus group discussions with SDM users	DRC	Married women of reproductive age	<u>Behavior</u> . Significant improvements in couple communication, associated with SDM method use.		2
IRH (2013c) ⁵	Intervention Inclusion of the SDM in FP services	Guatemala	Married women of reproductive age Baseline n=498 Endline n=475	<u>Knowledge</u> . Population level fertility awareness increased when the Standard Days Method was included in family planning services.	<u>Program implications</u> . Including the SDM in FP services appears to increase population level fertility awareness and FP options for women and their partners. Over time, and with programmatic support, these dual results may build on one another, further increasing "actionable" fertility awareness and FP method use.	5
IRH (2013d) ⁵	Intervention Inclusion of the SDM in FP services	India	Married women of reproductive age Baseline n=1455 Endline n=1809	<u>Knowledge</u> . Population level fertility awareness increased when the Standard Days Method was included in family planning services. It was highest among women who had ever used the Standard Days Method.		5
IRH (2013f)	Cross-sectional surveys Data from multiple DHS surveys	Philippines, DRC, Morocco, Azerbaijan, Bolivia, and Cameroon	Married women ages 18-49 n = 13462	<u>Knowledge</u> . More educated women, and wealthier women, are more likely to respond "halfway between two periods" when asked when a woman is most likely to be fertile. While this association is not always statistically significant, the relationship is consistently in the same direction and holds true in the multivariate analysis in all countries except Azerbaijan, which might be explained by the highly educated sample of women in Azerbaijan (Jain & Sinai, 2013). The multivariate analysis of fertility awareness indicates that as age increases fertility awareness also increases while controlling for other background characteristics, though this association was statistically significant only in the Philippines, Bolivia, and Cameroon. As the number of living children increases, fertility awareness decreases in Bolivia and Cameroon, suggesting that a previous birth experience does not necessarily influence fertility awareness. There appears to be linear increase in fertility awareness as wealth quintile increases in the Philippines, Morocco, Azerbaijan and Cameroon. Urban and rural	<u>Program implications</u> . Fertility awareness appears to increase with wealth, education and age. Incorporating fertility awareness into programs addressing micro-enterprise and education may further strengthen population level fertility awareness. Additionally, with fertility awareness increasing with age, cross-generational approaches may provide opportunities in expand fertility awareness.	4

				residential differences are not a factor in fertility awareness except in Azerbaijan.		
IRH (2013h) ⁵	Qualitative: in-depth interviews Formative research in preparation for a study to develop approaches and materials for offering the TwoDay Method at the community level	Guatemala and DRC	Married women of reproductive age n=35	Participants' perceptions of their cervical secretions were discussed in detail. All participants had recognized that they had cervical secretions. Some thought they were normal but not associated with fertility; others thought they were dirty or a sign of infection. Several participants had received fertility awareness education in the past, and associated secretions with fertility.	<u>Program implications.</u> Given the predictive value of cervical secretions as a fertility indicator, since women tend to notice their secretions (without associating them with fertility) simple information about TwoDay Method may be very empowering.	5
Katz (2002)*	Cross-sectional survey	Senegal	Single and married girls ages 15-24, single boys ages 15-19 n=2909	<u>Lack of knowledge of the fertile time of the menstrual cycle.</u> Fewer than 50% the respondents knew this. "Women between ages 20-24 were the most likely to respond correctly, while men were the least likely." Less than 50% of women knew that a woman could get pregnant the first time she had sex. Men were more likely than women to respond correctly, yet fewer than 50% of all respondents gave a correct response. <u>Behavior. Low use of FP</u> among those who had had premarital sex, 80% of the men did not use contraception; 16% reported they did not think pregnancy was possible.	Knowledge of the fertile time was used as a proxy for measuring SRH knowledge. <u>Program implications.</u> As education, age and participation in a family life education session were significantly associated with SRH knowledge; inclusion of fertility awareness in educational sessions may add value, especially if these sessions occur before young people become sexually active.	4
Kaye (2009) ²	Report (cross-sectional survey)	United States	Unmarried young men and women ages 18-29. Pre-pregnancy and postpartum. Nationally representative. n=1800	<u>Lack of knowledge of the fertile time.</u> 68% do not know when the most fertile time is. Those who reported using rhythm or NFP had more knowledge of this. (40% lack knowledge or the fertile days.) <u>Attitudes, misperception of having more knowledge</u> about the fertile time than they actually had. Over 65% strongly agree that they had "all the knowledge they need to avoid unplanned pregnancy".	SRH knowledge gaps (including fertility-related knowledge) were associated with less likelihood of FP method use, less likelihood of considering LARC and greater likelihood to predict having unprotected sex in the future. Fertility awareness knowledge was not analyzed separately. <u>Program implications.</u> Since young people tend to underestimate their fertility, overestimate the risks associated with FP methods, and believe many myths/misinformation about fertility, pregnancy and FP while also believing they have sufficient and accurate information to	2

				<p><u>Attitudes overestimating negative side effects of FP methods.</u> 27% of unmarried women believe that getting a serious health problem like cancer from pill use is extremely or quite likely. 30% said it was extremely or quite likely to get an infection from using an IUD.</p> <p><u>Attitudes about infertility</u> 59% of women and 47% of men say it is at least slightly likely they are infertile; 15% of women and 14% of men describe it as quite or extremely likely.</p>	<p>avoid pregnancy—increasing fertility awareness knowledge may support more accurate perceptions of their own pregnancy risk, and help address concerns about perceived risks of modern methods of FP.</p>	
Lavoie (2009)*	Intervention Incorporation of a male-involvement/ couple-focused approach and SDM into a community-based health center	United States	Adolescents Women and men of reproductive age	<p><u>Fertility awareness educational tool.</u> CycleBeads were a useful tool for helping adolescents understand the <u>menstrual cycle.</u></p>	<p><u>Program implications.</u> Counselors, educators, and outreach staff use CycleBeads to counsel and education patients attending the <u>teen clinic and school-based family life educational sessions.</u></p>	5
Leon (2013) ⁴	Intervention Large scale, community-level SDM introduction	India	Women of reproductive age Baseline n = 1171 Endline 1 n = 1745 Endline 2 n = 1800	<p>Secondary analysis of the Impact study data in India. Multivariate analysis found significant improvements at the community level in women's empowerment between baseline and endline.</p>		6
Makinwa-Adebusoye (1992)*	Cross-sectional survey	Nigeria	Young men and women ages 12-24, pre-puberty through postpartum, from urban areas n=5599	<p><u>Lack of knowledge of the fertile time of the menstrual cycle.</u> 33% of females and 17% of males reported knowing the fertile days, but only 13% could correctly identify this on a calendar, indicating <u>perception of having more knowledge than they did.</u></p> <p><u>Attitudes.</u> Perceptions of low risk of pregnancy were linked to nonuse of FP methods. Belief that a girl could not get pregnant the first time she had sex was a top-stated reason for not using FP. Fear of side effects was another reason often reported.</p>	<p><u>Program implications.</u> Increased fertility awareness knowledge regarding risk of pregnancy may support increased FP use or delay of sex. Very few parents were reported as a source of knowledge regarding fertility awareness, FP or SRH. Efforts to support and encourage parental and school-based education of youth on these topics may help reduce risky behaviors.</p>	2
Marsiglio* (2001)	Qualitative: individual interviews Transcripts of	United States	Men mean age 21.3. Pre-pregnancy and postpartum (7 men were younger than 19 years and 10 men	<p><u>Lived experiences shaping men's "procreative consciousness"</u> This included: personal experiences during puberty; revelations through peer experiences; personal experiences</p>	<p><u>Program implications.</u> The importance of men relating "procreative consciousness" (male fertility awareness) concretely to their own bodies and life experiences, as well as associating this with plans for future action</p>	6

	interviews with 37 diverse men		were 26 years or more.) n=37	with first sex, first pregnancy scare, partner's miscarriage or abortion; perceived fertility or infertility based on direct sexual experiences with women; and perceptions influenced by the relationship with a partner and her beliefs, issues or concerns. <u>Attitudes about misperceptions of infertility</u> for some men was based on having had unprotected sex without a resulting pregnancy.	and/or potential parental responsibility, was underscored throughout the interviews.	
McPherson (2004)	Cross-sectional survey Compared US women with negative menarcheal experiences and poor preparation for menses (n=46) with women with positive experiences (n=38)	United States	Women mean age 20.1, Harvard University students n=84	<u>Attitudes and behavior associated with menstrual experiences.</u> Women in the negative group rated their periods as significantly more debilitating, and (interestingly), were better able to predict onset of menses based on preceding body changes. The group with negative experiences also reported more negative mood changes and more negative body image. In the groups combined, the more positive the woman's current menstrual experiences, the more likely she was to have accurate menstrual knowledge, positive health habits, and personal satisfaction with her appearance.	The "lived experience" of painful menses and negative mood changes may heighten awareness of overall body changes associated with menses—increasing self-awareness through direct, personal experiences associated with one's own body. <u>Program implications.</u> The power of relating fertility awareness knowledge to one's own body or circumstance may be particularly relevant in terms of the value added of this type of learned or "lived experience". This supports the rationale for increasing body/fertility awareness among women in general, through a variety of avenues (education, medical service delivery, informal networks, etc.) to help women link fertility awareness knowledge with observable, meaningful changes in their own body.	4
Myntti (2002)	Qualitative: individual interviews	Lebanon	Men ages 33-47 and women ages 22-53 who were current or previous users of withdrawal n=25 (14 women and 11 men)	<u>Attitudes.</u> Concern about FP method side effects was the most common reason for using withdrawal. <u>Behaviors.</u> Use of withdrawal combined with a variety of fertility awareness-related strategies. Some determined their estimation of fertile days, and used withdrawal during this time. Others used withdrawal during their estimation of days with low risk of pregnancy, and used condoms or abstinence on days they considered fertile. <u>Couple communication and joint decision-making</u> with withdrawal reported by all, except for one woman who discussed lack of power and discontent.	<u>Program implications:</u> Given that withdrawal was often used in combination with some knowledge of the woman's fertile days, additional fertility awareness for both women and men may improve results. Withdrawal users may benefit from provider assessment of their perception of risk of pregnancy, how withdrawal is practiced, how additional and accurate fertility awareness knowledge may improve FP outcomes, and referral or information on other methods if desired.	5

<p>Nettleman (2007)</p>	<p>Cross-sectional survey</p>	<p>United States</p>	<p>Women who had recently given birth after an unintended pregnancy were asked why they had not used contraception n=7856</p>	<p><u>Attitudes. Misperceptions of pregnancy risk.</u> 41% reported that they did not use FP because they either believed that they could not get pregnant at the time they had had intercourse or they considered themselves or their partner to be sterile. Also 18% of free text (other) responses indicated that the woman thought she was at low risk of pregnancy. <u>Attitudes about fertility and aging.</u> Only 4 women stated (in free text) they thought they were too old to become pregnant.</p>	<p><u>Program implications.</u> Efforts to increase fertility awareness knowledge, including when during the cycle a woman is likely to become pregnant, may increase accurate perceptions of risk of pregnancy among sexually active women and increase the use of FP methods if pregnancy is not desired.</p>	<p>4</p>
<p>Ortayli (2005)</p>	<p>Qualitative: individual interviews</p>	<p>Turkey</p>	<p>Male factory workers, mean age 32.2 ± 5.6 years, majority married n=68</p>	<p><u>Lack of knowledge about male fertility and withdrawal.</u> Men described learning about withdrawal in "bits and pieces" until you "guess" or "figure it out". <u>Lack of knowledge of a woman's fertile time</u> may contribute to lack of success with withdrawal, especially when withdrawal is used selectively, in combination with inaccurate perceptions about female fertility. (Only 3% of the men could accurately describe the fertile days.) Some used withdrawal during the perceived fertile days. Others used condoms on perceived fertile days and used withdrawal on other, "less risky" days. <u>Attitudes. Concern about FP method side effects</u> was typically based on concerns respondents had heard about rather than personal experiences. Use of withdrawal was described as a way for men to contribute to FP and reduce their partners' risk of method side effects.</p>	<p><u>Program implications.</u> Some men who used withdrawal initially experienced high failure rates, but gradually gained experience and success. Men did not systematically learn about withdrawal or about male and female fertility. With the selective use of withdrawal by some during a woman's "perceived" fertile days, additional fertility awareness knowledge among men and women may improve the outcome of withdrawal use. Other men, female partners and parents are potential sources of information and experience regarding male fertility and use of withdrawal to reduce the risk of pregnancy. A man's personal experience with withdrawal appeared to contribute to his confidence and use of this method, as well as his potential sharing of this fertility awareness knowledge and experience with others.</p>	<p>4</p>
<p>Parasuraman (2009)</p>	<p>Report (cross-sectional survey)</p>	<p>India</p>	<p>Men ages 15-54 and women ages 15-49, pre-pregnancy through menopause/mid-life. Nationally representative. n=233,426</p>	<p><u>Lack of knowledge of the fertile time</u> While 49-74% of women and 39-74% of men had general knowledge of a fertile time, specific and correct information was much lower (5-16% for women and 4-17% for men). Knowledge increased with age and marital status.</p>	<p><u>Program implications.</u> With sterilization, followed by the user-directed methods condoms and rhythm as the 2nd and 3rd most often used methods of FP in India, (and with lack of fertility awareness knowledge among women and men as well as lack of condom knowledge among women) fertility awareness education may improve correct and timely use of the user-directed methods.</p>	<p>2</p>

				<p><u>Lack of knowledge of risk of pregnancy when breastfeeding.</u> The percentage of men who believed (incorrectly) that a breastfeeding woman cannot get pregnant increased with age (29-56%). One third of women knew they could get pregnant during breastfeeding.</p> <p><u>Attitudes about puberty education.</u> Men were more favorable than women that changes in girls' and boys' bodies should be taught to both girls and boys in schools.</p>		
Sadovsky (2006)	Qualitative: individual interviews	United States	<p>Men and women (majority) ages 18-28, pre-pregnancy and postpartum. Majority college students.</p> <p>n=55</p>	<p><u>Attitudes regarding the value of SRH education received in the past</u> About 40% indicated that past SRH education did influence their behavior, mostly in the area of heightened awareness of their risk of STIs. However, findings do not provide meaningful evidence regarding fertility awareness.</p>	<p><u>Program implications.</u> Fertility awareness knowledge may complement STI instruction by teaching girls and women how to notice their typical secretion pattern and signs of a possible health problem or vaginal infection as well as strengthen partner or even parent communication on these topics. Teaching methodologies that reinforce key concepts over time, rather than infrequent or one-time instruction, were suggested.</p>	5
Scorgie (2011)	Qualitative: individual interviews and focus groups	South Africa	<p>Men and women from rural and urban areas. Mean age 35 for women individually interviewed.</p> <p>n=20 for individual interviews</p> <p>n=57 for focus groups (33 women and 24 men)</p>	<p><u>Lack of knowledge of secretions</u> as a healthy, naturally-occurring substance and fertility indicator. Women FGD participants in KwaZulu-Natal described what appeared to be normal secretions as a sign of "illness" and "revealed intense anxieties" about this, along with learned behaviors to remove these normal secretions.</p> <p><u>Attitudes about "wetness" of increased "discharge" associated with injectable contraception</u> perceived as "dirty". In addition to removing secretions, women removed menses as well as semen after sex, which were also considered "dirty".</p>	<p><u>Program implications.</u> With women's lack of knowledge regarding the purpose and function of secretions, and concern about and removal of healthy secretions, increased knowledge of their role and importance may help reduce potentially harmful "hygiene" behaviors that include washing or drying out the vagina. Basic knowledge of secretions as an indicator of fertility may also empower women by enhancing their FP strategies.</p>	6
Sinai (2006)	Other: (Clinical trials of fertility awareness-based methods: the Standard Days Method and TwoDay Method)	Guatemala, Peru, the Philippines	<p>Women ages 18-29, clients of public or NGO health programs, in union, and practicing family planning.</p> <p>n=928</p>	<p><u>Behavior.</u> FAM users successfully used FAMs to avoid unprotected intercourse on fertile days without reducing monthly coital frequency.</p>	<p><u>Program implications.</u> With accurate knowledge of the fertile days and with the behavior components for managing these days, couples have an effective FP method that does not reduce coital frequency. Increasing fertility awareness among the general population may help reduce unintended pregnancy, especially among those who currently use inaccurate information along with their own self-styled strategies for</p>	7

					reducing the risk of pregnancy.	
Singh (1998) ³	Cross-sectional survey	India	Married men ages 15-59 living in five districts of the northern state of Uttar Pradesh, India n=6549	<u>Lack of knowledge of the fertile time.</u> Only 20% of boys/men responded correctly regarding when during the menstrual cycle women are most likely to get pregnant. Males with more education, more assets, and those over age 20 had somewhat more fertility awareness knowledge, although still generally low.		5
Smit (2002)	Mixed methods Quantitative: cross-sectional survey Qualitative: focus group interviews	South Africa	Injectable contraceptive users from a rural sub-district in the province of KwaZulu-Natal, South Africa. Women ages 15-49 (quantitative), women ages 17-60 and men ages 18-75 (qualitative). n=848 for cross-sectional survey n=100 for focus groups (63 women and 37 men)	<u>Attitudes. Concern about increased vaginal wetness associated with injectable side effects.</u> 18% of injectable users (n=187) noted and were concerned about vaginal wetness (secretions?) when using a progestin injectable method of FP. This vaginal wetness was the most often noted side effect, after amenorrhea. (The study authors also questioned whether the increased sensation of vaginal wetness may be related to a noticeable change in healthy secretions associated with injectables or as a sign of infection.)	<u>Program implications.</u> Given the very common changes in observed menstrual cycle symptoms among injectable users, as well as the increased sensation of vaginal wetness noted in this study, anticipatory fertility awareness and method-related counseling may allay fears and increase continuation of hormonal methods, including injectables. Increased fertility awareness may also provide an opportunity to support good vaginal health, and help individuals notice early on the possible signs of some STIs, and the need to be tested and treated if STI symptoms appear.	Quantitative: 4 Qualitative: 5
Wilcox (2004)	Prospective (other)	United States	Women in their late twenties and early thirties. Most were white, college-educated, and parous. IUD users or women with a tubal ligation n=69	<u>Behavior. Increased prevalence of sexual intercourse on fertile days.</u> Women using an IUD or with a tubal ligation (not using FAM, without apparent knowledge or concern about trying to avoid unprotected sex during fertile days) had intercourse more often during the fertile days of the cycle. "Intercourse was 24% more frequent during the 6 fertile days than during the remaining non-bleeding days."	Emerging themes from this review document lack of fertility awareness knowledge among women and men, along with the common misperception that they have accurate knowledge about the risk of pregnancy when they do not. Information about possible biological factors (libido, pheromones, or other factors), that may increase a couple's propensity to have sexual intercourse more often around the fertile time, is noteworthy. This is especially important if subtle or unperceived influences increase the frequency of intercourse during fertile days, without the woman or man's knowledge. This evidence adds to the rationale for the need for increased fertility knowledge among adolescents, women and men, especially given that couples who do have sufficient fertility awareness knowledge and wish to use this information to abstain from sex or use condoms on fertile days (FAM), can successfully do so without reducing coital frequency (<i>It's all in the timing</i> , Sinai, 2006).	3

Witt (2013)	Cross-sectional survey	United States	<p>Women ages < 21 28.4%, ages 22-31 45.3%, ages 32-41 18.4%, and >42 7.9% low-income. Title X funded health centers</p> <p>n=465</p>	<p><u>Lack of knowledge of the fertile time.</u> Over 60% lacked this knowledge, women with less than a high school education and non-white women had significantly less knowledge.</p> <p><u>Attitudes. Perception of having accurate knowledge when one does not.</u> Only 40% who believed they knew the fertile days, actually did.</p> <p><u>Attitudes about hormonal FP methods.</u> Almost 40% strongly agreed or agreed that non-chemicals, non-hormonal methods were an important consideration regarding method selection.</p>	<p><u>Program implications.</u> While few had received information about FAMs/NFP, increased fertility awareness knowledge and access to FAMs may contribute to improved/more accurate knowledge and perceptions of the fertile time which may support timely FP method use.</p>	3
Witte (1997)	Qualitative: focus groups	United States	<p>Young women with children, ages 14-26</p> <p>n=21</p>	<p><u>Attitudes. Lack of perception of pregnancy risk</u> was prevalent among US adolescents and young adult mothers, reinforced by experiences of having had unprotected sex without getting pregnant. While knowledge of LARC was described, concern about FP method side effects was emphasized during the FGDs.</p>	<p><u>Program implications.</u> The author advocates the use of the Extended Parallel Process Model (EPPM) for adolescent and young adult SRH campaigns with theoretically developed "fear appeal" messages to increase fear of unintended pregnancy (increased perception of risk of pregnancy) while increasing efficacy of "danger control" strategies to mitigate pregnancy risk through abstinence or FP method use.</p>	3
Emergency contraception						
Byamugisha (2006)	Cross-sectional survey	Uganda	<p>First-year female students at Makerere University, ages 18-25, mean age 21.</p> <p>n=379</p>	<p><u>Lack of knowledge of the fertile time of the menstrual cycle.</u> Only 22% correctly responded between two periods.</p> <p><u>Lack of knowledge of emergency contraception (EC).</u> 45% had heard of EC and 7 had used it. Contraceptive ever-use rate was 14.5% and the most commonly used methods were condoms (48.9%) and withdrawal (23.4%).</p>	<p><u>Program implications:</u> Increased knowledge about fertility awareness, risk of pregnancy, FP methods and EC may increase correct and timely use of the commonly used methods (condoms and withdrawal), other methods and EC, when needed.</p>	3
Meng (2009)	Cross-sectional survey	China	<p>Women seeking abortions, ages 15-48, were surveyed on their previous use of emergency contraceptives</p> <p>n=5677</p>	<p><u>Attitudes. Perceived low risk of pregnancy.</u> Non-use of emergency contraceptive pills (EC) was correlated to less knowledge of fertility and a lower rate of contraceptive use. "The main reason for non-use (of EC) was lack of awareness of the risk of pregnancy and the subsequent need for protection."</p>	<p><u>Program implications:</u> Increased fertility awareness knowledge, including knowledge of the risk of pregnancy, may increase the perceived need to use FP to avoid unintended pregnancy, and the perceived need to seek EC if unprotected sex occurs, especially during the fertile time.</p>	3

Fertility Awareness Literature Review – Appendix A
Key for articles with the same data source

- 1=Articles with the Sommer data
- 2=Articles with the Fog Zone data
- 3=Articles with the Bloom and Singh data
- 4 = IRH 2008b and Leon
- 5 = IRH 2013a, IRH 2013b, and IRH 2013c

* indicates that article is repeated in multiple categories

Young adult/ adult – Perceptions about return to fertility— Postpartum, breastfeeding and miscarriage or induced abortion

Study	Design	Country	Population	Fertility Awareness Evidence	Comments and Case Building	Study Design Strength with Regard to Fertility Awareness
Bongiiovanni (2005)	<p>Report (cross-sectional survey)</p> <p>Note: For a breastfeeding woman to use the Lactational Amenorrhea Method (LAM) she adheres to the following criteria: -Fully or nearly fully breastfeeding AND -Less than 6 months postpartum AND -Menses has not returned</p>	Jordan	<p>Women postpartum ages 16-49</p> <p>Includes women knowledgeable of all 3 LAM criteria, 7.1%, and women who used breastfeeding for FP but did not mention all 3 criteria, BFFP, 26%.</p> <p>n=3183</p>	<p><u>Attitudes and Behavior. Postpartum fertility perceptions and transition to FP method use.</u> LAM users were twice as likely as BFFP users to begin using a method at 12 months postpartum, as well as more likely than non-FP method users, periodic abstinence users and withdrawal users to be using a method at 12 months postpartum. LAM users, with their knowledge of all 3 LAM criteria, were also more likely to transition to a complementary FP method at 6 months postpartum compared to BFFP users, and also more likely to use a FP method at 12 months once menses resumed (89% LAM, 68% BFFP).</p> <p><u>Attitudes. Breastfeeding, menses and return to fertility.</u> Although knowledgeable of the 3 LAM criteria, many LAM users appeared to wait past 6 months postpartum for return of menses, to begin using a complementary method.</p> <p><u>General knowledge of the LAM criteria.</u> Many women in the study, who used a wide-range of FP methods, also had knowledge of one or two of the LAM criteria (lactational amenorrhea, 76% and full/nearly-full breastfeeding, 79%, n=2921), but very few had knowledge of the less-than-6-month-postpartum criterion (<15%).</p>	<p><u>Program implications.</u> Since very few women in the entire study knew about the need for breastfeeding women to transition to another FP method by at least 6 months postpartum, and with many LAM users waiting past 6 months until the return of menses to begin another method, this study highlights the need for accurate information and supportive attitudes regarding postpartum return to fertility and timely transition to an effective method for women relying on LAM or BFFP.</p> <p>The authors suggest that personal experience and success with past breastfeeding may contribute to the decision to use LAM or BFFP. The lived, personal experience of women may serve as a resource or foundation for added fertility awareness messages.</p>	4
IRH (2013j)	<p>Cross-sectional survey</p> <p>Village census</p>	Mali	<p>All women of reproductive age and all men married to women of reproductive age interviewed in two villages</p> <p>Married women ages 18-44; Men married to a woman ages 18-44</p> <p>N=726</p>	<p><u>Lack of knowledge about breastfeeding and return to fertility.</u> 16.7% of women in one village, and 20.4% of women in the second village were not using a family planning method, even though they wished to avoid pregnancy, because they were in postpartum amenorrhea or breastfeeding, and believed they could not become pregnant.</p>		4

<p>Kouyate (2010)</p>	<p>Report (mixed methods: individual interviews and questionnaire associated with a LAM intervention)</p>	<p>Bangladesh</p>	<p>Women postpartum who had participated in a LAM intervention. A small number of husbands and mothers-in-law were also interviewed. n=80 for survey n=40 for individual interviews</p>	<p><u>Attitudes and beliefs about return to fertility postpartum.</u> Even among LAM users, women lack knowledge (hold different beliefs) about the return to fertility postpartum. The 6 month LAM criterion is the criteria most often <u>not</u> followed, as many women (both LAM transitioners and non-transitioners) waited until menses as a signal of return of fertility.</p>	<p><u>Program implications.</u> Among women who had breastfed previous children, many described a personal, "lived" experience of previous conception occurring sometime after first postpartum menses and/or after a year postpartum. As a result, this "lived" experience contradicted the LAM 6 month criterion. Possible fertility awareness strategies in this context include determining a woman's perception of risk of pregnancy and tailoring fertility awareness messages to address her personal experience or circumstances. Incorporating additional fertility awareness messages during postpartum visits, or community-based counseling, especially around 6 months may support timely FP uptake.</p>	<p>Quantitative : 4 Qualitative: 4</p>
<p>Marsiglio (2001)*</p>	<p>Qualitative: individual interviews Transcripts of interviews with 37 diverse men</p>	<p>United States</p>	<p>Men mean age 21.3. Pre-pregnancy and postpartum (7 men were younger than 19 years and 10 men were 26 years or more.) n=37</p>	<p><u>Lived experiences shaping men's "procreative consciousness"</u> This included: personal experiences during puberty; revelations through peer experiences; personal experiences with first sex, first pregnancy scare, partner's miscarriage or abortion; perceived fertility or infertility based on direct sexual experiences with women; and perceptions influenced by the relationship with a partner and her beliefs, issues or concerns. <u>Attitudes about misperceptions of infertility based on unprotected sex not resulting in pregnancy.</u></p>	<p><u>Program implications.</u> Male experiences with partner pregnancy (or pregnancy scare), miscarriage, abortion or perceived infertility, contributed to men's personal experiences and associated plans for future action or potential parental responsibility.</p>	<p>6</p>
<p>Vernon (2009)</p>	<p>Background article</p>	<p>N/A</p>	<p>Postpartum women</p>		<p><u>Summary fertility awareness points pertaining to this review.</u> Over 50% of postpartum women desiring FP want to use a method immediately after birth (or within 6 weeks), and the rest prefer to postpone method use between 6 weeks and one year postpartum. Within this context, and with a typical delay in FP uptake among breastfeeding women, postpartum method preferences are often influenced by a woman's perceptions about her return to fertility, parity, and method desire. Although Vernon reports mixed results of LAM users being able to understand and follow the three LAM criteria, and mixed results regarding timely transition from LAM to a complementary method of FP, along with other challenges with the behavioral component of the method, he confirms the correct use rate of 98% and suggests additional research to determine whether there are more effective ways to operationalize the method.</p>	<p>N/A</p>

Miscarriage and post-abortion						
Aneblom (2002)	Cross-sectional survey	Sweden	Women obtaining induced abortions. Mean age 27.7 years (range 14-46). n=518	<u>Attitudes. General knowledge of mid-cycle fertility not associated with perceived personal risk of pregnancy.</u> Among teens and women in Sweden seeking abortion services, 81% knew the fertile days of the cycle were between two menstruations (although this knowledge was lower in the youngest age group). However, despite high awareness of EC (83%) few women used it to attempt to prevent this pregnancy. When those who had used EC before were asked why they didn't use EC this time, the main reason given was "unawareness of pregnancy risk".	<u>Program implications.</u> Incorporating strategies that help girls and women relate knowledge about their fertility and the fertile days of the cycle to their own bodies may increase their "personal" perceived risk of pregnancy.	3
Curtis (2010)	Background article	N/A	Women after miscarriage or post-abortion		Given the maternal morbidity and mortality from unsafe abortion (especially in developing countries), the wide-spread lack of knowledge among women regarding the quick return to fertility post miscarriage or post induced abortion, the recognized best practice of "offering FP" to all women who have just experienced either a miscarriage or an induced abortion to delay the next birth for at least 6 months was emphasized for the health of the mother and her next baby. These circumstances contribute to the rationale for increasing fertility awareness knowledge, accurate perceptions of personal risk of pregnancy, and related FP messages and services, in conjunction with services for those treated for miscarriage or abortion.	N/A
Mahmoud (2013)	Cross-sectional survey	Egypt	Women post-abortion, mean age 27, mostly rural n=210	<u>Lack of knowledge of the quick return to fertility post miscarriage or post induced abortion.</u> Over 75% of the respondents either did not know how soon a woman could get pregnant post abortion, or gave incorrect responses.	<u>Program implications.</u> Given the significant morbidity and mortality of unsafe abortions, the potential benefit of increasing fertility awareness knowledge, along with information about and access to FP, is promising for women who have just experienced a miscarriage or an induced abortion.	4
Melkamu (2003)	Cross-sectional survey	Ethiopia	Women post-abortion, mean age 26.4 n=401	<u>Lack of knowledge of the quick return to fertility post-abortion.</u> Only 26.7% responded that fertility would likely return soon, within 2 weeks. Most participants in this study (81.8%) indicated they did not wish to become pregnant within the next 3 months.	<u>Program implications.</u> Given the negative health consequences and maternal mortality from unsafe abortion, and lack of knowledge of return to fertility post abortion, the abortion visit appears to be a potentially beneficial time to provide fertility awareness information, support accurate perceptions of "personal" return to fertility and offer FP methods.	2

Key for articles with the same data source

- 1=Articles with the Sommer data
- 2=Articles with the Fog Zone data
- 3=Articles with the Bloom and Singh data

Subfertility and perceptions of about aging and fertility

Study	Design	Country	Population	Fertility Awareness Evidence	Comments and Case Building	Study Design Strength with Regard to Fertility Awareness
Blake (1997)	Cross-sectional survey	New Zealand	Women attending an infertility clinic ages 18-46, mean age 28.4 years.	<u>Lack of knowledge of the fertile time of the menstrual cycle.</u> Women (76%) had "inadequate understanding" of this as indicated by a knowledge/self-described skill score of less than 4 on a fertility awareness survey.	<u>Program implications.</u> For those without adequate fertility awareness knowledge (no experience with SDM, no TwoDay Method Sypmtothermal, Billings ovulation or BBT method instruction etc.) the ability to actually identify the fertile time of a woman's cycle is lower, potentially exacerbating a sub-fertile woman's inability to conceive. And, for women wanting to avoid pregnancy based on their own personal perceptions of the risk of unintended pregnancy (without sufficient fertility awareness information) the chance of pregnancy is higher, especially if the couple inadvertently targets fertile days for unprotected intercourse.	2
Bretherick* (2010)	Cross-sectional survey	Canada	Female undergraduate students at the University of British Columbia in Vancouver, British Columbia, Canada. Ages 18-42, Mean age 21.3. n=360	<u>Lack of knowledge about fertility and aging.</u> College students overestimated the risk of pregnancy (number of months it takes to get pregnant, and the % of women pregnant within 1 month) as well as overestimated the risk of infertility and pregnancy loss. They also underestimated the influence of age on both infertility and the risk of miscarriage. <u>Attitudes. Perceptions about age and miscarriage.</u> Although most women in the study were aware that fertility declines with age, they did not perceive "the steep rate of decline" nor did they recognize a woman's age as the strongest risk factor for miscarriage (75% incorrect response rate) and infertility (54% incorrect). <u>Attitudes. Perceptions about FP methods and infertility.</u> Some believed (incorrectly) that long-term contraceptive use was the strongest risk factor for infertility (9.2% of respondents)	<u>Program implications.</u> This misinformation about fertility may heighten a young woman's concern about her own possible infertility, negatively influence attitudes, contribute to contraceptive risk-taking and result in unrealistic expectations of successful conception at older ages. Accurate information about fertility awareness may contribute to attitudes and behaviors that support effective reproductive life planning and consistent method use when pregnancy is not desired.	4

Bunting (2008)	Cross-sectional survey, online	United States	Male and female undergraduate and postgraduate university students, mean age 24. n=149	<u>Attitudes. Misperceptions about fertility/infertility.</u> Knowledge of risk factors associated with infertility was high but overestimated. Fertility-enhancing myths included: "moving to the countryside, using special coital techniques, eating fruits and vegetables, or adopting a baby" and beliefs that certain healthy practices, like regular exercise enhanced fertility.	<u>Program Implications:</u> Given the wide range of misinformation about risk factors for infertility, incorporation of this topic into fertility awareness education may be a meaningful addition.	2
Daniluk (2011)	Cross-sectional survey	Canada	Childless women mean age 29. n=3345	<u>Lack of knowledge about fertility and aging</u> was evidenced by a low response rate (37% correct) on a knowledge survey about fertility, infertility and assisted human reproduction (AHR). <u>Attitude. Perceptions of knowing more about fertility than one actually does.</u> Respondents overestimated their knowledge about fertility and infertility.	<u>Program implications.</u> Many reflected uncertainty when completing the knowledge survey and also scored lower on some knowledge questions specifically relevant to individual women and decision-making such as: 1) misinformation about the role of continuous OC use on fertility; and 2) misinformation about the impact of good health and fitness rather than age as the greater indicator of fertility for women over 30. Online respondents also requested the correct answers to the survey questions as well as additional fertility awareness information. "Targeted public health programs" to increase fertility awareness for adult women and their partners were recommended.	3
Daniluk (2012)	Cross-sectional survey	Canada	Childless men presumed fertile, ages 20-50. Mean 29 n=599	<u>Lack of knowledge about fertility and aging</u> as evidenced by a low knowledge score (20%) on an online survey of knowledge about fertility, infertility and ART. Men appeared to have no coherent body of fertility awareness knowledge. <u>Attitude. Perceptions of knowing more about fertility than one actually does.</u> Men perceived that they had greater knowledge than they did, and also had significantly less knowledge than women for almost all the knowledge questions.	The belief that one has more fertility awareness knowledge than they actually do may have a negative influence on health behaviors.	2
Dyer (2004)	Qualitative	South Africa	Men seeking medical care for couple infertility at a hospital that provides care to low-income patients n=27	<u>Lack of knowledge of the physiology of reproduction.</u> Only one man was able to describe the basic facts of ovulation, fertilization and implantation. Gender roles, focused on male virility, were discussed in association with stigma experienced by the involuntarily childless men. Community responses experienced by the men reflect low fertility awareness knowledge in the	<u>Program implications.</u> Increased fertility awareness and gender awareness may help reduce stigma associated with infertility as well as provide a tool for childless couples to target the fertile days of the woman's menstrual cycle to maximize fertility potential. Infertility programs/services provide a venue for increasing fertility awareness among men and for offering initial, fertility-awareness-based infertility assessment and conception strategies for sub-fertile individuals and couples.	6

				community. <u>Attitudes. Misperceptions about fertility/infertility</u> including previous use of contraception as a cause of infertility, ejaculate “proof” of male fertility and infertility evoked by displeased gods.		
Hampton (2012)	Cross-sectional survey	Australia	Women, ages 25-36+, seeking fertility assistance n=204	<u>Lack of knowledge of the woman's fertile time.</u> Less than 25% could identify cervical secretion changes indicative of fertility. <u>Attitude. Perceptions of knowing more about fertility than one actually does.</u> Over 68% believed they had timed intercourse to match the fertile window, while only 12.7 % were able to do so (based on their ability to chart cycles for 3 months). An additional 24% demonstrated accurate knowledge, but had less than 3 months of charting.	Women with increased fertility awareness had accessed several sources. <u>Program implications.</u> Lack of fertility awareness knowledge and assuming one has more knowledge than they do, may result in a false, inaccurate and ultimately disappointing impression of power and control over one's fertility. However, increasing fertility awareness knowledge may contribute to attitudes and behaviors that support meaningful reproductive life planning—for both women who want to conceive and for those who wish to avoid pregnancy at a given point in time.	4
Peterson (2012)	Cross-sectional survey	United States	Men and women, mean age 20.4, attending a four-year university n=246	<u>Lack of knowledge of fertility and aging.</u> Students underestimated the decline in fertility with age, and overestimated the chance of pregnancy (both during the fertile window and over a year's time) when responding to questions about a woman's fertility throughout her reproductive years. <u>Attitudes. Misperceptions regarding IVF success.</u> Participants greatly overestimated the likelihood of IVF treatment success.		4
Polis (2012) ²	Cross-sectional survey	United States	Unmarried men and women ages 18-29. Nationally representative. n=1699	<u>Lack of knowledge of the fertile time and risk of pregnancy.</u> Although 80% had received sex education, fertility-related knowledge was poor: 34% were unaware of a “fertile window” during the woman's menstrual cycle, 90% overestimated the risk of pregnancy from one act of intercourse, 67% incorrectly estimated the chance of pregnancy after a year of unprotected sex. Women were more knowledgeable than men. <u>Attitudes about perceived infertility.</u>	<u>Program implications.</u> Fertility awareness information, as it relates to one's own body, may contribute to more accurate perceptions of fertility/infertility and risk of pregnancy.	5

				19% of women and 13% of men perceived themselves "very likely" to be infertile. Among women's reasons for perceived infertility, 37% mentioned not getting pregnant after having had unprotected sex. Perception of infertility was associated with: 1) women overestimating the chance of pregnancy from unprotected sex, and 2) men indicating that they would likely have sex without contraception in the next 3 months. Being Latino was significantly associated with perceptions of "very likely" to be infertile.		
Quach (2008)	Cross-sectional survey	Canada	Young men and women, mean age 17.5. High school students. n=772	<u>Lack of knowledge about the potential of STIs to harm fertility.</u> More than 94% did not know that chlamydia and gonorrhea could lead to infertility. <u>Attitudes regarding concerns about fertility:</u> Girls were significantly more in agreement than boys about the following attitudes: concern about possible infertility in the future, would be upset if infertile, and the importance of protecting one's fertility.	Lack of knowledge about ways to protect fertility (e.g. condom use and safer sex practices to reduce STIs), as well as concerns about future infertility, may influence risk-taking behaviors among girls and young women in terms of their FP method use and STI protection behaviors.	4
Zinaman (2012)	Prospective cohort study	United Kingdom	Women trying to conceive, mean age 30.6 n=330	Lack of fertility awareness knowledge (in relation to a woman's knowledge of her own fertile days in a given cycle) even among women actively trying to become pregnant.	Given the often, text-book and incorrect assumption that day 14 or 15 of the cycle is the day of ovulation, and corresponding inaccurate determination of the fertile window, increased FA knowledge and the application of that knowledge to one's own body is relevant to preconception counseling and initial infertility treatment as well as to method counseling and overall reproductive life planning.	4

Key for articles with the same data source

- 1=Articles with the Sommer data
- 2=Articles with the Fog Zone data
- 3=Articles with the Bloom and Singh data

Midlife and beyond (perimenopause and menopause) and perceptions about aging and fertility

Study	Design	Country	Population	Fertility Awareness Evidence	Comments and Case Building	Study Design Strength with Regard to Fertility Awareness
Bertero (2003)	Qualitative (semi-structured, individual interviews)	Sweden	Women age 47 n=39	<u>Expectations, apprehensions and knowledge about menopause.</u> Many anticipated not having monthly menses, no menstrual hygiene products to buy, and no worries about pregnancy. They also expressed concerns about vaginal dryness and the associated negative effect on their sex lives as well as concerns about irregular or heavy periods during peri-menopause. Often, expectations and apprehensions were attributed to hearing about their mothers' personal experiences with peri-menopause.	<u>Program implications.</u> Given that very few women mentioned self-care activities associated with mid-life and beyond (like practices to deal with vaginal dryness) additional fertility awareness knowledge about the normal changes of peri-menopause may help decrease apprehension and increase self-care activities. The informal sharing of menopausal experiences, between older women and their daughters, may be an approach programs can build upon to support the sharing fertility awareness knowledge on aging across generations.	6
Bretherick* (2010)	Cross-sectional survey	Canada	Female undergraduate students at the University of British Columbia in Vancouver, British Columbia, Canada. Ages 18-42, Mean age 21.3. n=360	<u>Lack of knowledge about fertility and aging.</u> College students overestimated the risk of pregnancy (number of months it takes to get pregnant, and the % of women pregnant within 1 month) as well as overestimated the risk of infertility and pregnancy loss. They also underestimated the influence of age on both infertility and the risk of miscarriage. <u>Attitudes. Perceptions about age and miscarriage.</u> Although most women in the study were aware that fertility declines with age, they did not perceive "the steep rate of decline" nor did they recognize a woman's age as the strongest risk factor for miscarriage (75% incorrect response rate) and infertility (54% incorrect). <u>Attitudes. Perceptions about FP methods and infertility.</u> Some believed (incorrectly) that long-term contraceptive use was the strongest risk factor for infertility (9.2% of respondents)	<u>Program implications.</u> This misinformation about fertility may heighten a young woman's concern about her own possible infertility, negatively influence attitudes, contribute to contraceptive risk-taking and result in unrealistic expectations of successful conception at older ages. Accurate information about fertility awareness may contribute to attitudes and behaviors that support effective reproductive life planning and consistent method use when pregnancy is not desired.	Bretherick (2010)

<p>Stenger (2007)</p>	<p>Masters thesis Intervention- physician conducted workshop on peri- menopause and related health issues with a follow- up phone survey of 14 questions at 3 months post workshop</p>	<p>United States</p>	<p>Women ages 40- 60 who attended educational workshops on menopause n=157</p>	<p><u>Knowledge of menopause and related health issues.</u> Eight reported gaining information about accessing health services for peri-menopausal-related health issues. 90% reported increased knowledge of treatment options. 43% (67/157) said they had changed health behaviors, including: talking with the physician about mid-life SRH issues, exercise, and nutrition.</p>	<p><u>Program implications.</u> Inclusion of fertility awareness peri-menopausal messages may result in notable changes in behavior.</p>	<p>4</p>
<p>Sherman (2005)</p>	<p>Background</p>	<p>United States</p>			<p><u>Summary points.</u> Women continue to be sexually active from mid-life and beyond (over 60% have sex at least once a week.) This is often a time of change of relationship status (e.g. divorce, death of partner) and women may engage in sex with a new partner after having had a long-term committed relationship in the past. As a result, peri-menopausal women may face an increased risk of unintended pregnancy and STIs, often ill-equipped to negotiate safer sex behaviors. For many who become pregnant later in life, the pregnancy is unintended, and abortion prevalence increases for women over age 35. The peri-menopausal years may include the need for FP method-switching, due to health or other issues. While formative research by the authors revealed misconceptions and questions about fertility from peri-menopausal women, a Medline search examining women's knowledge of pregnancy risk during the peri-menopausal years yielded nothing. And the authors of this paper also did not find studies on this topic either.</p>	<p>N/A</p>

Key for articles with the same data source

- 1=Articles with the Sommer data
- 2=Articles with the Fog Zone data
- 3=Articles with the Bloom and Singh data

Additional background articles

Study	Design	Country	Population	Fertility Awareness Evidence	Comments and Case Building	Study Design Strength with Regard to Fertility Awareness
Aksel et al. (2012)	Background article	Africa	Women ages 18-49		<u>Report summary.</u> Review of the literature about the effect of female genital cutting, and other intra-vaginal practices, on the ability to correctly note secretions, and implications of these practices on efficacy and acceptability of the TwoDay Method.	N/A
Barron (2013) Article on fertility literacy for women	Background article	N/A	Women		<u>Report summary.</u> Describes the menstrual cycle as a vital sign and includes influences such as lifestyle factors and menstrual variability, post contraceptive cycles, and other factors to consider when incorporating menstrual cycle care and fertility literacy more systematically into health promotion and primary care. Proposes strategies for integrating female fertility literacy into health promotion and the primary care visit, specifically relevant to nurse practitioners.	N/A
Barron (2013) Article on fertility literacy for men	Background article	N/A	Men		<u>Report summary.</u> Companion article on fertility literacy for men, and defines fertility literacy as a subset of information on health literacy that “includes knowledge of how the male reproductive system functions and the effect of modifiable lifestyle factors on male fertility.” Proposes strategies for integrating male fertility literacy into health promotion and the primary care visit.	N/A
Fhi360 publication on fertility awareness (1996)	Background article	N/A	All phases of the life cycle		<u>Report summary.</u> This publication defines fertility awareness beyond detecting physical changes of the menstrual cycle to understanding how emotional, behavioral, and cultural factors are related to fertility. This includes “a couple’s ability to use and apply this basic information in their everyday lives and ability to discuss the information with sexual partners and with health providers. Across countries, programs, and throughout the life cycle there is a lack of fertility awareness knowledge (among the general public, including self-identified NFP users and withdrawal users, and also among providers). Results of various studies were cited, including a Guatemalan PATH study that found women were unaware of changes to their secretions. Possible benefits of educating the community and providers on fertility awareness include: 1) support for accurate and timely use of FP methods including FAMS; 2) addressing concerns	N/A

					about FP method side effects; 3) involving men in FP and discussion/personal engagement around couple-related fertility issues; and 4) increasing access to reliable FAMs if the woman/couple wishes to use fertility awareness knowledge as a FP method. A fertility awareness educational component to a program may serve as a starting point for discussions with women and men about pregnancy, FP, STI prevention, vaginal health and other SRH topics.	
Pyper (1997)	Background article	N/A	Adults (pre-pregnancy, postpartum, pre-menopause)		<u>Report Summary.</u> Documentation of the different FAMs available. Together with the SDM and TwoDay Method efficacy studies, and the European study "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 study" (Frank-Herrmann), these studies report that given accurate fertility awareness knowledge, the desire to prevent pregnancy and a willing partner, couples can effectively use fertility awareness information as a FP method— this behavior outcome requires fertility awareness knowledge applied to a woman's body and a willing partner.	N/A
Pyper (1997)	Background article	N/A	N/A		<p><u>Report summary.</u> Supports a fertility awareness approach and advocates for a focus on participatory self-awareness and SRH communication (within the relationship and at the community level). This involves personal involvement, building on observations of changes that can be noticed in one's own body, related to significant reproductive events like: puberty, menses/nocturnal emissions, pregnancy, breastfeeding and menopause.</p> <p>The model presented in this article reflects early IRH work in the area of fertility awareness including: gender awareness, body awareness and self-care, integration of sexuality and interpersonal communication.</p> <p>The article includes a table of normal and abnormal self-observations in the following categories: anatomical, physiological and psychological. The author discusses that many women incorrectly think their normal healthy secretions are a discharge associated with a STI or other health problem. Fertility awareness would help them to differentiate these.</p>	N/A

<p>Vigil (2006)</p> <p>Usefulness of monitoring fertility from menarche</p>	<p>Background article</p>	<p>N/A</p>	<p>Girls and women from puberty through menopause</p>		<p><u>Report summary.</u> Describes the concept of the "ovarian cycle," and details the events of the normal ovulatory cycle, changing hormonal patterns and cervical secretions as a determinant for fertility. Advocates self-observation of cervical secretions for girls and women as an "invaluable tool for women desiring to achieve and maintain a health reproductive system." Details the benefits of cervical secretion observation in maintaining good SRH and in identifying signs of a possible health problem indicating the need for girls or women to seek health care services. Provides recommendations for clinicians for using cervical secretion indicators to diagnose and treat certain pathologies including, "metabolic and endocrine disorders, anatomical alteration, pelvic inflammatory disease, or even neoplasia." Describes the menstrual cycle and secretions as "important components of the clinical decision-making process."</p>	<p>N/A</p>
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