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FACT Project Technical Report

Year 1, Quarter 2
(January-March 2014)

Institute for Reproductive Health, Georgetown University



USAID
FROM THE AMERICAN PEOPLE



Fertility Awareness
for Community
Transformation

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FACT Project

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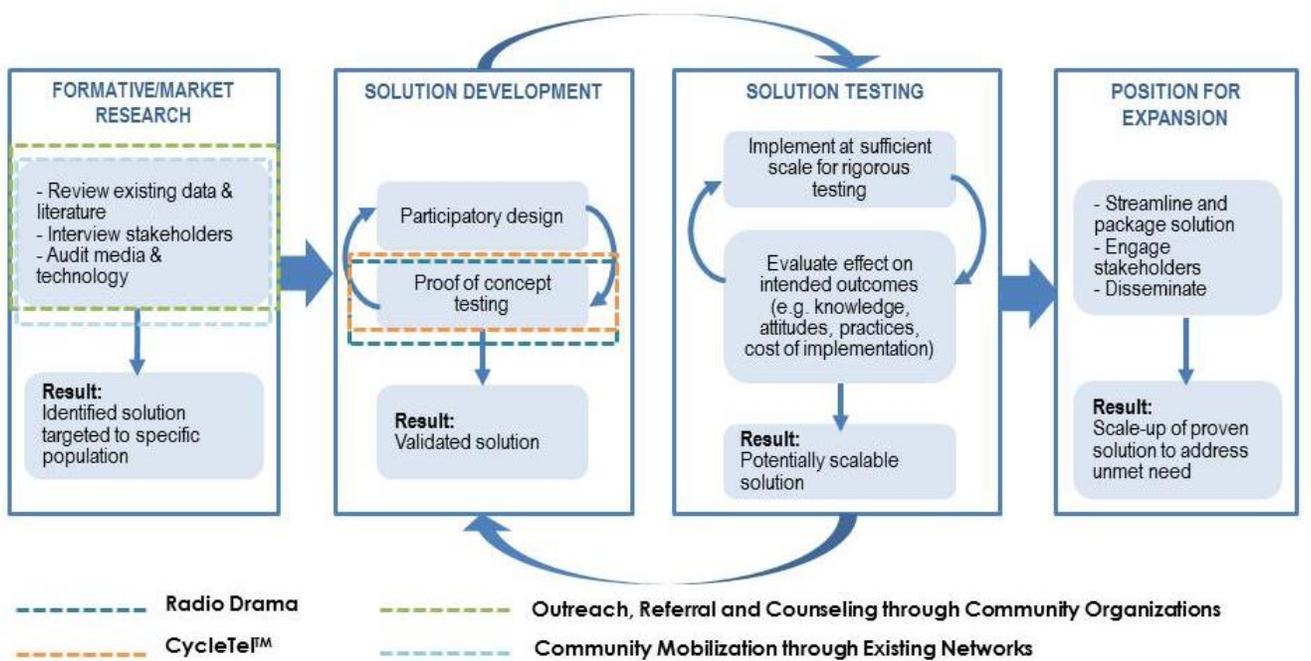
FACT Project	Fertility Awareness for Community Transformation
FAM	Fertility awareness-based methods
ICRW	International Center for Research on Women
IRH	Institute for Reproductive Health, Georgetown University
LAM	Lactational Amenorrhea Method
PMC	Population Media Center
PMP	Project Monitoring Plan
SDM	Standard Days Method
USAID	United States Agency for International Development

INTRODUCTION

The FACT Project, supported by United States Agency for International Development (USAID)'s Office of Population and Reproductive Health's Research, Technology, and Utilization Division, is being implemented by Georgetown University's Institute for Reproductive Health (IRH) in partnership with the International Center for Research on Women (ICRW), Population Media Center (PMC), and Save the Children International.

In the second quarter of Year 1, IRH and its partners focused on planning for and completing project start-up activities including planning the formative research and developing strategies for partnership engagement and solution implementation. Solutions are progressing steadily within the solution development cycle, as noted in Figure 1.

Figure 1. Solution Status by Solution Development Cycle Stage at end of Quarter 2



IRH held bi-weekly meetings with USAID to update on FACT Project strategy, progress, and challenges, and to further develop the travel plan, work plan, and project monitoring plan (PMP). ICRW also provided input and feedback on drafts of the PMP as part of their role as gender-focused technical advisors, and is working with IRH to develop a gender indicators workshop for all FACT solution managers and directors. IRH expects to finalize the PMP in early Quarter 3. IRH also continued to work on a Global Leadership Strategy, designed to share and promote utilization of FACT Project results by the global health community and to build and maintain support for fertility awareness-based methods (FAM) and fertility awareness.

GOAL 1: INCREASE FERTILITY AWARENESS AMONG KEY GROUPS WITH UNMET NEED IN ORDER TO INCREASE FP ADOPTION, CORRECT USE, AND CONTINUATION

Overview

Goal 1 activities – the Radio Drama in Rwanda and the Community Mobilization through Existing Networks solution planned for Uganda and Nepal – are both moving forward, although the Radio Drama is well ahead in the solution development cycle. Quarter 2 activities for Goal 1 focused on project setup, including staffing, administrative setup, and planning for upcoming research and programmatic activities.

Radio Drama

The Radio Drama, developed in Rwanda with partial support from the FACT Project, will broadcast 156 episodes from April 2014 to October 2015 on the most popular station in the country, Radio Rwanda. Two 15-minute episodes will air each week for the 18 month period. Topics covered will include family planning (including FAM), youth reproductive health, maternal and child health, and gender-based violence. Other funders of the radio drama are UNFPA, UNICEF, and Society for Family Health Foundation. Fertility awareness messages and themes will be woven into the story line throughout.

In Quarter 2, the Radio Drama progressed smoothly through the solution development phase. PMC has assembled a local production team, including a director, producer, script writers, and technicians, who launched the project with stakeholders (including USAID-Rwanda) in February. The script writers, after having been trained in the Sabido Methodology, developed a vision for the radio drama plot (e.g. characters, storylines, settings, etc.). By the end of the quarter, they had written and pre-tested the initial four episodes.

Indicators	Q2 Results
# of episodes written and produced	4
# of trainings for scriptwriters	1
# of scriptwriters trained on fertility awareness	20

Key Accomplishments

Formative research completed. PMC hired a local research organization, IPAR, to complete the formative research for the radio drama. A desk review, policy analysis, focus group discussions, and in-depth interviews were conducted. The topics covered by the formative research were consistent with the themes of the radio series: family planning, gender-based violence, nutrition and maternal/child health, and youth reproductive health and HIV/AIDS. The desk review examines recently published literature (2009-2014) on sexual and reproductive health in Rwanda and included grey literature as well as peer reviewed publications (report available upon request). The policy analysis provides the legal foundation on which the program can promote its educational values. It includes a review

of the national constitution, relevant national laws and policies, and human rights conventions treaties to which the Rwanda is a signatory. Eight focus group discussions were conducted across various sites in Rwanda. The target audiences were adolescent boys and girls (14-17), young men and women (18-25), and middle aged men and women (25+). In-depth interviews were conducted with key informants such as a female community health worker (CHW), a male CHW, a manager of a health facility, a local leader, a teacher, local religious leaders, Ministry of Health–MCH Task Force Coordinator and colleges, and a manager of a youth-friendly center.

Script writers trained in the Sabido Methodology and fertility awareness. The script writers training workshop was held in Kigali at the PMC office over a three week period from Feb. 10 to 28, 2014. Over 20 writers were invited during week one for a training on the Sabido Methodology and introduction to the technical areas of the Radio Drama (family planning, youth reproductive health, maternal and child health, gender based violence). The formative research for the program was also presented during week one. IRH attended several sessions during this week to learn and document the process of developing a serial radio drama. At the end of the first week, PMC selected the top three writers for their team. IRH led a session on fertility awareness for the script writers during the workshop. This session aimed to encourage reflection on the concept of fertility awareness, review essential information on FAM, and explore how gender influences attitudes and behaviors related to reproductive health. During the interactive session, script writers participated through role plays and general discussion. The session revealed a low level of knowledge of a woman's fertile time during her menstrual cycle and the risk of pregnancy during the postpartum period, even among well-educated urban professionals such as the script writers themselves. IRH compiled a reference packet for script writers which included information about key fertility awareness concepts, the Standard Days Method (SDM), the Lactational Amenorrhea Method (LAM), and the FACT Project. After week one of the workshop, IRH analyzed the feedback from the sessions and developed a guidance document for the script writers on integrating fertility awareness into the storylines.

Story plotting completed. PMC uses a tested strategy to design and implement serial radio dramas. The first step in creating a drama is using the formative research to develop a list of key issues or problems to be addressed by the program. The list is generated by examining where the social norm differs from the stated policy of the government. Subsequently, a moral framework is developed which summarizes the existing laws and policies underlying the topics to be addressed in the serial drama. Therefore, the serial drama does not create values but reinforces existing positive/pro-social values, attitudes, and behaviors. This information is then used to create a values grid which is a matrix of the positive and negative values that will be included in the serial drama. It is a resource tool for scriptwriters in developing characters who embody the positive and negative values. Transitional characters start out neutral towards the positive and negative values in the values grid but evolve to adopt the positive values and behaviors over the course of the program. During the training workshop in February, PMC developed this values grid for the Radio Drama in Rwanda. They also developed the characters, general storylines, and settings for the program.

Four episodes written, produced, and pretested. After the visioning stage, scriptwriters wrote the first four episodes of the Radio Drama. PMC then pre-tested these episodes with focus groups organized in five districts of Rwanda (Nyarugenge, Gasabo, Bugesera, Gakenke and Nyabihu) from March 18-22, 2014, with a total of 150 participants comprising adults and

youth, male and female respondents. Participants were asked to listen to the episodes and respond to a series of questions. Interviewers asked respondents about four key areas: the program's entertainment value, listeners' comprehension of the program, listeners' likes and dislikes, and listeners' recommendations. Based on the feedback from respondents, PMC will revise the episodes and begin development of 30 or more additional episodes all before broadcast, which is expected in late April 2014.

Key Challenges

Lack of detailed formative research about fertility awareness. Due to the broad scope of the radio drama and the rapid timeline required by other donors, the formative research did not reveal much detail about fertility awareness within the Rwandan context. Fertility awareness is an under-recognized topic, thus little existing research is available, particularly research conducted in Rwanda. Although focus group discussions could have provided valuable information about fertility awareness in Rwanda, IPAR prioritized other topics. IRH plans to draw upon existing research and past experiences working with FAM in Rwanda to guide the scriptwriters. . We also plan to conduct focus group discussions independently of PMC soon after broadcast begins to provide information on how listeners are engaging with fertility awareness-related elements of the program and how fertility awareness themes might be strengthened. Findings from this research could then be used to make mid-course adjustments to the radio drama storyline if necessary.

Balancing expectations and priorities with PMC as the FACT Project is just one of multiple funders. IRH's FACT Project funds constitute only a small part of PMC's overall support for the radio drama. As such, a primary challenge in the partnership has been balancing IRH's research and programmatic priorities with those of the radio drama's other funders, particularly in terms of timeline and research design. During quarter 2, IRH and PMC worked to align expectations on both sides of the partnership through in-person meetings at both the central and local levels. The partners will continue these discussions and are developing a shared MLE plan to accommodate the needs of both organizations.

Compatibility of IRH research needs with PMC monitoring and evaluation procedures. PMC's process for designing, monitoring and evaluating radio dramas is evidence-based and built on their extensive experience with similar projects. Their primary aim is to determine the extent of behavior change attributed to the serial radio drama. The FACT Project, however, aims to test hypotheses. This will require isolating exposure to fertility awareness components and measuring associations with behavior change. IRH and PMC continue to discuss the research, and IRH will design additional research activities as needed with PMC's input.

Broadcast launch delayed. PMC has encountered delays in registering their project with the MOH and Rwandan Immigration. The original projection for the launch of the radio broadcast was late April 2014. However, as of April 30, 2014, PMC is still waiting on approval of their Memorandum of Understanding with the MOH. They expect this during the first week of May and will then submit their certificate of registration to Rwanda Immigration. The new projection for broadcast launch is late May or early June. While this challenge has been difficult to resolve, it has actually allowed more time for IRH to follow up closely with scriptwriters during their episode writing process so that we can review and contribute content related to fertility awareness.

Community Mobilization through Existing Networks (formerly Graphic Novel)

In Quarter 2, work for the Community Mobilization through Existing Networks Solution focused on finalizing project startup activities in Uganda, selecting a second country to work in, planning for initial field assessment activities, and developing the formative research protocol. As year one activities in Uganda are intertwined with the Outreach, Referral and Counseling through Community Organizations solution, the key accomplishments and challenges described in that section include Community Mobilization through Existing Networks activities as well. Accomplishments specific to this solution are described here.

Indicators	Targets	Q2 Results
# of countries selected	2	2

Key Accomplishments

Second country selected. IRH and Save the Children International considered Nepal, Bangladesh, and Malawi as potential countries for the second iteration of this solution. IRH and Save the Children reviewed Save the Children's existing projects and programs in each country to identify those that could serve as potential platforms for this solution, and considered each country office's interest in FACT, local relationships, and capacity to conduct the project. Nepal was identified as the best option, as the country office expressed strong interest in the project principles and has three programs that could be good platform candidates, including a sponsorship program that works at the community level with first-time mothers. IRH began the process of seeking approval from the USAID Mission in Nepal to implement the FACT project, an effort that will be continued in Quarter 3.

Literature review consultant confirmed. IRH has identified a consultant who has worked extensively on family planning programs in Nepal to conduct a literature review on the sexual and reproductive health context in Nepal, and potential opportunities and barriers for a solution that aims to spread fertility awareness knowledge. This literature review is planned for Quarter 3.

GOAL 2: EXPAND ACCESS TO FERTILITY AWARENESS-BASED METHODS, PARTICULARLY STANDARD DAYS METHOD, TWODAY METHOD, & LACTATIONAL AMENORRHEA METHOD, SUPPORTED BY OTHER UNDERUTILIZED METHODS

Overview

Goal 2 activities – CycleTel in India and Outreach, Referral and Counseling through Community Organizations (formerly Group Teaching) in Uganda – are both progressing steadily and preparing for upcoming research activities. The activities are at different stages in the solution development cycle, but focused for most of Quarter 2 on startup activities, preparing for upcoming research, further developing solution design, and preparing for upcoming travel to the solution sites.

CycleTel

CycleTel's Quarter 2 activities focused on preparing and implementing pretesting of fertility awareness messages on the Nokia Life platform. January and February activities included program design, instrument creation and training (detailed below), with messages sent out to the public March 3rd and proactive follow-up calls commencing in mid-April (Quarter 3). The pretesting phase of the partnership aimed to "soft launch" messages to Nokia Life users as well as operations with the Nokia Life team. Pretesting data and experiences will feed into amending messages, developing further content, and assessing the feasibility of a large-scale partnership with Nokia Life and HCL.*

Indicators	Q2 Results
# of fertility awareness messages developed and deployed	20
# of users for pretesting	25,000
Conversion rate	7% (25,000/300,000)
# of missed calls for more information	20
% of missed calls followed up on for more information	55% (11/20)

Key Accomplishments

Nokia Life contract signed. After a final round of negotiations, IRH and HCL agreed on terms and finalized a contract for pretesting phase of the partnership. The Microsoft Board has still not made any clear determination about Nokia Life's longer term plans, and IRH remained in contact with their business office to stay abreast of any further decisions.

Pretesting implementation designed. Collaborating with the Nokia Life team, IRH developed an implementation plan for pretesting to include deployment of 20 fertility awareness messages to 25,000 users over five weeks, a missed call system for users interested in further information on family planning and CycleTel, and a call center to provide that information and collect qualitative data from users who seek further information. The team also developed a plan for analyzing and using the data collected.

Call center operator script (survey instrument) and data tracking forms designed. IRH designed a short, six-question survey instrument to capture general customer feedback on the fertility awareness messages and the CycleTel service. The survey asks questions related to usefulness and likability of the messages and prompts participants to share suggestions, critiques, and general feedback on the message service and content. The team also developed a data tracking form that allows call center staff to record and share data on calls with the IRH HQ office in real time, thereby allowing IRH to make critical strategy decisions with very little delay for data entry or transmission.

* Nokia no longer exists as a legal company in India because of its acquisition by Microsoft, Customers in India will still know of the Nokia Life platform, whose identity will remain for brand consistency. IRH's partner for this work is a third party research and content provider known as HCL, who assumes all responsibility for delivery of Nokia Life services in India. The following report will refer to HCL interchangeable with Nokia Life, especially in reference to internal operations.

Call center trained, quality assurance process established. After the development of the survey instrument and tracking forms, HCL call center staff were trained on the overall goal of the study and how to conduct the interviews. Call center operators role-played mock calls to build their skills. IRH also contracted with ISHP, a family planning call center previously used in earlier CycleTel testing, to provide oversight and quality assurance. A plan was established between HCL and ISHP to forward any customer enquiries to ISHP that required more family planning expertise, as well as for ISHP to provide quality assurance checks on recorded HCL/user calls. A follow-up training will be conducted in early Quarter 3 to reinforce skills and address any problems.

Pretesting launched. In early March, IRH and Nokia Life launched pretesting. Fertility awareness messages – developed under the FAM Project with the input of Nokia Life – went live to 25,000 users of the Nokia Life platform. Translated into four languages (English, Hindi, Tamil, and Marathi), the messages were designed to reach a diverse audience in different geographical regions across the country, and the analysis team plans to compare uptake by language of users in this phase. The pretesting campaign will run through mid-April, with users receiving 20 fertility awareness messages over five weeks. Messages focus on basic fertility awareness topics like fertility cycle awareness and reproductive health information, and contain prompts to call CycleTel for more information. A snapshot of the user interaction and activity is as follows:

- User receives messages on Nokia Life asking if they want to opt in to a new family planning service on Nokia Life platform
Activity/Outcome: *HCL sent this message to over 300,000 current users of other health services on Nokia Life; of those, 7% or 25,000 users opted in to the CycleTel service after receiving this one message.*
- User receives seven messages on the importance of family planning and healthy birth spacing in the language of their choice within their Nokia Life inbox. The eighth message asks them to give a missed call to Nokia Life if they want more information on family planning
Activity/Outcome: *About 20 users who have received eight messages gave a missed call to the call center. The call center returned the calls within 48 hours, with the ability to reach and survey about half of these.*
- User receives 12 further messages, focused on fertile window, Standard Days Messages and CycleTel. Every fourth message, users are prompted to give a missed call if they are interested in further information.
Activity/Outcome: *Data has not yet been received on number of missed calls received by users at this stage.*

Key Challenges

Missed call mechanism not gaining traction: The missed call mechanism was suggested by HCL as a popular way in India to get customers to call the service at no fee, and for companies to call back at a later time. Based on missed call figures above, the number of missed call – and hence the data collection associated with it – was much lower than expected. IRH is unsure of the reason for this issue, though several have been hypothesized: the service itself did not resonate with users and they did not want further information, the rational or incentive for “Give us a missed call” message was not clear/strong to users, or

perhaps the missed call mechanism is an inaccurate proxy indicator for customer interest. At the close of Quarter 2, IRH decided to course correct to get more data by designing and implementing a post-exposure survey. IRH designed a new survey and script and will be proactively calling approximately 500 customers in Quarter 3 to get feedback on the service.

Challenges with Nokia's call center/research support. Despite trainings for HCL staff and supervisors on the survey script and data collection techniques, quality of the calls was below expectations based on recordings of the calls and incomplete tracking data collected by the call center staff. Comprehensive data was not collected according to the data instrument, nor did operators probe/interact with users in an effective way. IRH, through ISHP monitoring the call recordings for quality assurance, remained in close contact with Nokia expressing a need for higher quality data. IRH lead a revised training, and is working with HCL to ensure they feel comfortable talking to users of the service on areas of family planning. The Solution Manager will also check in with the call center during her April (Quarter 3) trip to India and will work with HCL supervisors to identify opportunities for further training of call center staff. IRH may need to consider outsourcing the call operations back to ISHP for the year campaign.

Lack of data on customer interaction with messages: Though IRH managed to reach 25,000 with messages, we are unsure of the exposure and penetration of the messages. For example, did these users even open the messages? Did they read them? Recall them? As the Nokia Life system can only measure deployment, it will be impossible to account for user activity with the messages in an automated way (though we can get this information from our sample survey).

Outreach, Referral and Counseling through Community Organizations

In quarter two, the Outreach, Referral and Counseling through Community Organizations solution focused on finalizing project start-up activities, identifying platforms to work with in Uganda, preparation for the project planning workshop and landscape assessment in Uganda, and developing the formative research protocol.

Indicators	Q2 Results
# of platforms selected for assessment	3
# of field assessment tools developed	8
# of research protocol(s) developed	1

Key Accomplishments

Scope of work and budget finalized. IRH and Save the Children finalized contract negotiations for the Outreach, Referral and Counseling through Community Organizations and Community Mobilization through Existing Networks solutions. Save the Children worked with their local office in Uganda to determine necessary staffing levels and appropriate resource allocation to be able to accomplish FACT project activities in Uganda for both the Outreach, Referral and Counseling through Community Organizations and Community Mobilization through Existing Networks solutions. Save the Children held discussions with their Nepal office on estimated resources and levels of effort needed to carry out FACT activities in Nepal. Save the Children and Georgetown are negotiating contractual language, and

expect to have a fully executed subagreement early in Quarter 3 to replace the preliminary spending authorization letter.

Uganda Mission approval received. On March 6, 2014, the USAID mission in Kampala gave approval for IRH to begin conducting FACT project activities in Uganda (see Key Challenges below).

New staff member in Uganda identified. Through a competitive application and interview process, IRH identified a candidate to serve as the Lead Researcher for FACT Project activities in Uganda. The top candidate has confirmed her enthusiasm for the position and willingness to begin work in Quarter 3. The hiring process will be completed once IRH receives authorization from the mission to hire staff for the project.

Literature review completed. In Quarter 1, IRH hired a consultant to conduct a review of literature related sexual and reproductive health, family planning knowledge, attitudes and use, fertility awareness knowledge, and potential opportunities for and barriers to fertility awareness and FAM in Uganda (see Appendix A). A report for this review was used to inform initial formative research planning.

Progress toward selection of platforms. Save the Children obtained information profiling 16 of their current projects in Uganda that could serve as platforms for the Outreach, Referral and Counseling through Community Organizations and Community Mobilization through Existing Networks solutions. IRH and Save the Children reviewed these options and identified four projects which met key criteria for consideration as solution platforms: they are not implemented through the health system, are large enough to achieve the desired sample size for research, and will have funding to continue for three years or longer. IRH gathered further details about each project and the potential for integrating fertility awareness and family planning research through telephone calls with platform managers. Three of these projects were considered top candidates and invited to attend the FACT Project Planning Workshop in early April. IRH and Save the Children staff will visit each of these platforms as part of the landscape assessment following the workshop prior to making a decision on which are best suited to implement the FACT solutions.

Preparations made for travel to Uganda. IRH made preparations for a two-week trip to Uganda scheduled for March 31- April 11, during which IRH and Save the Children plan to lead a project planning workshop in Gulu and conduct landscape assessment visits at prospective platform sites. IRH prepared a series of presentations and interactive activities to introduce the FACT project to potential platform partners, orient them to the concept of fertility awareness and to the three FAM, and develop their buy-in for and ownership of these solutions. IRH worked closely with Save the Children staff at Headquarters and in Uganda to ensure that the presentations were suitable for the local context and provide the appropriate level of detail for platform managers who do not have health background. IRH and Save the Children also prepared to conduct landscape assessment visits in the field, which will serve to give project staff a deeper understanding of the potential platforms and the local environment in which the FACT project would take place. IRH prepared tools and interview guides to guide observations, and interviews with platform members, platform leaders, community leaders, and health providers. These visits will help the project team to gain an understanding of local attitudes towards family planning, perceptions of FAM, availability of family planning services, as well as other community concerns, norms, and challenges that might influence FACT project research and implementation.

Research protocol developed. IRH developed a draft of the research protocol for the formative research that will be conducted in Uganda. The protocol details the rationale for conducting the research, how findings will be utilized to inform the design of the Outreach, Referral and Counseling through Community Organizations and Community Mobilization through Existing Networks solutions, and details the research plan. The research questions focus on understanding family planning knowledge and utilization, current knowledge of fertility awareness concepts, knowledge and use of FAM, norms and practices regarding communicating about family planning, and the feasibility of implementing the proposed solutions. The formative research will consist of up to 40 focus group discussions with men and women of different ages, and up to 24 in-depth- interviews with platform leaders and other stakeholders. An application for approval of the study from the Georgetown University IRB was submitted for review. In April, the study protocol will be submitted to USAID/W for review and approval and the protocol will be submitted to the Uganda ethical review board.

Key Challenges

USAID Mission in Kampala determining response to Anti-Homosexuality Act. In response to the Anti-Homosexuality Act which was signed into law in Uganda in February, the U.S. Government began reviewing its operations in Uganda and relationship with the Ugandan Government. The USAID Mission in Uganda continues to assess the situation and consider what projects and activities should be approved. Though IRH had previously received approval to conduct the FACT Project in Uganda, at the end of March the mission requested that IRH hold off on hiring field staff for FACT. Though a candidate to lead field research has been identified and has expressed interest in the position, IRH has not yet received authorization to hire the candidate.

PUBLICATIONS, DISSEMINATION AND UTILIZATION

Indicators	Q2 Results
# of times IRH invited to speak about FAM or non-IRH speakers include FAM in presentations at international & regional meetings	2
# of technical assistance events conducted by IRH on fertility awareness and FAM	1
# of blogs mentioning FAM or fertility awareness	1

As the FACT Project is in the start-up phase and data has not been collected, no journal publications have yet been submitted. However, IRH disseminated the systematic review of the fertility awareness literature and the results of the fertility awareness consultation IRH conducted a few months before the project began, both important guiding documents for the FACT Project (See Appendices B and C).

We continue to create space in the greater community for dialogue about the importance of fertility awareness and body literacy across the life cycle. Most recently, IRH contributed an article called, "[Fertility Awareness: Birth Control and Beyond!](#)" to Bedsider, an online platform for family planning information targeted at young adults in the U.S. Also, The Daily Circuit, a news program of Minnesota Public Radio (MPR) hosted a discussion on "the State of Birth Control in America" on March 12, where Dr. Jennings was an invited guest alongside Guttmacher Institute's Dr. Megan Kavanaugh. The [discussion from callers](#) was

heavily focused on concern over side effects from hormonal family planning methods and an interest in better understanding their bodies. The CycleTel Solution Manager also presented on IRH's mobile solutions during a panel titled "Hacking Global Health: New Solutions to Old Problems" at the Global Women Forum in Chicago in March.

At conferences and meetings, we continue to announce the FACT Project goals and objectives and generate interest among other CAs and donors. We also continue to produce communication products to support the FACT Project like a branded folder and various presentations to use as we engage with partners and stakeholders.

IRH is providing technical assistance to the Ministry of Health in Jharkhand through a subagreement with CEDPA. With materials and expertise gained during the FAM Project, IRH provides distance technical assistance to CEDPA. During this quarter, CEDPA conducted an advocacy meeting with state- and district-level MOH staff and a detailed discussion with training division cell officials on the project in the twelve new districts, facilitated a family planning counselors' training in March 2014 as requested by the MOH, and facilitated procurement and distribution of CycleBeads to past intervention districts as well as the twelve new districts. We expect this support to continue during the up-coming quarter.

APPENDICES

Appendix A: Uganda Literature

Strategic Opportunities in Uganda Fertility Awareness for Community Transformation (FACT)



Prepared by
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January 2014

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Introduction

Meeting the unmet needs of women (and couples) in the developing world is a high priority for family planning programs. Over 220 million women in the developing world want to avoid pregnancy but are not currently using an effective method of family planning. “Unmet need” is a dynamic concept over a woman’s life and is by no means straightforward or easy to measure. Non-use may be due to one or multiple reasons, including experience or fears of side effects or permanent infertility, lack of information (or misinformation) about methods, lack of access, or stigma. Unmarried women experience additional obstacles to use.

This report describes the current context and challenges of family planning in Uganda and recommends some programmatic actions and research-- that might be taken to increase the contribution of Fertility Awareness, Fertility Awareness Methods, and the Lactational Amenorrhea Method with the goal of reducing unmet need in Uganda. The intended impact of FACT (Fertility Awareness Community Transformation) is to increase the use of family planning in Uganda.

Given that resources to inform people about FA, FAM, and LAM are scarce, a key question is *who could benefit the most?* Adolescents, especially those who are sexually active but not married? Those who have a certain number of living children (three, four or five)? Those with “unmet need”? Those who plan to use contraception in the future? Those who would have preferred fewer children if life could be lived over? Contraceptive discontinuers, particularly of methods with high contraceptive effectiveness? Those who have indicated an interest in periodic abstinence methods? Couples in which *men* want medium sized families? Pregnant women or new mothers who could meet the conditions of LAM? Or some combination of these? This question can be addressed through operations research.

The second key question is how to build upon and strengthen communities to deliver these resources since individuals, couples, and families do not act in isolation but are embedded in community networks. This question will be addressed through several programmatic recommendations.

Although this paper focuses on how FACT can help Ugandans meet their fertility desires, in the longer run and as more children survive, Ugandans will need to reduce their ideal family sizes below five children for women and six or seven for men. It is hard to imagine that the current population growth rate of 3.5% can be sustainable for a country with a small land area. The current Ugandan population (37 million) is already about **ten** times that of the US State of Oregon (3.8 million) with a similar land area and Uganda’s 2025 population projection is 55 million. Given how slowly change occurs, it is not too early for Ugandans to think about the future.

I. How Greater Use of Family Planning Could Benefit Uganda and its Families

- Reduce unmet need for the 34% of Ugandan women who want to space or limit the number of their children
- Reduce the number of unintended pregnancies
- Give more children the advantages of being wanted
- Reduce the numbers of Ugandan adolescents who become pregnant, potentially giving them greater opportunities for education and skills
- Improve child survival through better child spacing (by 2015, FP could prevent 1 million child deaths)
- Prevent unsafe abortions and their high costs to individuals, families and society (in 2009, expenditures on induced abortion in accounted for more than 4% of Uganda's annual health care expenditure)
- Prevent maternal deaths (by 2015, FP could prevent 16,877 maternal deaths)
- Allow public resources to be spent on increasing *quality* rather than *quantity*-- whether for health, education, sanitation, or infrastructure. (For every dollar invested in family planning, more than \$3 is saved and could be used to attain the Millennium Development Goals.)
- Contribute to women's equality and empowerment

II. What Could FACT contribute?

The Fertility Awareness for Community Transformation (FACT) Project's mission is to expand solutions for reducing unmet need for family planning. Awarded by USAID in 2013 to the Georgetown University Institute for Reproductive Health, the Project's international partners are the Population Media Center, Save the Children, and the International Center for Research on Women.

By reviewing the evidence base, this report identifies opportunities for FACT to strengthen the ability of Ugandan women and couples to delay pregnancy, space children and limit childbearing through increased information about fertility awareness (FA), Fertility Awareness Methods (FAM) and the lactational amenorrhea method (LAM), all information-based methods often ignored by health services.

Fertility Awareness (FA) includes information on body changes during puberty and onset of fertility, postpartum return to fertility, fertility risk during the menstrual cycle, and observable signs of fertility and mechanisms by which FP methods prevent pregnancy as well as their associated side effects and benefits.

FACT's three broad objectives are to:

(1) Increase access to and use of effective methods appropriate for postpartum and breastfeeding women, particularly the lactational amenorrhea method (LAM), with timely transition to other appropriate methods including woman-initiated methods.

(2) Focus on new approaches to increase access to and demand for new and underutilized woman-related family planning (FP) methods, particularly for post-partum and breastfeeding women, married and unmarried youth, and women having intermittent sex; expand public and private sector markets in rural and urban areas; utilize mobile phones and other direct-to-consumer approaches; and identify new partnerships within and outside the health sector.

(3) Develop and test innovative approaches to increase Fertility Awareness and expand access to and use of Fertility Awareness Methods (FAM) as well as other underutilized FP methods as appropriate.

*Although there are many natural family planning methods, FACT will emphasize the teaching of two simple **Fertility Awareness Methods (FAM)**: the **Standard Days Method (SDM®)** and the **TwoDay Method**.*

***SDM®** relies on a “standard rule” or a fixed window of fertility to help a woman know when she is likely to get pregnant. A woman having menstrual cycles between 26-32 days long should not have unprotected intercourse on cycle days 8-19 if she wishes to avoid a pregnancy. CycleBeads® can help her identify the fertile period.*

*The **TwoDay Method** relies on an algorithm to help a woman identify when she is fertile, based on presence or absence of cervical secretions. If she notices any secretions on the current day or the previous day, then she is probably fertile today and should avoid unprotected intercourse if she wants to avoid pregnancy. If she notices no secretions today and yesterday (i.e., two days in a row), then she is not fertile today.*

Since the FACT project anticipates that the Republic of Uganda is likely to be a priority country, a strategic review of the context with recommendations about potential research, interventions, and partners is timely. FACT objectives that apply directly to activities in Uganda are: (1) To generate evidence on the impact of increases in Fertility Awareness on family planning adoption, correct use, and method continuation; (2) To develop and test scalable solutions to increasing Fertility Awareness in key demographic groups; (3) To define existing and scalable solutions that can be applied in and beyond the health system to increase the Standard Days Method, the TwoDay Method, and the Lactational Amenorrhea Method and assess the impact on unmet need; and (4) To promote widespread use of effective solutions to improve FA and increase access to FAM and other family planning methods to address unmet need.

The **Lactational Amenorrhea Method (LAM)** is a modern method of contraception based on the natural postpartum infertility that occurs when a woman has not yet resumed menstrual bleeding (i.e., is amenorrheic) and is only/exclusively breastfeeding her baby. The three criteria for its effective use are: (1) menstrual bleeding has not yet resumed since the baby was born; (2) the baby is only/exclusively breastfed; and (3) the baby is less than 6 months old.

It is plausible that a woman, couple or community that knows critical facts about fertility would be better at delaying, spacing, or limiting unintended pregnancies, regardless of the method used. But this has not been empirically demonstrated. FACT is framed as an operations research or strategic information project which addresses these challenging questions: (1) Can an increase in FA contribute to FP uptake and use? (2) Can serious efforts to increase FA at the population-level increase individual knowledge and skills in a large demographic group? (3) Will FAM appeal to women concerned about side effects, women living in settings where FP is stigmatized, women who have infrequent sex or women who underestimate pregnancy risk? (4) Will FAM bring in new users, including those who fear other FP methods? (5) Will FAM improve the use of other FP methods, specifically, increase understanding of when EC should be used, increase the use of barrier methods, increase acceptability of family planning to male partners or help women to use LAM?

A logic model and a results framework of FACT, agreed upon by USAID, appear in the Appendix. They clarify FACT's deliverables. The primary objective of FACT is to increase the use of family planning.

III. The Context of Family Planning in Uganda

As research or interventions are planned, it is important to review evidence. It is fortunate that results from the 2011 Uganda Demographic and Health Survey have recently become available. The Final Report is an amazing source of up-to-date information on family planning, fertility preferences, unmet need, health, breastfeeding, gender equity, domestic violence, nutrition, anemia, vitamin A deficiency and HIV knowledge. Its sample size (over 10,000 which includes eligible men 15-54 in every third household) is sufficient for estimates for ten regions. Most findings are broken down by age, female/male, household wealth, family size, education, region and urban/rural residence.

Given the five comparable Demographic and Health Surveys have been conducted in Uganda in the past 23 years, it is possible to assess trends for topics covered in multiple surveys. Although there are clear differences among Uganda's regions, the data cited in this report here are mainly national. If FACT concentrates its efforts in a particular region, statistics for that region can be extracted from the 2011 UDHS and other sources. Recommendations, indicated in **blue**, appear at the end of each of the following sections (III, IV, and V) and again at the end of the paper where they are organized as either "programmatic" or "research."

Demography and Families

Population size and growth: Uganda has one of Africa's largest and fastest growing populations. Its population is 37 million. More than half of the population (52%) is under age 15 and only 2% is over age 65. The median age of the population is 15.5 years. Only Afghanistan and Niger have equal or higher percentages under age 15. Its young age distribution means that even if fertility declines, there will still be rapid population growth.

A critical question for Uganda is whether this very large young population will prove to be more of a bonus or a burden.

Uganda has 8.3 million women of reproductive age (15-49). It has one of the highest rates of natural increase in the world (3.5% per year), reflecting its high fertility (45 births/1,000 population), declining mortality (10/1,000) and little in- or out-migration. Only Chad and Niger have more rapid population growth, 3.6% and 3.8% respectively. Projected populations are substantial for Uganda: 55 million by 2025 and 114 million by 2050.

Urbanization: Compared to other large, non-island populations in East Africa, Uganda is less urbanized although its urban population is growing at 5.7% per year. Given that less than 20% of its population lives in urban areas, national statistics that combine urban and rural statistics are weighted to reflect *rural* conditions.

Ten percent of Uganda's population lives in Kampala which has over 1.5 million people. The next largest cities (Gulu and Lira) are only one-tenth as large. Compared to the rest of the country, Kampala is better educated and wealthy. Over 90% of its population is in the highest wealth quintile. Uganda's population density is relatively high at 153 people per square kilometer compared to 52 for East Africa as a whole. The Central and Western regions are especially densely populated.

Sexual debut: Women typically initiate sex a year before marriage and men, four years before. The majority of youth ages 15-19 have not had sex yet: 55% of women and 60% of men. Another way of putting it is that 58% of young women and 47% of young men have had sex before age 18. Two percent of women 15-14 reported having sex with more than one partner in the past 12 months compared to nine percent of men. Thirteen percent of women 15-19 who had sex in the past 12 months had sex with a man 10 years or older.

Marriage: In Uganda, marriage (or union) begins early for women. Although the minimum legal age of marriage for girls is age 18, more than half of Ugandan girls marry by age 18 in all but the wealthiest quintile. The median age of marriage for men is 22.3 years and 17.9 years for women, a difference of 4.4 years. Very early marriages (i.e., those by age 15) have declined dramatically from 19% among women 45-49 to 3% among women 15-19. A quarter (25%) of women live in polygynous unions although only rarely are there more than two wives. Polygyny declined from 32% in 2000-2001 to 25% in 2011.

Three fifths (63%) of women 15-49 are currently in union: 36% married and 27% living together (without traditional, religious or civil ceremony). Customary marriages are common while religious or civil marriages are rare. Since 2006, more couples are living together and fewer are marrying.

First birth: The median age at first birth is 18.9 years. Almost two out of five (39%) women ages 20-24 report that they gave birth by age 18. Women giving birth later tend to be urban, from Kampala, have secondary or more education, and live in the wealthiest households. Women with no education have a median age of 18.1 at first birth compared to 20.8 for women with secondary or more education.

Childbearing is nearly universal in Uganda: primary infertility is low (3%).

Household composition: There is more diversity in household composition than one might expect. The average household size is 4.9 people. One fifth (19%) of urban households have only one resident. Twelve percent of children under age 18 are orphans. A third (33%) of households have either a foster child or orphan. Only a little more than half of children under age 18 (55%) live with both parents. About three out of ten households are headed by women. A fifth (19%) of the population has some kind of disability. These are mainly concentrated among those over age 60, two-thirds of whom have at least one disability.

Reproductive Health

Mortality: Mortality has declined and Uganda has begun its demographic transition. Life expectancy in Uganda is 58 years: 57 for males and 59 for females. Infant mortality has been declining and is now 54/1,000 live births with the deaths mainly due to neonatal causes, malaria, pneumonia, and diarrhea.

Almost all maternal deaths (99%) occur in developing countries. A Ugandan woman's life-time risk of maternal mortality is 1 in 49. Every year Uganda loses about 6,000 women to pregnancy-related complications. This corresponds to a maternal mortality ratio of 438 maternal deaths/100,000 live births or a maternal mortality rate of .93 maternal deaths/1,000 women years of exposure. Nearly one in five (18%) deaths to women 15-49 are maternal deaths. Uganda is unlikely to reach its targeted Millennium Development Goal for maternal mortality in rural areas.

Maternal care: Most countries are concerned that pregnant women receive ante-natal care and be delivered by a trained attendant. In 2011, almost all pregnant women (95%) in Uganda had at least one ante-natal visit with about half (48%) having four or more visits. About two-fifths (58%) of births are attended by skilled health personnel, an increase from 42% in 2006. Between 2006 and 2011, the percent of births taking place in a health facility increased from 41% to 57% (44% in public facilities and 13% in private facilities).

Fewer than 2% of women reported that they had been circumcised. Between 2006 and 2011, the percent of women reporting obstetric fistula declined from 3% to 2% although this is still a high rate given the seriousness of the problem. Three in five (62%) of those reporting obstetric fistula said they sought treatment although we do not know how many of these had successful repairs.

HIV/AIDS: Uganda's HIV prevalence has declined markedly from the 1980s. About seven percent of the population ages 15-49 is HIV+ with women being infected at earlier ages than men. This corresponds to about one million people living with HIV, about 57% of these women. There were 64,000 deaths due to HIV/AIDS in 2009. The 2011 UDHS found knowledge about HIV to be surprisingly low, given how much attention has been given to HIV/AIDS in Uganda. Only 38% of women and 43% of men had comprehensive knowledge of HIV/AIDS. Among those with more than one sexual partner, 31% of women and 19% of men reported condom use during the last sexual encounter. Between 2006 and 2011, HIV testing and receipt of results increased dramatically for both women and men: 24% to 71% for women and 21% to 52% for men.

Geography and Environment

Uganda's land is slightly smaller than the U.S. State of Oregon. The country is landlocked. Although Uganda is on the equator, it has a relatively moderate climate due to its elevation. Its boundaries contain a wide range of ethnic groups with diverse cultures and political systems.

Natural resources include copper, cobalt, hydropower, limestone, fresh water lakes and abundant rain, and arable land. Oil and natural gas were discovered recently and have the potential to double government revenues within 6-10 years.

Environmental challenges include draining of wetlands for agriculture, deforestation, overgrazing, soil erosion, and growth of water hyacinth in Lake Victoria, the largest fresh water lake in Africa.

Compared to urban areas, rural areas are disadvantaged with regard to sanitation, electrification, and drinking water. Twenty six of urban populations and 17 percent of rural populations have access to improved sanitation (unshared and shared). Fifty five percent of urban households and five percent of rural households have electricity. Ninety percent of urban households and 67% of rural households have access to improved drinking water. More than half (54%) of households have to travel 30 minutes or more to fetch drinking water, a job that usually falls to females.

Education

In Uganda, women tend to have less education than men. The median years of schooling is 5.2 for females and 5.8 for males. Almost two thirds (64%) of women ages 15-49 are literate compared with 78% of men of the same age. Gender equity in enrollment extends to about age 16, after which the proportion of adolescent males attending school is higher than that of females. The current policy is that when a girl becomes pregnant, she terminates her education.

In Uganda, primary schooling lasts seven years, secondary lasts six years and university or tertiary education lasts three or more years. Primary students are expected to be ages 6-12 although there are many over-aged students in primary schools. Despite free universal primary education, many children get a late start. A third of boys and girls who are 6-9 years of age have never attended school although this declines to 4% by ages 10-14. Almost a quarter of children attend pre-primary school; these are mostly children from higher wealth households.

Uganda is doing much better at primary school enrollment than secondary school enrollment: four fifths (81%) of primary-age children attend primary school compared to 17% of secondary-aged children. There has been an increase in secondary school attendance since 2006.

Now that more children are attending school worldwide, the spotlight has turned to the *quality* of education. Measuring this requires different kinds of surveys than the DHS.

Mass Media and Communications

Women have less media exposure than men in Uganda. One in five women (21%) and 11% of men are not exposed to any media (newspapers, radio, or TV). Radio is available to most Ugandans: in urban areas, 78% of women and 88% of men listen to the radio; in rural areas, 73% of women and 85% of men listen.

TV is mostly an urban phenomenon: 60% of urban women report watching TV compared to 10% of rural women. Comparable figures for men are 77% and 18%. As of 2014, Ugandan TV will be required to broadcast 70% Ugandan content. This may offer opportunities for public education on some of the issues covered in this report.

There has been a rapid penetration of mobile phones in the past five years in Uganda. In the 2011 UDHS, 59% of respondents reported that their household had a mobile phone. In 2012, seventeen million subscribers had registered SIM cards for mobile phones in Uganda compared to only 315,000 main line phones.

Politics

Uganda's history in most of the past decades has been turbulent, making development activities difficult. It is still trying to catch up, particularly in health and education.

Uganda gained its independence in 1962; it remains a member of the Commonwealth. In the 1970s and 1980s, up to half a million people were killed as part of state-sponsored violence. In addition to internal conflict, Uganda has also participated in civil wars in the Democratic Republic of the Congo.

The current President, Yoweri Kaguta Museveni, came to office in a coup in 1986 and has remained in power since then. The next election is in 2016. Since 1986, Uganda waged armed resistance against the government by different rebel groups, including the Lord's Resistance Army which is known for its violence and ruthlessness. In 2005, the LRA was forced out of Uganda and moved to neighboring countries (Central African Republic, South Sudan, and the DRC). This has allowed some Ugandans to return to their places of origin, resulting in fewer internally displaced persons.

In recent years, Uganda has gained negative publicity for several policies. In 2006, a Non-Government Organization (Amendment) Act was passed that has constrained the freedom of NGOs, erecting barriers to setting up NGOs and restricting their activities, funding and assembly. All foreign funds must go

through the Bank of Uganda. The Public Order Management Bill limits freedom of assembly, including for NGOs.

Uganda is also well known for its official opposition to homosexuality. Starting in January, 2014, a person convicted of being a homosexual can get a minimum of two years in prison to a maximum of life imprisonment. In 2011, a bill was considered that would have allowed the death penalty for homosexual acts.

Administration

Uganda has a decentralized system of governance. It is divided into four administrative regions (Northern, Central, Western, and Eastern) which are sub-divided into 111 districts (plus the capital city) which are in turn divided into sub-districts which are made up of counties. (One reference mentioned that 36 new districts were to be added in July 2012.) Below the county level are parishes and villages. Districts especially affected by the civil war are referred to as “post-conflict districts.”

Uganda spends almost a quarter of its national budget on health and education.

Health personnel and facilities are insufficient: .12 physicians/1,000 population and .5 hospital beds/1,000 population. The government is sponsoring programs to train, retain and disperse health personnel.

Two administrative challenges are investing in its fast-growing youth population and setting up a system for managing recently discovered oil. Uganda’s image as a model developing country has been tarnished recently by a deterioration of governance and an increase in corruption. On an index of corruption where 0 is the most corrupt and 100 is the least, Uganda has a score of 29.

Economics and Employment

On UNDP’s Human Development Index for 2012, Uganda ranked 161 out of 187 countries, indicating that it ranks among the poorer countries. Uganda’s economy depends on agriculture, fishing and forestry. More than 80% of the labor force works in agriculture although since 2006, the agriculture sector has been declining while the service sector has been increasing. Major exports include coffee, fish, and tea. Uganda’s greatest source of foreign exchange is from remittances from Ugandans living outside the country.

Almost two-thirds of its population (65%) lives on less than two dollars per day. Its per capital income is \$506, according to the World Bank. Poverty is more concentrated in the Northern region. Its gross domestic product grew by 5.7% between 2007 and 2011 although in 2012, the rate declined to 2.8%. As in many countries, economic growth has not necessarily trickled down to the poor. Discovery of oil and natural gas will allow some diversification once production and sales begin.

Almost all adult men are employed. More than two-thirds (69%) of women are currently employed outside the home, a decline from 81% in 2006. Two-thirds of women report that they are self-employed.

Economic development challenges include unreliable power, high energy costs, inadequate transportation infrastructure, and corruption. In recent years, Uganda experienced relatively high inflation although this has recently come under control. Uganda has been experiencing declining donor support.

Income inequality is high. Its Gini Index, where zero indicates equal distribution of wealth and one indicates that one person has all the wealth, is .39--- similar to that of the U.S. The top 20% of Uganda's population accounts for half (51%) of total income while the bottom 20% accounts for 6%.

Wealth distribution is closely related to fertility and early childbearing. The total fertility rate (TFR) is strongly associated with the household wealth quintile: the poorest quintile has a TFR of 7.9 while the wealthiest quintile has a TFR of 4.0, almost four children lower. Two fifths (41%) of women in the poorest quintile begin childbearing as adolescents (15-19) compared to 16% of women in the richest quintile.

Uganda has achieved Millennium Development Goals related to extreme poverty and hunger but not those related to health and education.

The country has considerable potential but is unlikely to reach its goal of becoming a middle income country without reducing its high fertility, reducing corruption, managing its natural resources, and investing in the productivity of its large youth population.

Language, Sub-populations, Religion, and Culture

English and Swahili are the national languages with Ganda (or Luganda) being common as well. The 2011 UDHS was conducted in seven local languages.

There are 56 named tribes in Uganda, making up a large number of diverse communities. Idi Amin forced out Asians (Indians) living in Uganda. In recent years, some have returned; there are about 15,000 Indians living in Uganda now.

According to the 2011 UDHS and averaging women's and men's responses, 42% of the population is Catholic, 31% is Protestant, 13% is Muslim, 11% is Pentecostal, and 2% is Seventh Day Adventist.

The culture tends to be pronatalist---with men in particular seeing their identity tied up with having numerous children. According to Jennifer Wanyana in the Ministry of Health, "...many Ugandans oppose contraception for cultural reasons or they associate family planning with promiscuity."

Gender Inequality and Domestic Violence

One challenge for development in Uganda is gender inequality. Gender inequality is expressed in many forms, including disadvantages for females in higher education, public health professions, and family decision making. Rural women in Uganda average 15 hours of work per day compared with men who work 8-10 hours a day.

In 1999, a National Action Plan on Women (NAPW) identified the following critical areas for action to advance women's rights: legal and policy framework and leadership; social and economic empowerment

of women; reproductive rights and responsibilities; girl-child education; peace building conflict resolution; and freedom from violence.

Another challenge for development is violence. Although not all violence is domestic, we will focus on domestic violence here. The 2011 UDHS has an unusually detailed description of the extent of domestic violence as well as its determinants and consequences for *both* women and men.

Domestic violence (combining emotional, physical, and sexual violence) is common in Uganda, with men typically the perpetrators and women, the victims, although men can also be victims. Six out of ten ever-married women and four out of ten men age 15-49 report emotional, physical, or sexual violence from a spouse. Among those who have experienced spousal physical or sexual violence, 37% of women and 26% of men experienced physical injuries and four out of ten sought outside help. Drunkenness (of either spouse) is strongly related to domestic violence.

Many women have internalized the legitimacy of physical force by husbands: in the 2006 UDHS, more than 70% of women thought that a husband could be justified for hitting or beating his wife; by 2011, the figure declined to 58%.

The 2011 UDHS identifies the following characteristics of women most likely to experience domestic violence: those who are older, those with more living children, Pentecostal women, women of Itesa ethnicity, rural women, women living in the Eastern region, divorced/separated/widowed women, women whose husband has no education or only primary, women whose husband is often drunk, wives who are better educated than their husbands, women whose fathers beat their mothers, and women whose husbands display controlling behavior.

Ugandan Family Planning Program and Its Challenges

Uganda has policies and programs that address development issues but none has effectively addressed the country's very high fertility (Karra and Gribble). Two government priorities, backed up by allocation of government resources, are birth spacing and youth-friendly sexual and reproductive health services. Uganda's National Population Policy Action Plan 2011-2015 gives priority to sexual and reproductive health and rights and gender and family welfare.

Uganda's public health system must address competing health problems; access to contraception is only one. Challenges to the family planning program include: improving family planning/contraceptive and reproductive commodity security; increasing contraceptives supplies at lower-level health care facilities where stock outs are frequent; improving the quality of sexual and reproductive services and rights of the population; providing integrated family planning services in all health facilities at all levels; designing programs to engage men in family planning services and use; broadening the range of methods provided by hospitals and clinics, including long-acting and permanent methods to tackle high discontinuation rates of injectables and pills; improving strategies to reach people in remote areas with FP; improved supervision of Village Health Teams; training more health care providers in FP counseling; and improving public knowledge of contraceptive methods. According to one government source, budget constraints are impeding these interventions. (MOH, 2010).

Given that most of the need for family planning is in rural areas, we should describe the teams responsible for community based FP programs. District “core teams,” made up of the District Health Officer, clinic managers, clinic midwives, and health assistants are responsible for implementing community-based family planning programs. Village Health Teams are made up of volunteer community health workers. Going door-to-door in hard to reach areas, they distribute pills and condoms, provide injectable contraception (in some districts), and refer for long acting or permanent methods.

Recently research has suggested that if FP and reproductive health care were given a high priority, this would be highly cost effective (Karra and Gribble, 2013). Although the country has policies and programs related to family planning, the global reproductive health community perceives that national leaders in Uganda have given relatively weak support to family planning. Resources for contraceptive commodities barely cover the small urban population.

Contraceptive services are not just the task of government. As noted elsewhere, more than half of women using modern contraceptives get them through the private sector. The private sector provides half or more of pills, injectables and IUDs (few in number) while the public sector provides most of the female sterilizations and implants. The public sector does somewhat better in fostering informed choice, especially in providing information on potential problems users may encounter and how to deal with them. Pills and condoms are sold through social marketing.

To reduce high fertility, more than family planning is required. A three-pronged approach would be to strengthen the family planning program, expand access to education, and concentrate on job creation.

Recommendations

Interventions should include not only married couples but the increasing number of couples who are in union but not married.

Given that most Ugandans are affiliated with organized religions, FACT could look into how these networks might be used to communicate information about FA, FAM, and LAM. The same could be explored for language and ethnic groups.

Development efforts, including family planning programs, need to be sensitive to high baseline rates of domestic violence and not exacerbate them. Given that Fertility Awareness Methods require couple cooperation, client counselors will need to be prepared to address domestic violence.

IV. Fertility, Contraception, Fertility Desires and Unmet Need

Fertility

Fertility: Uganda’s total fertility rate (TFR) is **6.2** children, the seventh highest in the world after Niger, Chad, Somalia, the Democratic Republic of the Congo, Angola, and Burundi. It has the same rate as Zambia. This TFR represents a one-child decline from that in the 1970s (**7.1**). Fertility has been declining very slowly but consistently. It has declined the most for younger women (ages 15-19).

Current TFRs range from 3.3 in Kampala to 3.8 in all urban areas to 6.8 in rural areas. The TFR also varies widely by wealth quintile: from 4.0 for the highest quintile to 7.9 for the lowest. Looking at all currently married women, the mean number of children ever born is 4.5 with the mean number of living children, 3.9.

Two million Ugandan women get pregnant each year. Childbearing starts early although not as early as it used to: a third (33%) of women ages 20-24 report that they had a birth by age 18.

Birth intervals: The median interval between births is 30.2 months. A quarter of births (25%) occur within 24 months of a previous birth. Intervals are longer for older women, those whose infants survived, and for women living in Kampala.

By ages 48-49, 40% of women have experienced menopause. If more than half of women have not experienced menopause by age 49, one might wonder whether by not interviewing women over age, the 2011 UDHS may have missed a few births.

Contraception

Contraceptive knowledge: Female and male respondents were asked if they had ‘heard of’ ten different modern methods and two traditional methods. By this measure, awareness of at least one family planning method is almost universal in Uganda; the average number of methods ‘heard of’ by women and men is at least **eight**. Condoms are the best known method (97% of women, 99% of men), injectables next (94% and 91%) and pills third (93% and 92%) with LAM the least well known of modern methods (13% and 11%). Traditional methods, including ‘rhythm/moon beads,’ are not as frequently known as modern methods.

However, just asking people whether they have ‘heard of’ a method is not a very strong indicator of knowledge and is likely to overestimate people’s familiarity with methods since respondents may not want to appear poorly informed. [Note: I know this from personal experience. When doing a fertility survey in rural Kentucky, I added some rare contraceptive methods to a list, for example, the ‘ota ring’ and got a fair number of respondents saying they had ‘heard of’ the ‘ota ring.’]

Contraceptive use: According to the 2011 DHS, **30%** of married women 15-49 report using contraception. Most of these (26%) report using modern methods, an increase from 14% in 2000-01. The percent using traditional methods has remained constant at **4-6%**.

Contraceptive use varies by household wealth with 13% of the poorest quintile, 25% of the middle quintile and 39% of the richest quintile using contraception. Contraceptive use is higher in urban areas than rural areas (46% versus 27%), within certain regions (for example, 48% in Kampala versus 8% in Karamoja), and for those with more education. Contraceptive use also increases with women’s empowerment, particularly their participation in household decision making. Half (52%) of sexually active unmarried women report using some method of contraception, mostly male condoms or injectables.

Method mix: Uganda’s modern method mix is distinctive: injectables are by far the most popular method (14.1%), followed by pills, other modern methods and female sterilization (each at 2.9%), and condoms

(2.7%). Traditional methods account for 4%, mostly withdrawal (2.1) and periodic abstinence (1.4%). IUDs and male sterilization are rare. Slightly more women (52%) using modern methods got them from the *private* sector than the *public* sector (47%).

Discontinuation: Injectables are the most popular method in Uganda, perhaps because they are easy to conceal their use from partners. However, almost half (47%) of women (15-49) starting an injectable discontinue it within 12 months, citing the following reasons: side effects and health concerns (23%), desire to become pregnant (9%), method-related reasons (7%), other reasons (5%) and other fertility-related reasons (3%). Discontinuation of pills is even higher (53%).

Fertility Desires

A number of approaches have been taken to measure fertility desires. The first one below could be considered prospective while the other three are retrospective.

Future fertility desires: Currently married women and men were asked whether they wanted another child soon (within the next two years), later (in two years or more), whether they were undecided, and whether they wanted no more children. The results are below.

Future Fertility Desires	Currently married women (15-49)	Currently married men (15-54)
Want child within 2 yrs.	14.3%	19.3%
Want a child later (after 2 yrs.)	37.8%	43.1%
Want another, not sure when	.8%	1.3%
Undecided	2.7%	2.7%
Want no more children	39.5%	32.8%
Sterilized	3.0%	.6%
Infecund	1.8%	.9%
Total	100.0%	100.0%

When these data are presented by parity, more women than men want no more children at every parity (i.e., number of live births) with the percentages wanting no more children increasing by parity, especially

after four children for women and five for men. Still, the differences between women and men in the table above are not huge. Note that these data are for the married. It is likely that most unmarried sexually active people want to prevent/postpone a birth.

The next three measures of fertility desires are retrospective. These estimates tend to be underreports of unintended or unwanted births due to the rationalization of births originally unintended or unwanted who are now valued members of the family.

Wantedness status of births/pregnancies in past five years (for women 15-49 only): Looking at all births and any current pregnancies taking place in the past five years, 56% of births (or pregnancies) to women were reported as planned/wanted, 32% as mistimed, and 12% as unwanted. The percent unwanted increases steadily by birth order and age. This measure includes unmarried women.

Wanted fertility rate (women 15-49): This is the level of fertility in the past three years that would have prevailed if unwanted births had been avoided. The ideal number of births reported was **4.5** compared with the actual TFR of **6.2**---a difference of almost two unwanted births if unwanted births were avoided. The discrepancy is lower in urban areas (3.2 wanted TFR versus 3.8 actual TFR) than rural areas (4.8 wanted TFR versus 6.8 actual TFR). This again provides evidence of a high level of unintended fertility in the midst of high actual fertility and pronatalism.

If life could be lived over: Respondents with living children were asked, "If you could go back to the time when you did not have any children and could choose exactly the number to have in your whole life, how many would that be?" Almost all respondents could give numeric answers. The answers for women and men in 2011 were the same as those in 2000-01.

Men's fertility desires are consistently higher than women's. If people could "live their life over," married men (15-49) report that they would have wanted **6.6** children compared to **5.1** children for married women (15-49). The figures for all men (15-49) are **5.7** and **4.8** for all women (15-49). Responses are strongly related to existing numbers of children. For those with *no* children, the "lived life over" numbers are lower: **4.5** for all men and **3.9** for all women. For those with *six or more* children, the ideals are **8.5** (for men) and **6.1** (for women).

Even though actual and desired fertility are high, many women (and fewer men) are having unintended or unwanted pregnancies and births. While the average number of lifetime births per woman in Uganda is **6.2**, the number of wanted births is **4.5**.

Correlates of smaller ideal family size: Those with small ideal family sizes include younger women, urban women, those living in Kampala, those with more education and those with higher household wealth.

Spacers versus limiters: There is more demand for spacing than limiting in Uganda, especially by men. If one adds the percentages of women and men who want to wait at least two years (spacers) to those who do not want any more children (limiters), about three quarters of women (78%) and men (75%) do not want a child immediately. These figures have not changed substantially since 2006. Considering the modal categories by sex, women are more likely to want to limit (40%) while men are more likely to

want to space (46%). When fertility desires are analyzed by number of living children, women flip from being spacers to limiters at four children while men flip at five children.

Unmet Need

In the short run, the best way of addressing high fertility is to help those with an unmet need for spacing or limiting. People move through categories but at any one time, about three quarters of currently married women and men in Uganda do not want a child immediately (i.e., within the next two years). Of course, some of these are already using contraception or are sterilized.

Two recent studies, one (2011) on the costs and economic burden associated with induced abortions in Uganda and the second (2012) examines the potential costs and health benefits to increasing access to modern contraceptives. The two studies agree that “providing greater access to contraception in Uganda may be highly cost effective by alleviating unmet need for family planning services, reducing the incidence of induced abortions and abortion-related complications and promoting overall reproductive health and well-being.”

Measurement of unmet need: Depending on the measures are used, unmet need can vary and figures may be inconsistent. Figures can be for all women (or men), currently married women (or men), or ever-married women (or men). Some estimates are prospective while others are retrospective. Some are percentages while others are means or medians. Some figures include sterilizations while others do not. Men’s ages may be from 15-49 or 15-54.

Unintended pregnancies: There are 755,000 unintended pregnancies in Uganda each year. This corresponds to 37% of the total number of pregnancies.

Unsafe abortions: An especially strong indicator of unmet need is the number of abortions. Abortions are illegal in Uganda except to save the life of the mother. Almost 300,000 (297,000) pregnancies result in abortion each year. Most are unsafe, resulting in health complications for individuals, even death, as well as costs to the health system. Economic costs include direct medical costs, direct non-medical costs (e.g., transportation), and indirect costs (loss of time and productivity). More than 4% of Uganda’s public health budget is devoted to complications of abortion.

Official estimates of unmet need: Using a prospective approach, **43%** of currently married women (15-49) say they want no more children or are sterilized---compared to **30%** of men (15-49).

According to the 2011 UDHS, **20.8%** of currently married women do not want a child within the next year two years and are neither contracepting nor sterilized or have a mistimed pregnancy. These women could benefit from contraception to achieve their goals for spacing. The comparable figure for limiters is **13.5%** for a total of **34.3%**. If all currently married women who say they want to space or limit were to use family planning, the contraceptive prevalence rate (CPR) would more than double, from **30%** to **64%**.

To express this in absolute numbers, over 1.4 million Ugandan women would like to delay a pregnancy in order to space their children or stop childbearing but are not using contraception.

In order to reduce unmet need, we need to identify who has it. Although women with unmet need reside in every analysis category, some groups of women have *above average* unmet need (i.e., above 34%). There is little variability by age except that women 45-49 have a low level of unmet need and those 30-34 have an above average level. Thirty six percent of rural women have unmet need, 38% of women with primary education, and 42% of women in the lowest wealth quintile and 39% in the next lowest wealth quintile. Several regions have above average unmet need: East Central (42%), Northern (42%), West Nile (43%) and Southwest (37%). It is likely that unmarried women have higher unmet need than married women although data are not available on this.

Reasons for unmet need: There are many reasons for high rates of unmet need at the individual or couple level, including lack of accurate information about the benefits of family planning, poverty, cultural and religious beliefs, pronatalism, lack of women's empowerment, stigma toward contraceptives, fear of side effects, lack of access to FP commodities, partners' desires for more children, and a limited choice of methods at district and local levels. Research is needed on the extent to which improved Fertility Awareness and knowledge of Fertility Awareness Methods could address some of these reasons.

Significance of "unmet need": This is a logical construction produced by demographers. However, just because a woman (or man) does not want another child (or any more children) or currently has an unintended pregnancy, it does not necessarily follow that she/he will be a successful contraceptive. She/he may know little or nothing about methods, may have had a bad experience or heard rumors, may be afraid of using a method, may not have access to an appropriate method, may not know how to use it correctly or deal with side effects or his/her spouse may not allow them to use a method. A method may be discontinued within the first year.

Information, support, commodities and perhaps permission (in the case of the husband) may all be needed to turn "unmet need" into effective and satisfied contraceptive use. There is nothing automatic about it (i.e., once a woman has "unmet need," she springs into action).

Intention to use contraception in the future: Given the just-mentioned reservations about the concept of 'unmet need,' it is encouraging that 64% of currently married women who are not using contraception say they intend to use it in the future (while 31% do not). About two-thirds of currently married women of parities 1, 2, 3, and 4+ intend to use contraception compared with 54% of those with no children.

If one looks at information on Uganda's family planning program and a number of indicators of desire for spacing or limiting, including the number of abortions and desire for contraception among the unmarried, one can argue that *more than* a third of Ugandan women (34%), the official estimate of unmet need, would be open to use of contraception if they could be matched with an appropriate method, are not impeded by stock outs, and are given information and support.

At the same time, men have higher fertility desires.... Should the pronatalism of men be confronted directly, worked around (i.e., with women using injectables secretly), or ignored? Or should the emphasis be on men who are already amenable to medium-sized families? Encouraging surreptitious use by women could be risky, given the relatively high rates of domestic violence in Uganda.

Recommendations

Users of two hormonal methods, injectables and pills, have high one-year discontinuation rates and could possibly benefit from Fertility Awareness to help them deal with side effects and health concerns or switch to another method.

Although Ugandan men typically want more children than women and are more favorable to spacing rather than limiting, some men are closer in their attitudes toward women than others. An intervention study could be conducted in which couples are included based on attitudes of *male partners* toward spacing, limiting or contraceptive use. The intervention could include a FA curriculum directed toward both men and women and try to identify a method acceptable to both partners.

Over 80 percent of women and men in the 2011 UDHS want four or more children. Given that most Ugandans (outside the urban elite) want *at least three* children, the focus could be on those with three living children to help them keep their final number to four (or five at most). This idea could be incorporated into an OR stud, looking at the impact of FA and the couple's preferred contraceptive method to help them stop at four children.

Or the focus could be on those with *four* children, to help couples stop at four or five children. Couples could be dichotomized by age/stage of childbearing and by urban and rural. The goal for younger and urban couples could be to complete their families at four while the goal for older and rural couples, five. The means could be through teaching fertility awareness, helping people choose and appropriate method and giving them support to continue with the method (or switch to a more appropriate method). Outcomes could be contraceptive use, choice of an effective method, method satisfaction, continuation or appropriate switching, satisfying unmet need and prevention of unintended pregnancy.

Regions with the largest discrepancies between actual fertility (TFR) and wanted numbers of children (East Central, Eastern, and Northern) might be promising regions to work in, given that wanted fertility is so much lower than actual fertility.

An OR study could identify (through a baseline household survey) a substantial number of women (or men) with "unmet need" as demographers define it and then try different approaches (including fertility awareness training, LAM training, or FAM) to help those with "unmet need" become successful and satisfied contraceptors.

Another approach would be to identify those who say they *intend to use family planning in the near future* (rather than those with "unmet need") to see if they can be helped to make the transition.

Although Ugandan men typically want more children than women and are more frequently favorable to spacing rather than limiting, some men are closer in their attitudes toward women than others. An intervention study could be conducted in which couples are included based on attitudes of *male partners* toward spacing, limiting or contraceptive use. The intervention could include a FA

curriculum directed toward both men and women and try to identify a method acceptable to both partners.

V. Fertility Awareness, Fertility Awareness Methods, Breastfeeding and LAM

Fertile Period

Knowledge of the fertility period is just one component of Fertility Awareness. Others are listed at the end of this section. In the USHD 2011, respondents were asked when the fertile period occurs during the cycle. The percentage of respondents giving the correct answer (i.e., the fertile period is half way between menstrual periods) was 16% in 2006 and 14% in 2011. The modal category for all respondents was "right after the menstrual period" (45%).

Fertility Awareness Methods

More than half of female and male respondents said they had heard of the "rhythm/moon bead" method: 53% of all women, 58% of currently married women and sexually active unmarried women, and even more men (67% of all men and 77% of currently married men). Of course, as noted earlier, this is a fairly weak measure of knowledge. Still, it indicates some familiarity with periodic abstinence.

Of the 30% of currently married women 15-49 reporting that they used a method of contraception, **1.4%** reported using a periodic abstinence method ("rhythm/moon beads"). Moon beads are the Ugandan version of CycleBeads® that are distributed and sold in Uganda. Of current users of "rhythm/moon beads," 33% correctly identified the fertile period, compared with 13% of non-using women. However, about half (48%) of the periodic abstinence users thought that the fertile period was right after the menstrual period, a similar percentage as non-users.

Given that only a third of users of rhythm/moon beads correctly identified the fertile period, one would expect some unintended pregnancies. The pregnancy rate for "rhythm/moon beads" was about the same as for pills (9.8% versus 9.4% respectively). Discontinuation is high for the periodic abstinence (PA) methods. Reasons for discontinuation included respondents saying they wanted to get pregnant or they actually became pregnant. Unlike for hormonal methods, concerns about side effects were uncommon for PA methods.

Fertility Awareness

Although Fertility Awareness (FA) cannot tackle all of Uganda's family planning challenges, it could potentially contribute to:

- improved knowledge of the menstrual cycle and fertile period
- understanding of risk taking
- insights on how methods work as well as their pros and cons
- provision of a wider choice of methods, including ones without the side effects of hormonal methods (side effects are the major reason for discontinuation)

- provision of knowledge-based methods not dependent on commodities and stock outs
- support for better and longer use of methods
- increased understanding of the conditions for using LAM
- better couple communication

If improvements could be made in any of these areas, FA could help women (and couples) come closer to their wanted number of children.

Breastfeeding and the Lactational Amenorrhea Method

Breastfeeding practices in Uganda are not perfect but they are good. The challenge in the future is to make sure that breastfeeding and post-partum abstinence practices do not erode with development.

Almost all (98%) of new mothers in Uganda breastfeed, 89% within a day after the baby is born. Although two out of five (41%) of mothers give pre-lacteal feeds (not recommended), infant formula supplementation is rare. The mean and median duration of breastfeeding are 19 months. However, the duration of *exclusive* breastfeeding is less than the optimal 6 months: 3.4 months (median) or 4.6 months (mean).

Liquids are introduced too early and complementary foods, too late. Only 13% of children 6-23 months get enough diversity of foods. Half (49%) of children 6-59 months are anemic although this has decreased from 73% in 2006.

After giving birth, Ugandan women abstain from sexual relations for an average of 2.4 months whereas the median duration of post-partum amenorrhea is 9.4 months. By analyzing these two practices together, the UDHS 2011 concluded that the median duration of post-partum insusceptibility to pregnancy is 11 months. By region, the duration of insusceptibility has a wide range--from 4.6 months in Kampala to 16.2 months in the West Nile region.

The duration of post-partum abstinence does not vary much by sub-groups but post-partum amenorrhea does vary; it is longer for women who are older, rural, less educated, and living in poorer households.

Although many Ugandan women receive some child spacing benefit from lactational amenorrhea, LAM is the least known of the modern methods of family planning. Only 13% of women (15% of currently married women) and 11% of men have heard of LAM. Knowledge of the three LAM "rules" is certainly less than this. Only .2% of users report that they are using LAM. Given that previous surveys did not ask about LAM, there are no trend data on use of LAM although it is safe to assume it was uncommon.

Recommendations

Knowledge of the fertile period tends to be inaccurate in Uganda. It is not clear why respondents believe that the fertility period is right after menses. This might be explored through qualitative research.

A memory aid be devised which would make it easier to remember when the fertile period is relative to the menstrual cycle. For example, Americans trying to remember how to set their clocks in the US for change in daylight savings time rely on the mnemonic “spring forward” and fall back.”

Qualitative research on how Ugandan users of “rhythm/moon beads” are actually using them, their challenges, and their level of knowledge, including about timing of abstinence, would be useful before a new program is launched.

A process evaluation of a new electronic fertility awareness education program in Uganda could be useful to see if this is a promising approach.

Both knowledge and use of LAM are very low in Uganda. Similarly, relatively few people know when the fertility period is. Given widespread radio listening, this might be one avenue of public information.

Women in the proposed OR study who are pregnant or new mothers (or all women) could be taught about LAM.

Women who seek ante-natal or delivery services could be informed about LAM, possibly through additions to the ante-natal care protocols.

VI. Potential Partners for FACT

a. Relevant Ugandan organizations

Name of Organization
Reproductive Health Uganda (formerly Family Planning Association)
Uganda Health Information Network (UHIN)
Uganda National Health Research Organization (UNHRO)
Ugandan Association of Obstetricians and Gynaecologists (AOGU)

b. International organizations with presence in Uganda (potential partners)

Save the Children
Engender Health
JHU Advance FP project
Marie Stopes International
Wellshare International
FHI360
Population Council

Pathfinder International

Pathfinder International has focused on community engagement and capacity building for family planning and RH. It has developed a Pathways to Change Game. Would it be possible to integrate fertility awareness or LAM into this game?

Population Council and Pathfinder International have worked with adolescents in Uganda, particularly on a project called “Safe and Smart Savings” for vulnerable girls in Uganda. Could FA be integrated into these programs?

c. Regional organizations with presence in Uganda

East, Central, and Southern Africa Health Community (ECSA)
ECSACON: regional nurses/midwives
Regional Center for Quality of Health Care which is affiliated with Makerere University

d. Projects that might provide an opportunity for collaboration with FACT

Communications for Health Communities (USAID) led by FHI360	Seeks to decrease HIV, reduce the TFR, and reduce maternal and child mortality
HOPE (Healthy People and Environment) in the Lake Victoria Basin. Led by Pathfinder	
USAID/Uganda Community Connection (CC) Project. Implemented by FHI360.	Among other things, it seeks to increase demand by women and men for later timing and spacing of pregnancies
Advancing Partners and Communities. Supports community based family planning in several countries	
Fertility Awareness might be integrated into Pathfinder International's Pathways to Change.	

II. Anticipated Challenges

The 2011 UDHS is not particularly encouraging regarding FA, FAM, or LAM. Most respondents cannot identify the timing of the fertile period although more of the periodic abstinence users can. Very few

respondents are using “rhythm/moon beads” although from one half to three quarters of respondents had “heard of” it. LAM is the least recognized of the modern methods and its use is very low. Some potential partners may be discouraged by these results and may not want to participate in interventions or research. In addition to this, there is the usual bias against knowledge-based methods in favor of more clinical ones.

Of course, it must be kept in mind that the resources to popularize these information-based approaches have been very limited and this may explain their low visibility.

The 2011 UDHS results point to the need for research on why could benefit the most from FA, FAM, or LAM and where limited resources should be directed. There are many challenges for FP in Uganda and room for new approaches that are very client-centered **if** they can be shown to have impact.

Regarding target groups, given Uganda’s very young population, it might make sense to focus on FA among adolescents (10-19). But if the goal of FACT is to increase contraceptive use, this population, especially the younger adolescents, would not show increases in contraceptive use for some years and probably beyond the duration of the project. On the other hand, *sexually active unmarried adolescents* do have an immediate unmet need for contraception and, **if** it were politically feasible to do an intervention with this group, it might be possible to demonstrate an impact on contraceptive use among this group.

Promoting LAM is a special challenge since only new mothers can use the method. The large OR project could identify women who qualify for LAM (or will soon) and provide them information on the rules and then see if use of LAM is increased. In order to reach more potential LAM users, given that more Ugandan women are getting antenatal care and are attended by a trained attendant at delivery, another approach might be to work with public or private facilities providing prenatal and delivery care to make sure that their clients get information about LAM.

The OR study cannot work if there are few choices of methods, if there are stock outs or if when clients go for clinical methods, they do not receive information and support. Thus, it will probably be necessary to conduct the study in an area where FP services are relatively good.

VIII. Recommendations

A. Programmatic

How can FACT build upon and strength communities to deliver these resources since individuals, couples, and families do not act in isolation but are embedded in community networks?

- Interventions should include not only married couples but the increasing number of couples who are in union but not married.
- Interventions should acknowledge that many households may vary from the stereotype of the large family with many biological children and two parents (i.e., be female headed, have non-related children, have children without both parents, be polygamous).

- Given that most Ugandans are affiliated with organized religions, FACT could look into how these networks might be used to communicate information about FA, FAM, and LAM. The same could be explored for language and ethnic groups.
- Development efforts, including family planning programs, need to be sensitive to high baseline rates of domestic violence and not exacerbate them. Given that Fertility Awareness Methods require couple cooperation, client counselors will need to be prepared to address domestic violence.
- Users of the two hormonal methods injectables and pills, have high one-year discontinuation rates and could possibly benefit from Fertility Awareness to help them deal with side effects and health concerns or switch to another method.
- Although most women in Uganda get child spacing benefits from the amenorrhea associated with breastfeeding, both knowledge and use of LAM are very low in Uganda. Similarly, relatively few people can identify when the fertility period is. Given widespread radio listening, this might be one avenue of public information on FA and LAM.
- Regions with the largest discrepancies between actual fertility (TFR) and wanted numbers of children (East Central, Eastern, and Northern) might be promising regions to work in, given that wanted fertility is so much lower than actual fertility.
- Given that 80% of the population lives in rural area and rates of contraceptive use are much lower in rural areas, the interventions are going to need to be conducted in rural areas.
- A memory aid might be devised which would make it easier to remember when the fertile period is relative to the menstrual cycle. The same thing might be done for the three “rules” for LAM.
- Women who seek ante-natal or delivery services could be informed about LAM, possibly through additions to the ante-natal care protocols in public or private facilities.

B. Research

Qualitative Research

- Qualitative research could be conducted on how Ugandan users of “rhythm/moon beads” are actually using them, their challenges, and their level of knowledge, including about timing of abstinence---before a new program is launched.

- Knowledge of when the fertile period is tends to be inaccurate in Uganda. It is not clear why respondents believe that the fertility period is right after menses. This might be explored through qualitative research.
- A process evaluation of a new electronic fertility awareness education program in Uganda could be useful to see if this is a promising approach.

Operations Research (or Implementation Science)

Given that resources to teach people about FA, FAM, and LAM are scarce, a key question is *who could benefit the most* and should get priority for FA, FAM or LAM instruction? This can be answered by operations research (OR) or by what is now called, implementation science which has been defined as a process of understanding how programs can be effectively scaled up. Which of these groups would benefit the most?

- *Discontinuers?* These people have already made a decision to use contraception but dropped out.
- *Couples with three living children?* Over 80 percent of women and men in the 2011 UDHS want four or more children. Given that most Ugandans (outside the urban elite) want *at least three* children, the focus could be on those with three living children to help them keep their final number to four (or five at most), looking at the impact of FA and the couple's preferred contraceptive method to help them stop at four children.
- *Couples with four living children?* OR could focus on those with *four* children, to help couples stop at four or five children. Couples could be dichotomized by age/stage of childbearing and by urban and rural. The goal for younger and urban couples could be to complete their families at four while the goal for older and rural couples, five.
- *Married men who want medium-sized families?* Although Ugandan men tend to want more children than women and are more interested in spacing rather than limiting, some men are closer in their attitudes toward their partners than others and might be satisfied with 3-5 living children rather than 6-8.
- *Those with "unmet need"?* Through a household survey, it would be possible to identify a substantial number of women (or men) with "unmet need" as demographers define it and then provide fertility awareness training, LAM training, or FAM to help those with "unmet need" become successful and satisfied contraceptive users.
- *Pregnant women or new mothers* who might benefit from LAM?

- *Those who intend to use family planning?* Another approach would be to identify those who say they *intend to use family planning in the near future* (rather than those with “unmet need”) to see if they can be helped to make the transition.

Operations Research Design

Studies should use the most rigorous design, given the topic, circumstances and funds available. In this case, it would be desirable to have a control or comparison group to help answer the question, what would have happened in the absence of the intervention. If another community could be included with the baseline and end line surveys but without any special intervention, this would increase the credibility of the results. Otherwise, critics could say that improvements in contraceptive use or discontinuation would have happened anyway.

These targeted groups listed above could be part of a community-level intervention, preceded by a fairly large baseline household survey so there would be enough people for analysis in each of the categories above. All couples in the targeted group or community would receive the intervention (FA, FAM, and LAM) and assistance in choosing an appropriate method and giving them support to continue with it (or switch to a more appropriate method).

At the end of the intervention, a follow up survey and data analysis would identify which people benefited the most.

Outcomes could be contraceptive use, choice of an effective method, method satisfaction, use of LAM, knowledge of the fertile period, continuation or appropriate switching, satisfaction of unmet need and prevention of unintended pregnancy. The duration would need to be *at least three years*: three months for the base line survey and data analysis; six months for the intervention (with additional boosters after this); two years for any changes to take place; and three months for the end line survey and data analysis.

The relevant qualitative data collection could take place in parallel during the first three months.

Bringing about behavior change, for example, increased use of contraception, is slow. The cost of such an OR study could be high, given that the intervention would need to be paid for by FACT, the duration would need to be *at least three years*, it could benefit from a control group or comparison group, and the number of participants would need to be fairly large to have enough people in each category. However, this design (or something similar) could answer the question of who benefits the most from FA, FAM and LAM and could also yield programmatic lessons.

IX. Resources

A. Resources Cited

Babigumira, Joseph. “Economic economics of unsafe induced abortion in Uganda.” Video on PRB site, accessed Dec. 30, 2014.

Karra, Mahesh and James Gribble, "Costs of induced abortion and cost-effectiveness of universal access to modern contraceptives in Uganda," Population Reference Bureau Research Brief, Sept. 2012.

Ministry of Health [Uganda] 2010. Health Sector Strategic and Investment Plan. Promoting People's Health to Enhance Socio-Economic Development. 2010/11-2014/15, Kampala, Uganda, MOH.
http://www.health.go.ug/docs/HSSP_III_2010.pdf.

Population Reference Bureau 2013 Family Planning Worldwide 2013 Data Sheet. Nov. 2013. Washington, DC.

WHO Maternal Mortality Fact Sheet No. 348, May 2012.

Uganda Bureau of Statistics (UBOS) and ICF International, Inc. 2012. Uganda Demographic and Health Survey 2011. Kampala, Uganda: USBO and Calverton, MD: IFC International Inc.

B. Resources to be Read

Haub, Carl and James Gribble. "The World at 7 Billion." PRB Population Bulletin 66, no. 2. July 2011, Uganda: At the Beginning of a Transition, pp. 4-5.

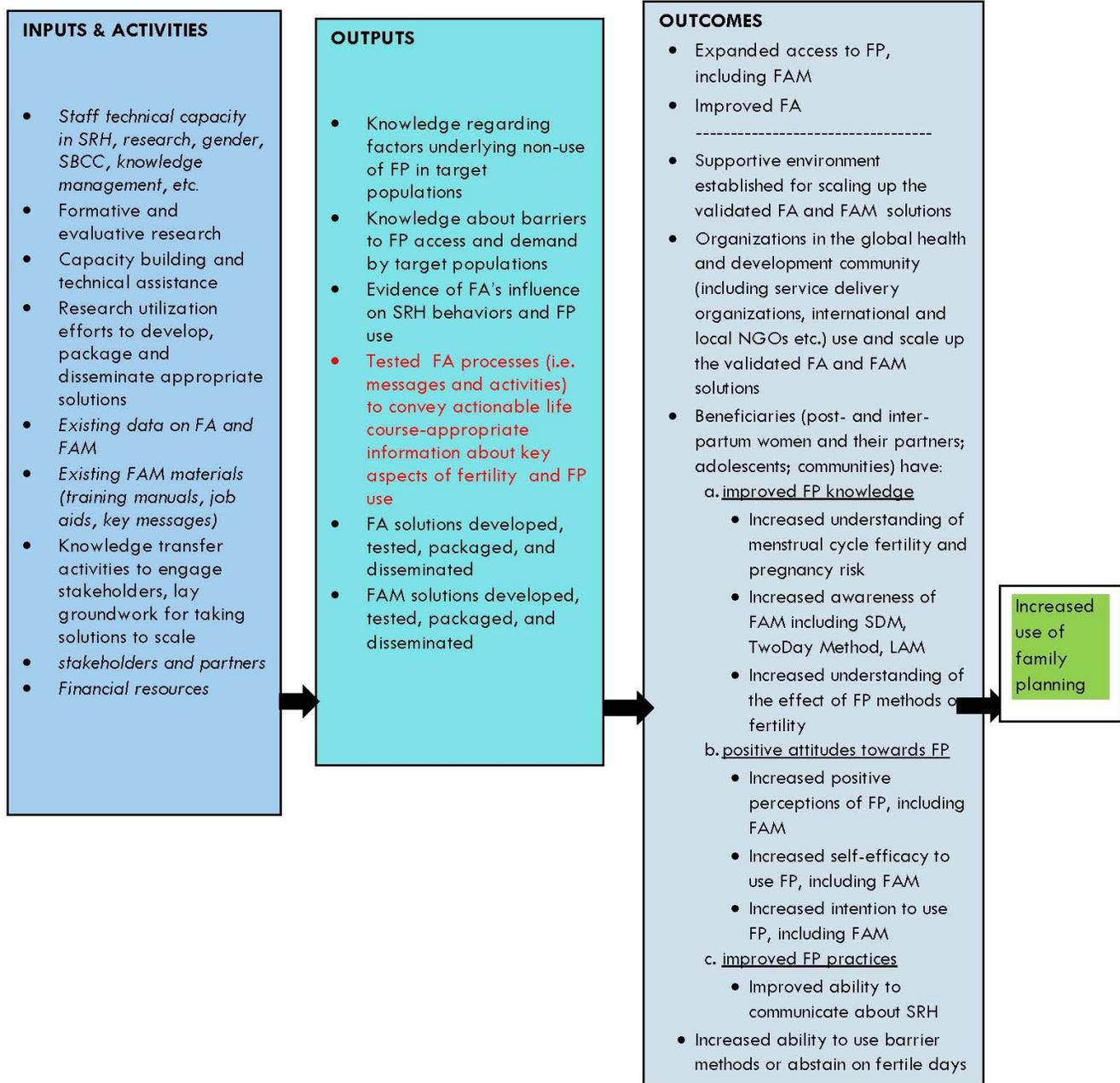
Pathfinder International. Pathways to Change Game, Uganda. December 2013, Pathfinder International: Watertown, MA. This version of the game was designed primarily for use in Uganda. It has a glossary of terms in local languages and a Moderator's Handbook.

Uganda Bureau of Statistics (UBOS) and ICF International, Inc. 2012. Uganda Demographic and Health Survey 2011. Kampala, Uganda: USBO and Calverton, Maryland: IFC International, Inc.

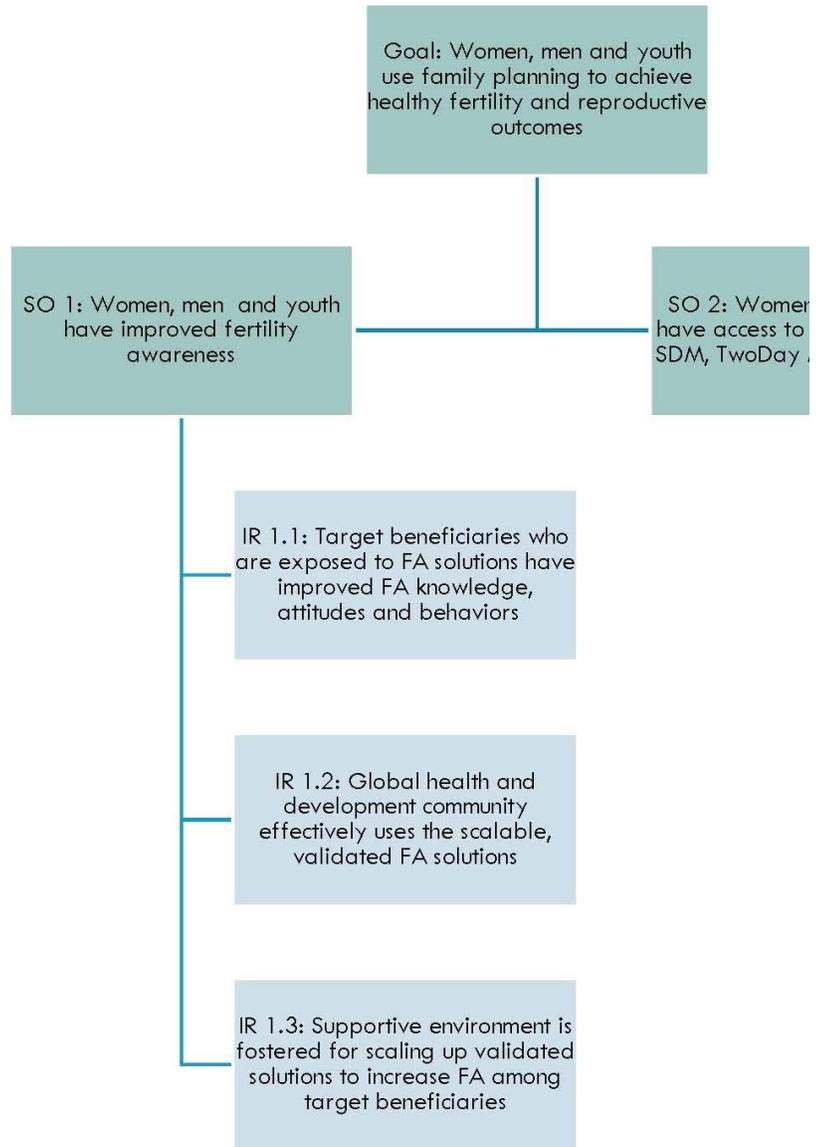
Appendix

A. Logic Model

Goal: Women, men and youth use family planning to achieve healthy fertility and reproductive outcomes.



B. Results Framework



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

Washington, DC

**Institute for Reproductive Health,
Georgetown University**

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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

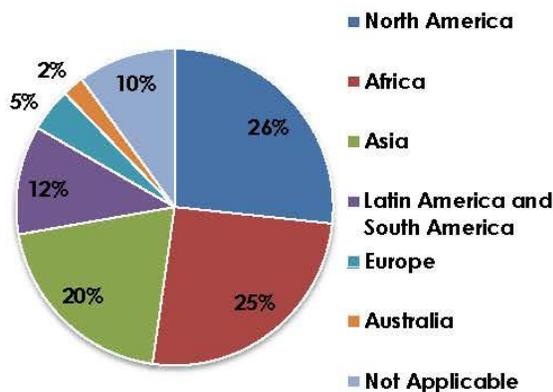
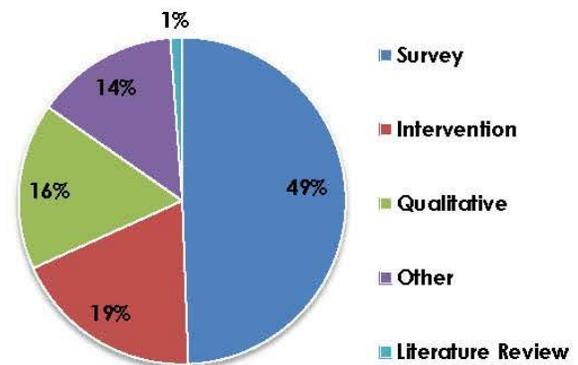


Figure #2: Methodologies of the Included Studies

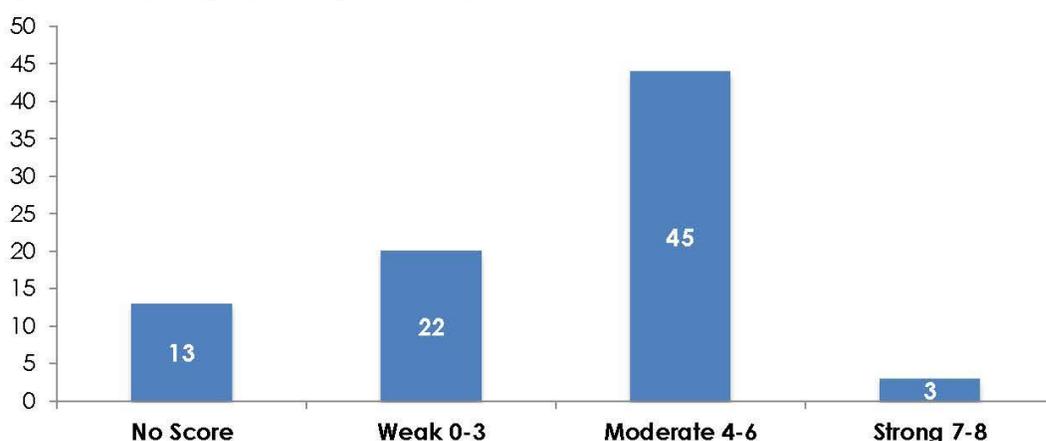
Note: Three studies combined qualitative and quantitative methodologies. These three studies were included in both the survey and qualitative studies categories in these calculations.



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:

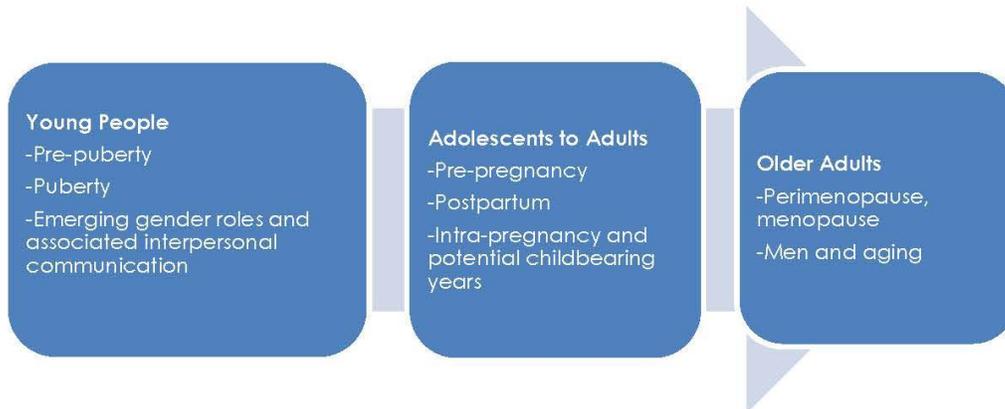
- What do people know, or believe they know, about fertility?
- How does fertility awareness (or lack thereof) influence sexual and reproductive health attitudes or behaviors (including FP) across the life course?
- What is the effect of interventions/programs that have incorporated fertility awareness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

References

1. Agrawal, S., Fatma, A., & Singh, C. M. 2007. A study of knowledge and attitude of adolescent girls towards reproductive health and related problems. *Indian J Prev Soc Med*, 38(1), 2.
2. Ajayi, A. A., Marangu, L. T., Miller, J., & Paxman, J. M. 1991. Adolescent sexuality and fertility in Kenya: A survey of knowledge, perceptions, and practices. *Studies in Family Planning*, 22(4), 205-216.
3. Aksel S., Sinai I., Aumach Yee K. 2012. Female genital cutting and other intra-vaginal practices: implications for TwoDay Method use. *Journal of Biosocial Science* 44:631-635.
4. Ali, M.M., Cleland J., & Shah, I.H. 2012. Causes and consequences of contraceptive discontinuation: evidence from 60 demographic and health surveys. WHO
5. Anчета, R., Hynes, C., & Shrier, L. A. 2005. Reproductive health education and sexual risk among high-risk female adolescents and young adults. *J Pediatr Adolesc Gynecol*, 18(2), 105-111.
6. Aneblom, G., Larsson, M., Odland, V., & Tydén, T. 2002. Knowledge, use and attitudes towards emergency contraceptive pills among Swedish women presenting for induced abortion. *BJOG: An International Journal of Obstetrics & Gynaecology*, 109(2), 155-160.
7. Ayoola, A. B., Nettleman, M., & Brewer, J. 2007. Reasons for unprotected intercourse in adult women. *Journal of Women's Health*, 16(3), 302-310.
8. Bandura, A. 1997. The Anatomy of Stages of Change. *American Journal of Health Promotion*, 12(1), 8-10.
9. Barnett, B. 1996. Fertility awareness affects method use. *Network*, 17(1), 4-17
10. Barron, M. L. 2013. Fertility Literacy for Men in Primary Care Settings. *The Journal for Nurse Practitioners*, 9(3), 155-160.
11. Barron, M. L. 2013. Fertility Literacy for Women in Primary Care Settings. *The Journal for Nurse Practitioners*, 9(3), 161-165.
12. Berger, A. et al. 2012. What Young Adults Know – and Don't Know – About Women's Fertility Patterns: Implications for Reducing Unintended Pregnancies. *Child Trends Research Brief*.
13. Berterö, C. 2003. What do women think about menopause? A qualitative study of women's expectations, apprehensions and knowledge about the climacteric period. *International Nursing Review*, 50(2), 109-118
14. Blake, D., Smith, D., Bargiacchi, A., France, M., & Gudex, G. 1997. Fertility awareness in women attending a fertility clinic. *Australian and New Zealand journal of obstetrics and gynaecology*, 37(3), 350-352.
15. Blair, C., Sinai, I., Mukabatsinda, M., & Muramutsa, F. 2008. Introducing the standard days method: expanding family planning options in Rwanda. *African journal of reproductive health*, 11(2), 60-68.
16. Bloom, S. S., Tsui, A. O., Plotkin, M., & Bassett, S. 2000. What husbands in northern India know about reproductive health: correlates of knowledge about pregnancy and maternal and sexual health. *Journal of Biosocial Science*, 32(2), 237-251.
17. Bongiovanni, A., Samam'h, M. M. A., Al'Sarabi, R. H., Masri, S. D., Zehner, E. R., & Huffman, S. L. 2005. The Lactational Amenorrhea Method (LAM) in Jordan Increases Modern Contraception Use in the Extended Postpartum Period. *Jordan: AED (Linkages)*
18. Bretherick, K. L., Fairbrother, N., Avila, L., Harbord, S. H., & Robinson, W. P. 2010. Fertility and aging: do reproductive-aged Canadian women know what they need to know? *Fertility and sterility*, 93(7), 2162-2168.
19. Brieger, W. R., Delano, G. E., Lane, C. G., Oladepo, O., & Oyediran, K. A. 2001. West African Youth Initiative: outcome of a reproductive health education program. *Journal of Adolescent Health*, 29(6), 436-446.

20. Bro, F. 1993. Vaginal discharge in general practice-women's perceptions, beliefs and behaviour. *Scandinavian Journal of Primary Health Care*, 11(4), 281-287
21. Bunting, L., & Boivin, J. 2008. Knowledge about infertility risk factors, fertility myths and illusory benefits of healthy habits in young people. *Human Reproduction*, 23(8), 1858-1864.
22. Byamugisha, J. K., Mirembe, F. M., Faxelid, E., & Gemzell-Danielsson, K. 2006. Emergency contraception and fertility awareness among University students in Kampala, Uganda. *African health sciences*, 6(4).
23. Cabezón, C., Vigil, P., Rojas, I., Leiva, M. E., Riquelme, R., Aranda, W., & García, C. 2005. Adolescent pregnancy prevention: an abstinence-centered randomized controlled intervention in a Chilean public high school. *Journal of Adolescent Health*, 36(1), 64-69.
24. Canto De Cetina, T. E., Canto, P., & Ordoñez Luna, M. 2001. Effect of counseling to improve compliance in Mexican women receiving depot-medroxyprogesterone acetate. *Contraception*, 63(3), 143-146.
25. Coggins M, Bullock LFC. The wavering line in the sand: The effects of domestic violence and sexual coercion. *Issues in Mental Health and Nursing*. 2003; 24: 723
26. Curtis, C., Huber, D., & Moss-Knight, T. 2010. Postabortion family planning: addressing the cycle of repeat unintended pregnancy and abortion. *International perspectives on sexual and reproductive health*, 36(1), 44-48.
27. Danielson, R., Marcy, S., Plunkett, A., Wiest, W., & Greenlick, M. R. 1990. Reproductive health counseling for young men: What does it do?. *Family Planning Perspectives*, 115-121.
28. Daniluk, J. C., & Koert, E. 2013. The other side of the fertility coin: a comparison of childless men's and women's knowledge of fertility and assisted reproductive technology. *Fertility and Sterility*. 99(3), 839-846
29. Daniluk, J. C., Koert, E., & Cheung, A. 2012. Childless women's knowledge of fertility and assisted human reproduction: identifying the gaps. *Fertility and sterility*, 97(2), 420-426.
30. Díaz A, Laufer MR, Breech LL. 2006. Menstruation in girls and adolescents: using the menstrual cycle as a vital sign. *American Academy of Pediatrics Committee on Adolescence; American College of Obstetricians and Gynecologists Committee on Adolescent Health Care. Pediatrics* 118 (5) 2245-2250
31. Dube H, Heidi Tucker, Pierre Ngom. Assessing the Sexual Risks and Reproductive Health Needs of Orphans and Vulnerable Youth in Zimbabwe. February 2006; USAID and FHI http://pdf.usaid.gov/pdf_docs/PNADJ959.pdf
32. Dyer, S. J., Abrahams, N., Mokoena, N. E., & Van der Spuy, Z. M. 2004. 'You are a man because you have children': experiences, reproductive health knowledge and treatment -seeking behaviour among men suffering from couple infertility in South Africa. *Human Reproduction*, 19(4), 960-967.
33. Esimai, O. A., & Esan, G. O. 2010. Awareness of menstrual abnormality amongst college students in urban area of Ile-Ife, Osun State, Nigeria. *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine*, 35(1), 63.
34. Finger, W. R. 1996. Withdrawal popular in some cultures. *Contraceptive update. Network*, 17(1), 15.
35. Foster D. G., Bley J., Mikanda J., et al. Contraceptive use and risk of unintended pregnancy in California. *Contraception* 2004; 70: 31.
36. Frost, J. J., Lindberg, L. D., & Finer, L. B. 2012. Young adults' contraceptive knowledge, norms and attitudes: associations with risk of unintended pregnancy. *Perspectives on Sexual and Reproductive Health*.
37. Guzman, L. et al. 2013. Fertility awareness method use among young adult low-income minority women. *Child Trends*, Poster.

38. Gutierrez, L., et al. 2000. Toward Understanding of (Em)Power(Ment) for HIV/AIDS Prevention with Adolescent Women. *Sex Roles*, 42, 7-8.
39. Hampton, K. D., Mazza, D., & Newton, J. M. 2012. Fertility practices of women seeking fertility assistance. *Journal of Advanced Nursing*. -a w a r e n e s s |
40. Hatcher, R., et al. 2011. *Contraceptive Technology*, 20th revised edition. Contraceptive Technology Communication, Inc.
41. Institute for Reproductive Health (IRH). 2004. Study to test the efficacy of the TwoDay Method, unpublished data.
42. Institute for Reproductive Health (IRH). 2008a. Assessing the impact of scaling-up the Standard Days Method® in India, Peru, and Rwanda, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
43. Institute for Reproductive Health (IRH). 2008b. AWARENESS Project comparison of Standard Days Method® users tools, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
44. Institute for Reproductive Health (IRH). 2008c. Evaluation of the acceptability of the Standard Days Method® in the Democratic Republic of Congo, Final study report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
45. Institute for Reproductive Health (IRH). 2011. Gender Roles, Equality, and Transformations Project: Report to USAID, October 2010-October 2011. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
46. Institute for Reproductive Health, Georgetown University. 2012. *My Changing Body: Puberty and Fertility Awareness for Young People*, 2nd Ed. Washington D.C. IRH/GU
47. Institute for Reproductive Health (IRH). 2013a. *Becoming CycleSmart: Rwanda Project Report*. Institute for Reproductive Health Country Report.
48. Institute for Reproductive Health (IRH). 2013b. *CycleSmart Kit: Developing and Testing a Tool for Fertility Awareness*, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
49. Institute for Reproductive Health (IRH). 2013c. *Endline evaluation of the FAM project in Guatemala*, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
50. Institute for Reproductive Health (IRH). 2013d. *Endline evaluation of the FAM project in India*, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
51. Institute for Reproductive Health (IRH). 2013e. *Fertility Awareness in Developing Countries: Analysis of Demographic and Health Surveys from 63 Countries*. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
52. Institute for Reproductive Health (IRH). 2013f. *Fertility awareness and pregnancy intentions: analysis of Demographic and Health Surveys in six countries*. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
53. Institute for Reproductive Health (IRH). 2013g. *My Changing Body: Revising and Testing Incorporation of Gender and Sexuality Topics*, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
54. Institute for Reproductive Health (IRH). 2013h. *The TwoDay Method® Community Study: Adapting tools for successful community-based delivery of the TwoDay Method®, Final Study Report*. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
55. Institute for Reproductive Health (IRH). 2013j. *Using network analysis for social change: breaking through the barriers of unmet need for family planning in Mali*, Final Study Report. Washington,

- D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
56. Jones RK, Darroch JE, Henshaw SK. Contraceptive use among U.S. women having abortions in 2000–2001. *Perspectives on Sexual and Reproductive Health* 2002; 34: 294
 57. Katz, K., & Nare, C. 2002. Reproductive health knowledge and use of services among young adults in Dakar, Senegal. *Journal of Biosocial Science*, 34(02), 215-231.
 58. Kaye, K., Suellentrop, K., and Sloup, C. 2009. *The Fog Zone: How Misperceptions, Magical Thinking, and Ambivalence Put Young Adults at Risk for Unplanned Pregnancy*. Washington, D.C.: The National Campaign to Prevent Teen and Unplanned Pregnancy.
 59. Killion CM. Poverty and procreation among women: An anthropologic study with implications for health care providers. *J Nurse Midwifery* 1998; 43: 273
 60. Kirk, J., & Sommer, M. 2006. Menstruation and body awareness: linking girls' health with girls' education. Royal Tropical Institute (KIT), Special on Gender and Health, 1-22.
 61. Kouyate, R.A. 2010. LAM and the Transition Barrier Analysis – Sylhet, Bangladesh. USAID/ACCESS Report.
 62. Lamprecht, V. M., & Pyper, C. (99). Fertility awareness and natural family planning. *Opinion. Network*, 17(1), 22.
 63. Lavoie, K. & Lundgren, R. *Improving Family Planning Services for Women and Their Partners: A Couple-Focused Approach, Final Study Report*. Washington, D.C. Office of Population Affairs, United States Department of Health and Human Services.
 64. Leon, F., Lundgren, R., Sinai, I. 2013. The role of women's empowerment and literacy in an intervention to increase met need for contraception in rural India. Submitted to Evaluation Review.
 65. Mahmoud, G. A., & Byomy, S. S. 2013. Fertility awareness and family planning use among post abortion women in Egypt. *Life Science Journal*, 10(1).
 66. Makinwa-Adebusoye, P. 1992. Sexual behavior, reproductive knowledge and contraceptive use among young urban Nigerians. *International Family Planning Perspectives*, 66-70.
 67. Marsiglio, W., Hutchinson, S., & Cohan, M. 2001. Young men's procreative identity: Becoming aware, being aware, and being responsible. *Journal of Marriage and Family*, 63(1), 123-135.
 68. McCleary-Sills, J., McGonagle, A., and Malhotra, A. 2012. *Women's Demand for Reproductive Control: Understanding and Addressing Gender Barriers*. Washington, D.C.: International Center for Research on Women (ICRW).
 69. McPherson, M. E., & Korfine, L. 2004. Menstruation across time: menarche, menstrual attitudes, experiences, and behaviors. *Women's Health Issues*, 14(6), 193-200.
 70. Melkamu, Y., Enquesslassie, F., Ali, A., Gebresilassie, H., & Yusuf, L. 200). Fertility awareness and post-abortion pregnancy intention in Addis Ababa, Ethiopia. *Ethiopian Journal of Health Development*, 17(3), 167-174.
 71. Meng, C. X., Gemzell-Danielsson, K., Stephansson, O., Kang, J. Z., Chen, Q. F., & Cheng, L. N. 2009. Emergency contraceptive use among 5677 women seeking abortion in Shanghai, China. *Human Reproduction*, 24(7), 1612-1618.
 72. Moos M. K., Petersen R., Meadows K, Melvin C.L., Spitz, A. M. Pregnant women's perspectives on intendedness of pregnancy. *Womens Health Issues*. 1997; 7: 385.
 73. Myntti, C., Ballan, A., Dewachi, O., El-Kak, F., & Deeb, M. E. 2002. Challenging the stereotypes: men, withdrawal, and reproductive health in Lebanon. *Contraception*, 65(2), 165-170.
 74. Nettleman, M. D., Chung, H., Brewer, J., Ayoola, A., & Reed, P. L. 2007. Reasons for unprotected intercourse: analysis of the PRAMS survey. *Contraception*, 75(5), 361-366.
 75. National Institute for Health (NIH). 2009. NIH Science of Behavior Change Meeting Summary, 15-16 June 2009.

76. Ortayli, N., Bulut, A., Ozugurlu, M., & Çokar, M. 2005. Why withdrawal? Why not withdrawal? Men's perspectives. *Reproductive Health Matters*, 13(25), 164-173.
77. Parasuraman, S., Kishor, S., Kant, S., and Vaidehi, Y. 2009. Profile of Youth in India. National Family Health Survey (NFHS-3), India. Mumbai: International Institute for Population Sciences; Calverton, Maryland, USA: ICF Macro.
78. Peterson, B. D., Pirritano, M., Tucker, L., and Lampic, C. 2012. Fertility awareness and parenting attitudes among American male and female undergraduate university students. *Human reproduction*, 27(5), 1375-1382.
79. Polis, C. B., & Zabin, L. S. 2012. Missed conceptions or misconceptions: perceived infertility among unmarried young adults in the United States. *Perspectives on Sexual and Reproductive Health*, 44(1), 30-38.
80. Pyper, C. M. M. 1997. Fertility awareness and natural family planning. *European J. of Contraception and Reproductive Healthcare*, 2(2), 131-146.
81. Pyper, C. 1997. Reproductive health awareness: an important dimension to be integrated into existing sexual and reproductive health programs. *Advances in Contraception*, 13(2), 331-338.
82. Quach, S., & Librach, C. 2008. Infertility knowledge and attitudes in urban high school students. *Fertility and sterility*, 90(6), 2099-2106.
83. Roth, B. E. T. H. 1993. Fertility Awareness as a Component of Sexuality Education: Preliminary Research Findings with Adolescents. *Nurse Practitioner*, 18, 40-40.
84. Rosenstock, I., Strecher, V., Becker, M. 1988. Social Learning Theory and Health Belief Model. *Health Education Quarterly*. Vol. 155 (2) 175-183.
85. Sable M, Libbus M, Chiu J. Factors affecting contraceptive use in women seeking pregnancy tests: Missouri, 1997. *Family Planning Perspectives* 2000; 32: 124
86. Scorgie, F., et al. 2009. In search of sexual pleasure and fidelity: vaginal practices in KwaZulu - Natal, South Africa. *Culture, Health & Sexuality*, 11(3), 267-283.
87. Scorgie, F., et al. 2011. Predictors of vaginal practices for sex and hygiene in KwaZulu-Natal, South Africa: findings of a household survey and qualitative inquiry. *Culture, health & sexuality*, 13(04), 381-398.
88. Scott, L., et al. 2010. New study shows sanitary protection for girls in developing countries may provide a route to raising their educational standards. Said Business School, University of Oxford.
89. Sedgh, G., et al. 2007. Women with an unmet need for contraception in developing countries and their reasons for not using a method. Alan Guttmacher Institute.
90. Shaikh, B. T., & Rahim, S. T. 2006. Assessing knowledge, exploring needs: A reproductive health survey of adolescents and young adults in Pakistan. *European J. of Contraception and Reproductive Healthcare*, 11(2), 132-137.
91. Sherman, C. A., Harvey, S. M., & Noell, J. 2005. "Are They Still Having Sex?" STIs and Unintended Pregnancy Among Mid-Life Women. *Journal of Women & Aging*, 17(3), 41-55.
92. Sinai, I., & Arévalo, M. 2006. It's all in the timing: coital frequency and fertility awareness-based methods of family planning. *Journal of biosocial science*, 38(6), 763.
93. Sinai, I. and Jennings, V. 2012. Status of NFP: How Many, Who, Why? *Science, Faith & Human Fertility*
94. Singh, K. K., Bloom, S. S., & Tsui, A. O. 1998. Husbands' reproductive health knowledge, attitudes, and behavior in Uttar Pradesh, India. *Studies in family planning*, 388-399.
95. Singh, S., and Darroch, J. E. 2012. Adding it Up: Costs and Benefits of Contraceptive Services— Estimates for 2012. New York: Guttmacher Institute and United Nations Population Fund (UNFPA).
96. Smit, J., McFadyen, L., Zuma, K., & Preston-Whyte, E. 2002. Vaginal wetness: an underestimated problem experienced by progestogen injectable contraceptive users in South Africa. *Social Science & Medicine*, 55(9), 1511-1522.

97. Sommer, M. 2009. Ideologies of sexuality, menstruation and risk: girls' experiences of puberty and schooling in northern Tanzania. *Culture, health & sexuality*, 11(4), 383-398.
98. Sommer, M. 2010. Where the education system and women's bodies collide: The social and health impact of girls' experiences of menstruation and schooling in Tanzania. *Journal of adolescence*, 33(4), 521-529.
99. Stenger, D. 2007. The Effects of an Education Program on Women's Knowledge and Behavior during Menopause. Thesis submission for Eastern Illinois University.
100. Tolley, E., Loza, S., Kafafi, L., & Cummings, S. 2005. The Impact of Menstrual Side Effects on Contraceptive Discontinuation: Findings from a Longitudinal Study In Cairo, Egypt. *International Family Planning Perspectives*, 31(1)
101. Uddin, M. J., & Choudhury, A. M. 2008. Reproductive health awareness among adolescent girls in rural Bangladesh. *Asia-Pacific Journal of Public Health*, 20(2), 117-128.
102. Vernon, R. 2009. Meeting the family planning needs of postpartum women. *Studies in Family Planning*, 40(3), 235-245.
103. Vigil, P., Ceric, F., Cortés, M. E., & Klaus, H. 200). Usefulness of monitoring fertility from menarche. *Journal of Pediatric and Adolescent Gynecology*, 19(3), 173-179.
104. Vigil, P., Riquelme, R., Rivadeneira, R., & Aranda, W. TeenSTAR: An option of maturity and freedom. Integrated sexuality education program for adolescents. *Revista Médica de Chile* 2005: 133:1173-1182.
105. Wallerstein, N. 2006. What is the evidence of effectiveness of empowerment to improve health? World Health Organization.
106. Wilcox, A. J., Baird, D. D., Dunson, D. B., McConaughey, D. R., Kesner, J. S., & Weinberg, C. R. 2004. On the frequency of intercourse around ovulation: evidence for biological influences. *Human Reproduction*, 19(7), 1539-1543.
107. Witt, J., McEvers, K., & Kelly, P. J. 2013. Knowledge and Experiences of Low-Income Patients With Natural Family Planning. *The Journal for Nurse Practitioners*, 9(2), 99-104.
108. Witte, K. 1997. Preventing teen pregnancy through persuasive communications: realities, myths, and the hard-fact truths. *Journal of Community Health*, 22(2), 137-154.
109. Woodsong C., Shedlin M., Koo H.P. The natural body, God and contraceptive use in the southeastern United States. *Culture Health Sexuality* 2004; 6: 61.
110. Von Sadovszky, V., Kovar, C. K., Brown, C., & Ambruster, M. 2006. The need for sexual health information: perceptions and desires of young adults. *MCN: The American Journal of Maternal/Child Nursing*, 31(6), 373.
111. Zinaman, M., Johnson, S., Ellis, J., & Ledger, W. 2012. Accuracy of perception of ovulation day in women trying to conceive. *Current Medical Research & Opinion*, 28(5), 749-754.

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

Cabezon (2005)	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.)	Chile	Female high school students who participated in the TeenSTAR program. Age at beginning of intervention was 15-16. n=1259	<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.	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.	7
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 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	<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 baseline, 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 <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.	8
Diaz (2006)	Background article	N/A	Young women pre-puberty and puberty		<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.	N/A

Dube (2006)	Report (cross-sectional survey)	Zimbabwe	Young men and women ages 13-21, from rural areas. Orphans and vulnerable youth (OVA) included. 34.6% of young women postpartum. n=1824	<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.	<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.	2
IRH (2013a)	Intervention Used the CycleSmart Kit for 5 weeks CycleSmart Kit included the CycleSmart Brochure, CycleBeads, sanitary pads, diary, and calendar.	Rwanda	Female adolescents ages 12-14, post-pubescent, and not sexually active. n=198	<u>Increase in knowledge of puberty, fertility and staying safe</u> as indicated by pre/post measures. <u>Behavior. Girls track their menstrual cycle</u> and report being better prepared for their next period.	<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.	6
IRH (2013g)	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	Guatemala and Rwanda	Adolescent girls and boys ages 10-14 and their parents. n=268 adolescents n=117 parents	<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."	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.	IRH (2013g)

<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 educate 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-puberly 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 SILs</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.</u> Men who believed that pregnancy could be prevented 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,</u> as well as social pressure to demonstrate their fertility before marriage continued post intervention. <u>Behavior.</u> Increased proportion reported using a FP method 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 Celina (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 <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.	8
Eimai (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

Frost (2012) ²	Cross-sectional survey About 17% of the questions on the knowledge scale addressed return to fertility or impact on fertility	United States	Unmarried men and women ages 18-29. Pre-pregnancy and postpartum. Nationally representative. n=1800	<u>Low scores on FP knowledge</u> among over 50% of men and 25% of women. <u>Attitudes regarding concern about FP methods</u> , 60% underestimated the effectiveness of OCs; fear of side effects was common.	Within the FP method knowledge scale, there were a few fertility awareness-related questions, not analyzed separately. <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.) <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. <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.	3
IRH (2004)	Admission interview for a clinical trial of a new family planning method	Guatemala, Peru, Philippines	Married women ages 18-45	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.	Additional analysis provided for this report.	2
IRH (2008a)	Intervention SDM introduction: This was a study to test differences between women who use CycleBeads vs. a paper version.	Guatemala	Married women ages 18-49 n = 556	<u>Behavior</u> , Significant improvements in couple communication and women's empowerment.		5
IRH (2008b) ⁴	Intervention Large scale, community-level SDM introduction	India & Peru	Married women of reproductive age Baseline n = 2079 Endline 1 n = 3092 Endline 2 n = 1800	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		5

				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 (2013)	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 & Sinci, 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 to 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.</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.	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 of 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, CycleBeads were a useful tool for helping adolescents understand the menstrual cycle.</u></p>	<p><u>Program implications, Counselors, educators, and outreach staff use CycleBeads to counsel and educate patients attending the 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, 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.</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
Mynflit (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. Concern about FP method side effects</u> was the most common reason for using withdrawal. <u>Behaviors. Use of withdrawal combined with a variety of fertility awareness-related strategies.</u> 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	Men and women (majority) ages 18-28, pre-pregnancy and postpartum. Majority college students. n=55	<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	Men and women from rural and urban areas. Mean age 35 for women individually interviewed. n=20 for individual interviews n=57 for focus groups (33 women and 24 men)	<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	Women ages 18-29, clients of public or NGO health programs, in union, and practicing family planning. n=928	<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 17-40 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, 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	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 n=465	<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	Young women with children, ages 14-26 n=21	<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	First-year female students at Makerere University, ages 18-25, mean age 21. n=379	<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	Women seeking abortions, ages 15-48, were surveyed on their previous use of emergency contraceptives n=5677	<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
Bongiavanni (2005)	Report (cross-sectional survey) 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	Jordan	Women postpartum ages 16-49 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%. n=3183	<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). <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. <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 (<1.5%).	<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. 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.	4
IRH (2013)	Cross-sectional survey Village census	Mali	All women of reproductive age and all men married to women of reproductive age interviewed in two villages Married women ages 18-44; Men married to a woman ages 18-44 N=726	<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.		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; relations 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</u> based on unprotected sex not resulting in pregnancy.</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
Poils (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
Berlero (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
Akset 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-Hermann), 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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MEETING REPORT

Let's talk about
**fertility
awareness:**
Implications for reproductive health

Institute for Reproductive Health,
Georgetown University

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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.

IRH was awarded the 5-year Fertility Awareness-Based Methods (FAM) Project by the United States Agency for International Development (USAID) in September 2007. This 5-year project aims to increase access and use of FAM within a broad range of service delivery programs using systems-oriented scaling up approaches.

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Acronyms

CPR	Contraceptive Prevalence Rate
CYP	Couple-years of Protection
FAM	Fertility Awareness-based Methods
IRH	Institute for Reproductive Health, Georgetown University
LAM	Lactational Amenorrhea Method
SDM	Standard Days Method®
SRH	Sexual and Reproductive Health
STI	Sexually Transmitted Infection
USAID	United States Agency for International Development

Acknowledgements

This report is the result of a half-day consultation organized by the Institute for Reproductive Health at Georgetown University (IRH) under the USAID-supported Fertility Awareness-based Methods (FAM) Project. The consultation was conducted in July 2013 at the International Center for Research on Women (ICRW), in Washington, DC.

The consultation was based on months of preparation by a team of IRH staff and consultants. Background preparations included a literature review of the available data related to fertility awareness and its effect on reproductive health attitudes and behaviors. This extensive review of the literature was conducted by Kimberly Aumack-Yee and Starr Hilliard to whom we express our appreciation for their outstanding work. Subsequently, they compiled the results into a white paper which provided the evidence-base for the consultation ([Appendix B](#)).

We are particularly grateful to all the participants in the consultation who offered their expert opinion and engaged with open minds regarding the role of fertility awareness in their work. We appreciate the contributions of the moderators and discussants who lead participants in rich conversation during the breakout group session. We also thank our colleagues at USAID for their participation in the meeting and their guidance and support under the FAM Project.

Introduction

While fertility is the physiological ability to become pregnant (or to cause a girl or woman to become pregnant), fertility awareness is much more. The Institute for Reproductive Health at Georgetown University (IRH), which focuses on fertility awareness interventions ranging from puberty education for very young adolescents to integration of fertility awareness-based methods (FAM) into family planning programs, 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 family planning methods work, how they affect fertility, and how to use them; and it can create the basis for understanding, communication about and correctly using family planning.”

Based on programmatic experiences, IRH has recognized the value of providing accurate information about fertility to women, men, girls, and boys. With this awareness, they are able to understand how sex, reproduction and family planning interconnect, which ultimately can improve sexual and reproductive health (SRH) outcomes and address unmet need for family planning. Fertility awareness can empower people to identify what is healthy and normal for them, and know when to seek reproductive health care. It can help youth understand their changing bodies and recognize their responsibilities to protect their SRH. It can also foster communication about SRH between future or current partners, parents and children, health care providers and patients, teachers and students. Fertility awareness can support reproductive rights, gender equality and social norms that help people develop the behaviors that have a positive effect on SRH for all.

With the potential for such positive outcomes, why has fertility awareness received so little attention within the SRH field? One reason may be the lack of documented evidence of the positive health outcomes directly related to fertility awareness. To begin the conversation, IRH conducted a comprehensive literature review, keeping 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 SRH attitudes and behaviors across the life course. With this initial evidence base, IRH assembled a group of experts to discuss how to achieve a better understanding of the role of fertility awareness in improving the health and well-being of women, men, girls, and boys across the life course.

Purpose and Objectives

The overall goal of the Fertility Awareness-based Methods (FAM) Project is to expand access to and use of the Standard Days Method® (SDM), TwoDay Method®, and Lactational Amenorrhea Method (LAM) within the framework of informed choice. Inherent in this goal is improved fertility awareness. Numerous experiences under the FAM Project pointed toward the importance of fertility awareness as a

foundation for positive SRH outcomes and overall well-being. IRH convened colleagues and experts in the field to assess the evidence identified through a systematic review of all literature published on fertility awareness since 1990.

The key objectives of the Fertility Awareness Technical Consultation were to:

- 1) Define fertility awareness,
- 2) Assess the evidence of the effect of fertility awareness on SRH attitudes and behaviors across the life course,
- 3) Explore how fertility awareness could contribute to SRH program goals, and
- 4) Identify the knowledge gaps that could be addressed by future research.

Fertility Awareness 101

The consultation began with an attempt to develop a common definition of fertility awareness. How fertility awareness is defined—what it includes and what it does not—is important because of potentially different influences on SRH behaviors and outcomes, including family planning use. A comprehensive definition of fertility awareness encompasses the factors throughout the life course that shape behavior: cognitive, social, environmental and developmental factors. Four fundamental components of a common definition evolved.

Fertility awareness:

1. Includes basic knowledge of the fertile time in a women's menstrual cycle and when a woman can get pregnant, including the associated symptoms or physiologic changes in her body.
2. Increases self-efficacy allowing the individual to use his/her knowledge of fertility to make healthy decisions.
3. Empowers women and girls while engendering support for SRH from men and boys.
4. Can serve as the foundation of holistic reproductive health programs.

Participants also recognized that in order to better understand the effect of fertility awareness on SRH outcomes, it should be intentionally integrated into programs and its effects clearly defined and measured in terms of intended outcomes (e.g., increasing family planning use, delaying sexual debut and first birth).

Participants agreed that the definition of fertility awareness proposed by IRH ([see page 1](#)) met these criteria but that further work is needed to identify strategies to implement it in programs and measure its effect.

Literature Review Synopsis

In preparation for the consultation, a literature review was conducted and shared with participants (see [Appendix B](#)). The review 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 SRH attitudes or behaviors (including family planning) across the life course?
- What interventions/programs have been implemented that have incorporated fertility awareness, and what is their effect on attitudes, behaviors, and SRH outcomes (including use of family planning)?

This review found that there is a dearth of accurate information—and a significant amount of misinformation—among the general population about fertility and how our bodies work. In regard to family planning, the most salient is concerns about side effects, along with other more nuanced perceptions that contribute to non-use of family planning. For example, inaccurate assessment of pregnancy risk reduces family planning use at critical points across the life course. Many believe pregnancy requires frequent sex, or that having had sex without becoming pregnant indicates they may be infertile. Some assume any breastfeeding prevents pregnancy. Others believe hormonal contraception impedes their future fertility, or using it during breastfeeding affects the infant's future fertility. Other researchers have found that negative perceptions of family planning, including lack of self-efficacy to control fertility and use contraception, result in failure to discuss and seek methods. In some settings, family planning use is stigmatized, or people believe it is not within human power to control fertility. Furthermore, gender inequities in reproductive decision-making may mean that even when women have accurate information, they may be constrained by the beliefs and choices of their partners and others who influence them. While several small-scale studies, conducted primarily with adolescents, have shown an individual-level increase in knowledge about fertility and self-efficacy following educational interventions, virtually no studies have addressed how increased fertility awareness could contribute to family planning uptake and use. And serious efforts to increase fertility awareness at a population level – not only increasing individual knowledge and skills in a large demographic group, but also creating a supportive environment in which to apply them – have not yet been attempted.

Working Group Discussions

During the consultation, participants joined small groups to discuss and achieve a common understanding of the potential effects that fertility awareness could have on attitudes and behavior. They also began the work of crafting an agenda for the SRH community related to fertility awareness research, programming, and communication.

Potential Effects of Fertility Awareness

Participants discussed the potential effects that improving fertility awareness could have at the individual and community level.

Individual effects could include:

- Better preparation for menses
- Fewer days of school missed/decreased absenteeism for girls
- Delayed sexual debut
- Improved self-care, hygiene, body care
- Fewer unintended pregnancies
- Improved ability to communicate with adults, youth, partners, health providers about SRH issues
- Better understanding of normal vs. abnormal signs and symptoms
- Increased ability to space pregnancies
- Increased condom use
- Increased correct/continued use of family planning methods
- Equal decision-making in family size, use of contraception, initiation of sex

At the community level, effects could include:

- Decreased rates of abortions
- Increased CYP
- Decreased rates of STIs
- Reduced stigma around puberty changes and menstruation
- Improved gender norms, improved respect between girls and boys/men and women
- Changed social norms around fertility, respect for men and women regardless of their chosen family size, changed social norms about masculinity

Participants recognized the complexity of developing and implementing interventions that could achieve these effects as well as the need to carry out research required to measure their effects. These were the topics of the small group discussions that followed.

Programs Discussion

How do we achieve widespread fertility awareness?

Participants in this group agreed that only by improving fertility awareness at the community level (creating a “tipping point”, supportive environment, etc.) can sustainable change be achieved. But this is not likely to be achieved in the context of reproductive health programs per se. Fertility awareness can be supported through one-on-one counseling, but it is important to use a variety of platforms including schools, women's groups, workplaces, sports clubs, churches, health clinics, savings and loans groups, nutrition groups, WASH groups, youth clubs, mass media, vocational training programs, etc., to reach large numbers of people.

The content of the messages is important. Content must be tailored to different stages across the life course. For example, young adolescents need to receive different information than sexually active adults. People need a sufficient level of “body literacy” in order to internalize and act on the information they receive. This is particularly important when past experience is a more likely predictor of behavior than knowledge alone. Messages also need to include links to health services.

Communications Discussion

What approaches could be implemented to increase fertility awareness? What channels could be used to spread fertility awareness information?

These are not isolated interventions: they need to be reinforced through multiple approaches. Depending on the channel and budget, fertility awareness could be a single message or a whole package of messages/information to be shared. Message content should be consistent with needs over the life course and can be communicated through a variety of platforms:

Mass media platforms: TV, radio spots/novellas/dramas, posters, social media outreach, mhealth (SMS), smartphone apps (through pre-existing messaging apps)

Social media platforms: social media should be considered an important tool, responsive to adolescents through sustained dialogue via tweeting, texting, and helplines.

Community-based/interpersonal platforms: community-based groups like women's groups, men's groups, discussion groups, and other peer groups can be important channels for reaching large numbers of people.

Print/distributed materials: comic books, revised counseling materials that include these messages, magazine tear outs, USAID Facts for Family Planning booklet, and online courses may be appropriate for particular target groups.

How could this be done at a scale that will achieve broad community-level behavior change?

- Collaborate with a variety of other interventions to integrate fertility awareness messaging. Share relevant knowledge with HIV prevention programs, women in postpartum programs, etc. Integrate fertility awareness into other messages that are already taking place, using channels that already exist to make it successful.
- Professional organizations/institutions, along with public systems for free in-service training can be important channels for reaching service providers, teachers, and other influential people so they can communicate and support fertility awareness.

Who are the communicators about fertility awareness?

- Parents, teachers, providers/health professionals, opinion-leaders, and members of community based organizations can learn to communicate/educate with their children contextually from a young age
- Celebrities, sports stars, and other role models can help expand the messaging by being champions and speaking out about fertility awareness

Research Discussion

What are some appropriate indicators to measure the potential behavioral outcomes?

Participants in this group reviewed the points raised in the previous discussion about the potential effects of fertility awareness at the individual and community levels. It was agreed that some of these would be more difficult than others to measure and that prioritization was needed.

What research design and methods should be used to address these questions?

While it was agreed that the design and methods would need to fit the effects (and their indicators), a number of possibilities include:

- “Layer-in” fertility awareness to an intervention including several phases and measure indicators incrementally
- To build a robust evidence base, it is preferable to develop and use a generic set of indicators for fertility awareness research
- Quantitative studies are needed, particularly to assess changes at the community level and to garner evidence that can result in policy change and broad support for fertility awareness programming, but qualitative studies will be equally important to gain an understanding of the actual effects of fertility awareness on a number of factors (e.g., communication, self-efficacy).
- Community-based organizations can be important research partners – not just “platforms” – as delivering high-quality fertility awareness programming is essential to understanding its effects.

What research questions need to be answered?

Possible priority questions for fertility awareness research include:

- Is fertility awareness a catalyst for improved outcomes of existing programs?
- What are the negative outcomes for those who lack fertility awareness?
- Does fertility awareness improve CPR?
- Does fertility awareness improve uptake, use, and continuation of family planning methods?
- Does fertility awareness improve service quality (e.g. counseling)?
- What are the most effective/efficient strategies for imparting fertility awareness messages?
- What is the effect/success of communicating fertility awareness messages through mass media?
- Which fertility awareness messages are best communicated through which channels?

Panel of Experts: Next Steps

The consultation concluded with a panel of experts who summarized the small group discussions, offered their perspectives on fertility awareness in their own work, and recommended next steps for the reproductive health field.

Vanessa Cullins, Planned Parenthood Federation of America

According to Dr. Cullins, fertility awareness affords an opportunity to support women to achieve or prevent pregnancy. She commended the group for raising important and rarely discussed issues within the reproductive health field. She encouraged each organization present to consider how they can integrate fertility awareness into their programs, particularly in a manner that demedicalizes this information. "We must shift the paradigm with which we see SRH so that access to this information is universal, not contained only within the walls of health clinics."

With regard to research, she reminded the group that this area tends to be primarily in the developing world, but we can also learn quite a bit from the US context as well, especially in relation to the Affordable Care Act, which is focused on clinical outcomes for the individual and the community. When asked how she would begin integrating fertility awareness into US-based Planned Parenthood clinics, Dr. Cullins suggested the focus be on educators who provide information to the community, particularly within the context of sex-education. She recommended all-site trainings on fertility awareness and how to incorporate it into a woman's base of knowledge. Dr. Cullins pointed out that "Medical office assistants can also play a role in discussing fertility awareness with women and educating them about it, while the clinician can ask clarifying questions about family size and contraception."

John Stanback, FHI 360

Based on Dr. Stanback's perspective as a seasoned researcher in the reproductive health field, there is an important role for fertility awareness in dispelling myths about family planning and its side effects. General counseling is often insufficient to reduce contraceptive discontinuation rates, but by incorporating key counseling messages to improve fertility awareness, providers may have a greater impact on uptake, use, and continuation.

Dr. Stanback is hopeful that better fertility awareness could also reduce abortions, suggesting that fertility awareness could be a cross cutting issue around which diverse groups could find common ground. Better fertility awareness, including knowledge of normal, healthy secretions, could decrease instances of behaviors with negative health impacts like dessicant use or dry sex and, instead, help women understand their bodies and refrain from trying to "cure" things that are perfectly normal. It could also help increase awareness of STIs, thus mitigating the health/fertility damage they cause. Further research is needed on how fertility awareness affects quality of life. As Dr. Stanback pointed out, "Men's understanding of women's menstrual cycles and variable fertility could have a huge impact on behaviors towards women and women's empowerment, especially related to sex of children."

Elaine Murphy, Visiting Scholar, Population Reference Bureau

Dr. Murphy provided conclusions from a communications perspective. She reminded the group that “communication is the heart of both fertility awareness and FAM.” Mass media is an area that has been neglected in traditional fertility awareness and FAM messaging, yet could have a powerful impact. In order to transform community norms, we want fertility awareness to be a universal experience for all people. Therefore, it could be integrated into school programs, pre-marital counseling, and other existing social groups. Both fertility awareness and FAM can be a springboard to other family planning use, and they address a major concern about many methods—side effects. Dr. Murphy encouraged the group to engage colleagues in discussion around fertility awareness. “We need to talk about how fertility awareness empowers women and youth, and we must document these cases.”

Suzanne Petroni, International Center for Research on Women

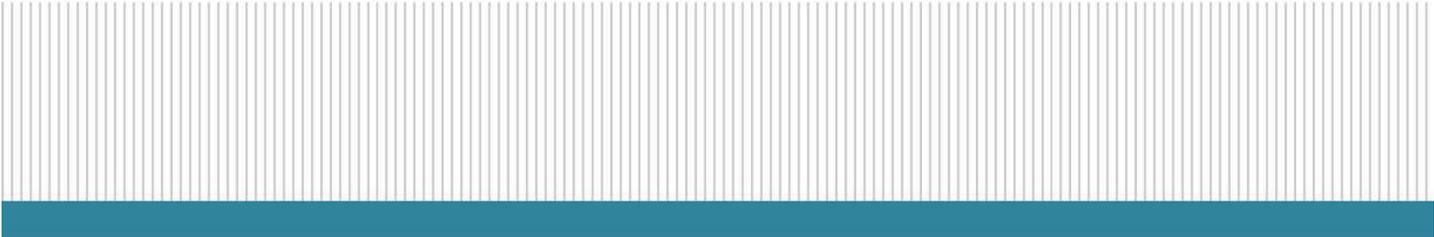
Dr. Petroni, a gender expert, emphasized the importance of addressing the stigma that girls and women face related to puberty and menstruation and, instead, turning that into empowerment. Stigma is also an issue for boys, but this is especially true for adolescent girls. She pointed out that “If you look particularly at adolescence as a period during which girls and boys are becoming more aware of their bodies, changes that are happening to them, the importance of their peers over the life course, discussions that they are or aren't having on puberty and on sexual pleasure, etc., you can see this as a critical period in which we can contribute to changing traditional and often harmful sexual norms and roles. Adolescence is a time to inform decisions, norms, and beliefs that have the potential to create lifelong change.” Looking at fertility awareness as an integral component of sexual and reproductive health and well-being generally is an opportunity to integrate these issues into programming for family planning, female genital cutting prevention, maternal mortality prevention, child marriage prevention, education, women's empowerment and wellbeing.

Next Steps

In conclusion, panel moderator, Shefa Sikder of USAID, reminded the group of the task before it. In order to integrate fertility awareness into reproductive health programs on a wide scale, there must first be a strong evidence base. In addition, she offered the following next steps for participants:

- Seek out ways your organization can integrate fertility awareness into SRH programming.
- Be champions of fertility awareness and challenge bias with your colleagues.
- Consider fertility awareness as an area of common interest, and engage colleagues with differing perspectives (particularly with regard to reducing abortions).
- Elucidate the connection between fertility awareness and family planning uptake, correct use, and continuation (particularly with regard to fear of side effects).
- Consider mass media approaches to communicate fertility awareness messages for universal access.
- Give particular attention to improving fertility awareness among adolescents.

Appendices



LET'S TALK ABOUT FERTILITY AWARENESS

Agenda | July 9, 2013
9:00am – 1:00pm

International Center for Research on Women
1120 20th St NW # 500N
Washington, DC 20036

Technical Consultation

Institute for Reproductive Health, Georgetown University

9:00 – 9:45 AM	Fertility Awareness 101 <i>Introduce participants, develop a shared definition of fertility awareness.</i>
9:45 – 10:25 AM	Fertility Awareness through the Lifecycle: What difference does it make? <i>Present results from a comprehensive review of studies integrating a fertility awareness component, followed by a facilitated discussion.</i>
10:25 – 10:40 AM	Break
10:40 – 10:50 AM	Defining Fertility Awareness <i>Discuss and prioritize the elements of fertility awareness, for both adolescents and sexually active men/women.</i>
10:50 – 11:50 PM	Breakout Discussions: Implications for Research, Program and Communications <i>Small group discussions to talk about the fertility awareness implications for communication, programming, and research.</i>
11:50 – 12:20 PM	Panel Discussion & Next Steps <i>Panel participants synthesize feedback and lead conversation on next steps.</i>
12:20 – 1:00 PM	Closing & Lunch

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

Washington, DC

**Institute for Reproductive Health,
Georgetown University**

7 July 2013



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Acknowledgments:

Written by Kimberly Aumack-Yee and Starr Hilliard

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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

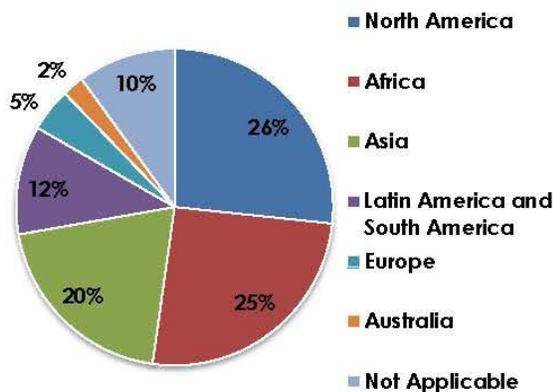
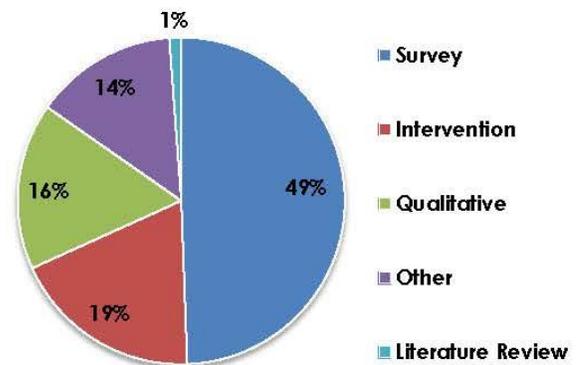


Figure #2: Methodologies of the Included Studies

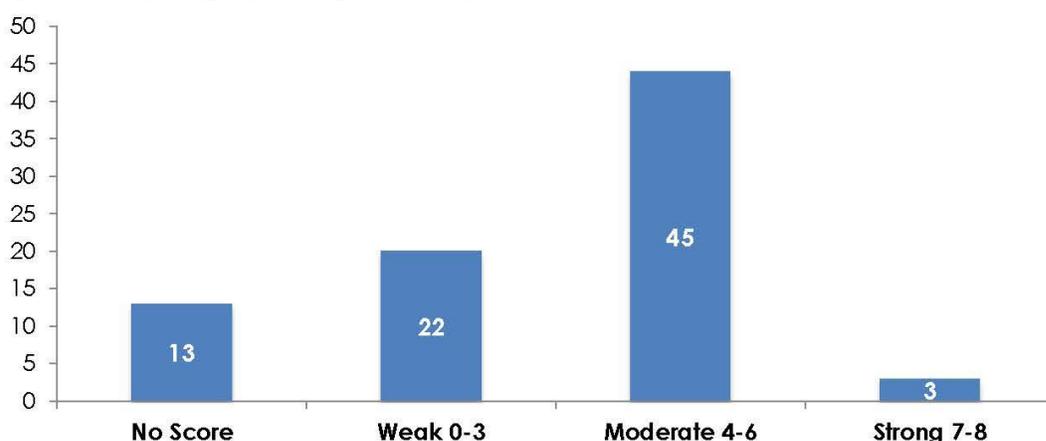
Note: Three studies combined qualitative and quantitative methodologies. These three studies were included in both the survey and qualitative studies categories in these calculations.



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:

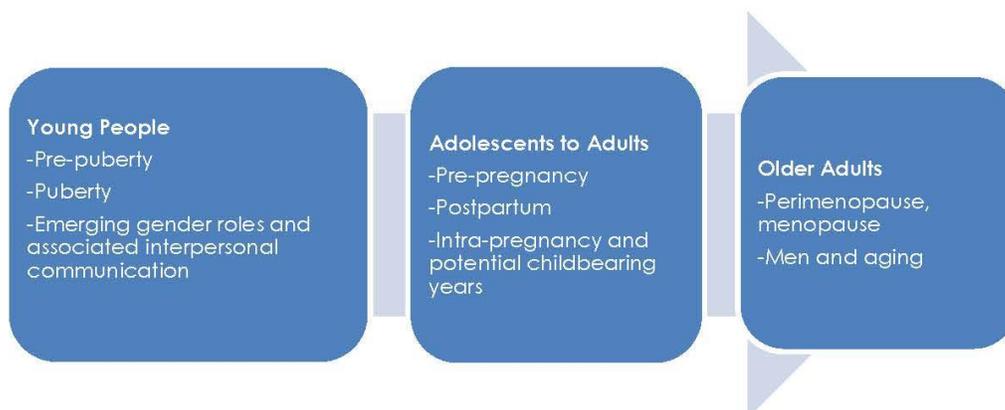
- What do people know, or believe they know, about fertility?
- How does fertility awareness (or lack thereof) influence sexual and reproductive health attitudes or behaviors (including FP) across the life course?
- What is the effect of interventions/programs that have incorporated fertility awareness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

References

1. Agrawal, S., Fatma, A., & Singh, C. M. 2007. A study of knowledge and attitude of adolescent girls towards reproductive health and related problems. *Indian J Prev Soc Med*, 38(1), 2.
2. Ajayi, A. A., Marangu, L. T., Miller, J., & Paxman, J. M. 1991. Adolescent sexuality and fertility in Kenya: A survey of knowledge, perceptions, and practices. *Studies in Family Planning*, 22(4), 205-216.
3. Aksel S., Sinai I., Aumach Yee K. 2012. Female genital cutting and other intra-vaginal practices: implications for TwoDay Method use. *Journal of Biosocial Science* 44:631-635.
4. Ali, M.M., Cleland J., & Shah, I.H. 2012. Causes and consequences of contraceptive discontinuation: evidence from 60 demographic and health surveys. WHO
5. Ancheta, R., Hynes, C., & Shrier, L. A. 2005. Reproductive health education and sexual risk among high-risk female adolescents and young adults. *J Pediatr Adolesc Gynecol*, 18(2), 105-111.
6. Aneblom, G., Larsson, M., Odland, V., & Tydén, T. 2002. Knowledge, use and attitudes towards emergency contraceptive pills among Swedish women presenting for induced abortion. *BJOG: An International Journal of Obstetrics & Gynaecology*, 109(2), 155-160.
7. Ayoola, A. B., Nettelman, M., & Brewer, J. 2007. Reasons for unprotected intercourse in adult women. *Journal of Women's Health*, 16(3), 302-310.
8. Bandura, A. 1997. The Anatomy of Stages of Change. *American Journal of Health Promotion*, 12(1), 8-10.
9. Barnett, B. 1996. Fertility awareness affects method use. *Network*, 17(1), 4-17
10. Barron, M. L. 2013. Fertility Literacy for Men in Primary Care Settings. *The Journal for Nurse Practitioners*, 9(3), 155-160.
11. Barron, M. L. 2013. Fertility Literacy for Women in Primary Care Settings. *The Journal for Nurse Practitioners*, 9(3), 161-165.
12. Berger, A. et al. 2012. What Young Adults Know – and Don't Know – About Women's Fertility Patterns: Implications for Reducing Unintended Pregnancies. *Child Trends Research Brief*.
13. Berterö, C. 2003. What do women think about menopause? A qualitative study of women's expectations, apprehensions and knowledge about the climacteric period. *International Nursing Review*, 50(2), 109-118
14. Blake, D., Smith, D., Bargiacchi, A., France, M., & Gudex, G. 1997. Fertility awareness in women attending a fertility clinic. *Australian and New Zealand journal of obstetrics and gynaecology*, 37(3), 350-352.
15. Blair, C., Sinai, I., Mukabatsinda, M., & Muramutsa, F. 2008. Introducing the standard days method: expanding family planning options in Rwanda. *African journal of reproductive health*, 11(2), 60-68.
16. Bloom, S. S., Tsui, A. O., Plotkin, M., & Bassett, S. 2000. What husbands in northern India know about reproductive health: correlates of knowledge about pregnancy and maternal and sexual health. *Journal of Biosocial Science*, 32(2), 237-251.
17. Bongiovanni, A., Samam'h, M. M. A., Al'Sarabi, R. H., Masri, S. D., Zehner, E. R., & Huffman, S. L. 2005. The Lactational Amenorrhea Method (LAM) in Jordan Increases Modern Contraception Use in the Extended Postpartum Period. *Jordan: AED (Linkages)*
18. Bretherick, K. L., Fairbrother, N., Avila, L., Harbord, S. H., & Robinson, W. P. 2010. Fertility and aging: do reproductive-aged Canadian women know what they need to know? *Fertility and sterility*, 93(7), 2162-2168.
19. Brieger, W. R., Delano, G. E., Lane, C. G., Oladepo, O., & Oyediran, K. A. 2001. West African Youth Initiative: outcome of a reproductive health education program. *Journal of Adolescent Health*, 29(6), 436-446.

20. Bro, F. 1993. Vaginal discharge in general practice-women's perceptions, beliefs and behaviour. *Scandinavian Journal of Primary Health Care*, 11(4), 281-287
21. Bunting, L., & Boivin, J. 2008. Knowledge about infertility risk factors, fertility myths and illusory benefits of healthy habits in young people. *Human Reproduction*, 23(8), 1858-1864.
22. Byamugisha, J. K., Mirembe, F. M., Faxelid, E., & Gemzell-Danielsson, K. 2006. Emergency contraception and fertility awareness among University students in Kampala, Uganda. *African health sciences*, 6(4).
23. Cabezón, C., Vigil, P., Rojas, I., Leiva, M. E., Riquelme, R., Aranda, W., & García, C. 2005. Adolescent pregnancy prevention: an abstinence-centered randomized controlled intervention in a Chilean public high school. *Journal of Adolescent Health*, 36(1), 64-69.
24. Canto De Cetina, T. E., Canto, P., & Ordoñez Luna, M. 2001. Effect of counseling to improve compliance in Mexican women receiving depot-medroxyprogesterone acetate. *Contraception*, 63(3), 143-146.
25. Coggins M, Bullock LFC. The wavering line in the sand: The effects of domestic violence and sexual coercion. *Issues in Mental Health and Nursing*. 2003; 24: 723
26. Curtis, C., Huber, D., & Moss-Knight, T. 2010. Postabortion family planning: addressing the cycle of repeat unintended pregnancy and abortion. *International perspectives on sexual and reproductive health*, 36(1), 44-48.
27. Danielson, R., Marcy, S., Plunkett, A., Wiest, W., & Greenlick, M. R. 1990. Reproductive health counseling for young men: What does it do?. *Family Planning Perspectives*, 115-121.
28. Daniluk, J. C., & Koert, E. 2013. The other side of the fertility coin: a comparison of childless men's and women's knowledge of fertility and assisted reproductive technology. *Fertility and Sterility*. 99(3), 839-846
29. Daniluk, J. C., Koert, E., & Cheung, A. 2012. Childless women's knowledge of fertility and assisted human reproduction: identifying the gaps. *Fertility and sterility*, 97(2), 420-426.
30. Díaz A, Laufer MR, Breech LL. 2006. Menstruation in girls and adolescents: using the menstrual cycle as a vital sign. *American Academy of Pediatrics Committee on Adolescence; American College of Obstetricians and Gynecologists Committee on Adolescent Health Care. Pediatrics* 118 (5) 2245-2250
31. Dube H, Heidi Tucker, Pierre Ngom. Assessing the Sexual Risks and Reproductive Health Needs of Orphans and Vulnerable Youth in Zimbabwe. February 2006; USAID and FHI http://pdf.usaid.gov/pdf_docs/PNADJ959.pdf
32. Dyer, S. J., Abrahams, N., Mokoena, N. E., & Van der Spuy, Z. M. 2004. 'You are a man because you have children': experiences, reproductive health knowledge and treatment -seeking behaviour among men suffering from couple infertility in South Africa. *Human Reproduction*, 19(4), 960-967.
33. Esimai, O. A., & Esan, G. O. 2010. Awareness of menstrual abnormality amongst college students in urban area of Ile-Ife, Osun State, Nigeria. *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine*, 35(1), 63.
34. Finger, W. R. 1996. Withdrawal popular in some cultures. *Contraceptive update. Network*, 17(1), 15.
35. Foster D. G., Bley J., Mikanda J., et al. Contraceptive use and risk of unintended pregnancy in California. *Contraception* 2004; 70: 31.
36. Frost, J. J., Lindberg, L. D., & Finer, L. B. 2012. Young adults' contraceptive knowledge, norms and attitudes: associations with risk of unintended pregnancy. *Perspectives on Sexual and Reproductive Health*.
37. Guzman, L. et al. 2013. Fertility awareness method use among young adult low-income minority women. *Child Trends*, Poster.

38. Gutierrez, L., et al. 2000. Toward Understanding of (Em)Power(Ment) for HIV/AIDS Prevention with Adolescent Women. *Sex Roles*, 42, 7-8.
39. Hampton, K. D., Mazza, D., & Newton, J. M. 2012. Fertility practices of women seeking fertility assistance. *Journal of Advanced Nursing*. -a w a r e n e s s |
40. Hatcher, R., et al. 2011. *Contraceptive Technology*, 20th revised edition. Contraceptive Technology Communication, Inc.
41. Institute for Reproductive Health (IRH). 2004. Study to test the efficacy of the TwoDay Method, unpublished data.
42. Institute for Reproductive Health (IRH). 2008a. Assessing the impact of scaling-up the Standard Days Method® in India, Peru, and Rwanda, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
43. Institute for Reproductive Health (IRH). 2008b. AWARENESS Project comparison of Standard Days Method® users tools, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
44. Institute for Reproductive Health (IRH). 2008c. Evaluation of the acceptability of the Standard Days Method® in the Democratic Republic of Congo, Final study report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
45. Institute for Reproductive Health (IRH). 2011. Gender Roles, Equality, and Transformations Project: Report to USAID, October 2010-October 2011. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
46. Institute for Reproductive Health, Georgetown University. 2012. *My Changing Body: Puberty and Fertility Awareness for Young People*, 2nd Ed. Washington D.C. IRH/GU
47. Institute for Reproductive Health (IRH). 2013a. *Becoming CycleSmart: Rwanda Project Report*. Institute for Reproductive Health Country Report.
48. Institute for Reproductive Health (IRH). 2013b. *CycleSmart Kit: Developing and Testing a Tool for Fertility Awareness*, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
49. Institute for Reproductive Health (IRH). 2013c. *Endline evaluation of the FAM project in Guatemala*, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
50. Institute for Reproductive Health (IRH). 2013d. *Endline evaluation of the FAM project in India*, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
51. Institute for Reproductive Health (IRH). 2013e. *Fertility Awareness in Developing Countries: Analysis of Demographic and Health Surveys from 63 Countries*. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID).
52. Institute for Reproductive Health (IRH). 2013f. *Fertility awareness and pregnancy intentions: analysis of Demographic and Health Surveys in six countries*. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
53. Institute for Reproductive Health (IRH). 2013g. *My Changing Body: Revising and Testing Incorporation of Gender and Sexuality Topics*, Final Study Report. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
54. Institute for Reproductive Health (IRH). 2013h. *The TwoDay Method® Community Study: Adapting tools for successful community-based delivery of the TwoDay Method®, Final Study Report*. Washington, D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
55. Institute for Reproductive Health (IRH). 2013j. *Using network analysis for social change: breaking through the barriers of unmet need for family planning in Mali*, Final Study Report. Washington,

- D.C.: IRH, Georgetown University for the U.S. Agency for International Development (USAID). (forthcoming)
56. Jones RK, Darroch JE, Henshaw SK. Contraceptive use among U.S. women having abortions in 2000–2001. *Perspectives on Sexual and Reproductive Health* 2002; 34: 294
 57. Katz, K., & Nare, C. 2002. Reproductive health knowledge and use of services among young adults in Dakar, Senegal. *Journal of Biosocial Science*, 34(02), 215-231.
 58. Kaye, K., Suellentrop, K., and Sloup, C. 2009. *The Fog Zone: How Misperceptions, Magical Thinking, and Ambivalence Put Young Adults at Risk for Unplanned Pregnancy*. Washington, D.C.: The National Campaign to Prevent Teen and Unplanned Pregnancy.
 59. Killion CM. Poverty and procreation among women: An anthropologic study with implications for health care providers. *J Nurse Midwifery* 1998; 43: 273
 60. Kirk, J., & Sommer, M. 2006. Menstruation and body awareness: linking girls' health with girls' education. Royal Tropical Institute (KIT), Special on Gender and Health, 1-22.
 61. Kouyate, R.A. 2010. LAM and the Transition Barrier Analysis – Sylhet, Bangladesh. USAID/ACCESS Report.
 62. Lamprecht, V. M., & Pyper, C. (99). Fertility awareness and natural family planning. *Opinion. Network*, 17(1), 22.
 63. Lavoie, K. & Lundgren, R. *Improving Family Planning Services for Women and Their Partners: A Couple-Focused Approach, Final Study Report*. Washington, D.C. Office of Population Affairs, United States Department of Health and Human Services.
 64. Leon, F., Lundgren, R., Sinai, I. 2013. The role of women's empowerment and literacy in an intervention to increase met need for contraception in rural India. Submitted to Evaluation Review.
 65. Mahmoud, G. A., & Byomy, S. S. 2013. Fertility awareness and family planning use among post abortion women in Egypt. *Life Science Journal*, 10(1).
 66. Makinwa-Adebusoye, P. 1992. Sexual behavior, reproductive knowledge and contraceptive use among young urban Nigerians. *International Family Planning Perspectives*, 66-70.
 67. Marsiglio, W., Hutchinson, S., & Cohan, M. 2001. Young men's procreative identity: Becoming aware, being aware, and being responsible. *Journal of Marriage and Family*, 63(1), 123-135.
 68. McCleary-Sills, J., McGonagle, A., and Malhotra, A. 2012. *Women's Demand for Reproductive Control: Understanding and Addressing Gender Barriers*. Washington, D.C.: International Center for Research on Women (ICRW).
 69. McPherson, M. E., & Korfine, L. 2004. Menstruation across time: menarche, menstrual attitudes, experiences, and behaviors. *Women's Health Issues*, 14(6), 193-200.
 70. Melkamu, Y., Enquesselassie, F., Ali, A., Gebresilassie, H., & Yusuf, L. 200). Fertility awareness and post-abortion pregnancy intention in Addis Ababa, Ethiopia. *Ethiopian Journal of Health Development*, 17(3), 167-174.
 71. Meng, C. X., Gemzell-Danielsson, K., Stephansson, O., Kang, J. Z., Chen, Q. F., & Cheng, L. N. 2009. Emergency contraceptive use among 5677 women seeking abortion in Shanghai, China. *Human Reproduction*, 24(7), 1612-1618.
 72. Moos M. K., Petersen R., Meadows K, Melvin C.L., Spitz, A. M. Pregnant women's perspectives on intendedness of pregnancy. *Womens Health Issues*. 1997; 7: 385.
 73. Myntti, C., Ballan, A., Dewachi, O., El-Kak, F., & Deeb, M. E. 2002. Challenging the stereotypes: men, withdrawal, and reproductive health in Lebanon. *Contraception*, 65(2), 165-170.
 74. Nettleman, M. D., Chung, H., Brewer, J., Ayoola, A., & Reed, P. L. 2007. Reasons for unprotected intercourse: analysis of the PRAMS survey. *Contraception*, 75(5), 361-366.
 75. National Institute for Health (NIH). 2009. NIH Science of Behavior Change Meeting Summary, 15-16 June 2009.

76. Ortayli, N., Bulut, A., Ozugurlu, M., & Çokar, M. 2005. Why withdrawal? Why not withdrawal? Men's perspectives. *Reproductive Health Matters*, 13(25), 164-173.
77. Parasuraman, S., Kishor, S., Kant, S., and Vaidehi, Y. 2009. Profile of Youth in India. National Family Health Survey (NFHS-3), India. Mumbai: International Institute for Population Sciences; Calverton, Maryland, USA: ICF Macro.
78. Peterson, B. D., Pirritano, M., Tucker, L., and Lampic, C. 2012. Fertility awareness and parenting attitudes among American male and female undergraduate university students. *Human reproduction*, 27(5), 1375-1382.
79. Polis, C. B., & Zabin, L. S. 2012. Missed conceptions or misconceptions: perceived infertility among unmarried young adults in the United States. *Perspectives on Sexual and Reproductive Health*, 44(1), 30-38.
80. Pyper, C. M. M. 1997. Fertility awareness and natural family planning. *European J. of Contraception and Reproductive Healthcare*, 2(2), 131-146.
81. Pyper, C. 1997. Reproductive health awareness: an important dimension to be integrated into existing sexual and reproductive health programs. *Advances in Contraception*, 13(2), 331-338.
82. Quach, S., & Librach, C. 2008. Infertility knowledge and attitudes in urban high school students. *Fertility and sterility*, 90(6), 2099-2106.
83. Roth, B. E. T. H. 1993. Fertility Awareness as a Component of Sexuality Education: Preliminary Research Findings with Adolescents. *Nurse Practitioner*, 18, 40-40.
84. Rosenstock, I., Strecher, V., Becker, M. 1988. Social Learning Theory and Health Belief Model. *Health Education Quarterly*. Vol. 155 (2) 175-183.
85. Sable M, Libbus M, Chiu J. Factors affecting contraceptive use in women seeking pregnancy tests: Missouri, 1997. *Family Planning Perspectives* 2000; 32: 124
86. Scorgie, F., et al. 2009. In search of sexual pleasure and fidelity: vaginal practices in KwaZulu - Natal, South Africa. *Culture, Health & Sexuality*, 11(3), 267-283.
87. Scorgie, F., et al. 2011. Predictors of vaginal practices for sex and hygiene in KwaZulu-Natal, South Africa: findings of a household survey and qualitative inquiry. *Culture, health & sexuality*, 13(04), 381-398.
88. Scott, L., et al. 2010. New study shows sanitary protection for girls in developing countries may provide a route to raising their educational standards. Said Business School, University of Oxford.
89. Sedgh, G., et al. 2007. Women with an unmet need for contraception in developing countries and their reasons for not using a method. Alan Guttmacher Institute.
90. Shaikh, B. T., & Rahim, S. T. 2006. Assessing knowledge, exploring needs: A reproductive health survey of adolescents and young adults in Pakistan. *European J. of Contraception and Reproductive Healthcare*, 11(2), 132-137.
91. Sherman, C. A., Harvey, S. M., & Noell, J. 2005. "Are They Still Having Sex?" STIs and Unintended Pregnancy Among Mid-Life Women. *Journal of Women & Aging*, 17(3), 41-55.
92. Sinai, I., & Arévalo, M. 2006. It's all in the timing: coital frequency and fertility awareness-based methods of family planning. *Journal of biosocial science*, 38(6), 763.
93. Sinai, I. and Jennings, V. 2012. Status of NFP: How Many, Who, Why? *Science, Faith & Human Fertility*
94. Singh, K. K., Bloom, S. S., & Tsui, A. O. 1998. Husbands' reproductive health knowledge, attitudes, and behavior in Uttar Pradesh, India. *Studies in family planning*, 388-399.
95. Singh, S., and Darroch, J. E. 2012. Adding it Up: Costs and Benefits of Contraceptive Services— Estimates for 2012. New York: Guttmacher Institute and United Nations Population Fund (UNFPA).
96. Smit, J., McFadyen, L., Zuma, K., & Preston-Whyte, E. 2002. Vaginal wetness: an underestimated problem experienced by progestogen injectable contraceptive users in South Africa. *Social Science & Medicine*, 55(9), 1511-1522.

97. Sommer, M. 2009. Ideologies of sexuality, menstruation and risk: girls' experiences of puberty and schooling in northern Tanzania. *Culture, health & sexuality*, 11(4), 383-398.
98. Sommer, M. 2010. Where the education system and women's bodies collide: The social and health impact of girls' experiences of menstruation and schooling in Tanzania. *Journal of adolescence*, 33(4), 521-529.
99. Stenger, D. 2007. The Effects of an Education Program on Women's Knowledge and Behavior during Menopause. Thesis submission for Eastern Illinois University.
100. Tolley, E., Loza, S., Kafafi, L., & Cummings, S. 2005. The Impact of Menstrual Side Effects on Contraceptive Discontinuation: Findings from a Longitudinal Study In Cairo, Egypt. *International Family Planning Perspectives*, 31(1)
101. Uddin, M. J., & Choudhury, A. M. 2008. Reproductive health awareness among adolescent girls in rural Bangladesh. *Asia-Pacific Journal of Public Health*, 20(2), 117-128.
102. Vernon, R. 2009. Meeting the family planning needs of postpartum women. *Studies in Family Planning*, 40(3), 235-245.
103. Vigil, P., Ceric, F., Cortés, M. E., & Klaus, H. 200). Usefulness of monitoring fertility from menarche. *Journal of Pediatric and Adolescent Gynecology*, 19(3), 173-179.
104. Vigil, P., Riquelme, R., Rivadeneira, R., & Aranda, W. TeenSTAR: An option of maturity and freedom. Integrated sexuality education program for adolescents. *Revista Médica de Chile* 2005: 133:1173-1182.
105. Wallerstein, N. 2006. What is the evidence of effectiveness of empowerment to improve health? World Health Organization.
106. Wilcox, A. J., Baird, D. D., Dunson, D. B., McConaughey, D. R., Kesner, J. S., & Weinberg, C. R. 2004. On the frequency of intercourse around ovulation: evidence for biological influences. *Human Reproduction*, 19(7), 1539-1543.
107. Witt, J., McEvers, K., & Kelly, P. J. 2013. Knowledge and Experiences of Low-Income Patients With Natural Family Planning. *The Journal for Nurse Practitioners*, 9(2), 99-104.
108. Witte, K. 1997. Preventing teen pregnancy through persuasive communications: realities, myths, and the hard-fact truths. *Journal of Community Health*, 22(2), 137-154.
109. Woodsong C., Shedlin M., Koo H.P. The natural body, God and contraceptive use in the southeastern United States. *Culture Health Sexuality* 2004; 6: 61.
110. Von Sadovszky, V., Kovar, C. K., Brown, C., & Ambruster, M. 2006. The need for sexual health information: perceptions and desires of young adults. *MCN: The American Journal of Maternal/Child Nursing*, 31(6), 373.
111. Zinaman, M., Johnson, S., Ellis, J., & Ledger, W. 2012. Accuracy of perception of ovulation day in women trying to conceive. *Current Medical Research & Opinion*, 28(5), 749-754.