OUR BODIES, OURSELVES, REVISTED?
A QUALITATIVE STUDY ON THE PHYSIOLOGY OF FERTILITY AMONG HIGHLY EDUCATED WOMEN IN THE TRIANGLE REGION OF NORTH CAROLINA

By

Nancy H. DeMaria

A paper presented to the faculty of The University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Public Health in the Department of Maternal and Child Health.

Chapel Hill, N.C.

July 15, 2014

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PREFACE

Acknowledgements

First and foremost, the author would like to thank the women who shared their stories for this project. The author would also thank Sherri L. Green, PhD, LCSW, for encouragement and detailed feedback, both as the author’s advisor and as course instructor for MHCH 780, Qualitative Methods in Maternal and Child Health. Paul Mihas, MA of the UNC-Chapel Hill Odum Institute provided invaluable direction in the earliest phases of this project, drastically improving the overall design. Additionally, the author would like to thank Erica Farley, BSN, for research assistance, and John M. Thorp, MD, and Joseph B. Stanford, MD, MSPH, for ongoing support and mentorship in preparing this manuscript for publication.

Disclosure

This project was conducted independently by the author and was not part of any grant, fellowship, or other support. The author has no potential, perceived, or real conflict of interest of any kind.
ABSTRACT

Objectives

This study explores knowledge about the physiology of fertility and attitudes towards fertility awareness based methods (FABM) of family planning among 21-35 year old women with a completed or partially completed graduate level education living in the Triangle region of North Carolina.

Methods

An eligible participant for this analysis includes any 21-35 year old women in the Triangle region of North Carolina who has completed or partially competed graduate education. Participants were selected by purposive, criterion, chain sampling. One-on-one pilot interviews (n = 2) and 5 focus groups of 4 participants each (n = 20) were conducted in April-June 2014 using a semi-structured guide developed by the author.

Results

1. Five major themes emerged from inductive study of the pilot interviews using ATLAS.ti: Uncertainty and Lack of Knowledge, Conflation of Terms, Relation to Artificial Methods, Receptivity and Conditionality.

2. Five major themes emerged from inductive study of the focus groups using ATLAS.ti: Uncertainty and Lack of Knowledge, Unawareness of Personal Fertility, Regret, Receptivity and Conditionality.

These findings will help inform an online, generalizable, quantitative survey in the third phase of this study and inform clinical practice in Chapel Hill.
Conclusions

There is a need and desire for provision of evidence-based reproductive health education and services in the area of the physiology of fertility and FABM among the study population. Further studies could illuminate ways to reach this population through programs and policy in order to increase knowledge and make FABM more attractive, and a better understood option.

**Key words:** Fertility; Fertility awareness; Fertile window; Natural family planning; Fertility awareness based methods of family planning; Cervical mucus; Family planning; Reproductive health; Subfertility
INTRODUCTION

Purpose

The purpose of this study is to use pilot interviews and focus groups to qualitatively assess the knowledge about the physiology of fertility and attitudes towards fertility awareness based methods of family planning among 21-35 year olds in the Triangle region of NC who have completed or partially completed graduate education. It is part of a larger, ongoing project described in Figure 1 below:

Figure 1. Overarching study design

The results of pilot interviews informed the development of a focus group guide, and then the findings from focus groups described in this study will inform the development of a generalizable quantitative survey. The results of this future survey will provide information not currently found in the literature.

This work is supported by phenomenological theory. Phenomenology, with an emphasis on clinical translation, seems to best fit this research. This theory asks the following question: what is the meaning, structure, and essence of the lived experience of this phenomenon for this person or group of people? The phenomenological approach is differentated by the assumption that there is an essence or essences to shared experience. This study will examine the essence or essences of being an educated, (presumably) fertile young woman in this Triangle community. This study will explore what this group of women knows about the physiology of fertility (and how they know) and how they feel about fertility awareness. Although the 5 focus groups in this study are not sufficient to provide the depth and breadth of fieldwork to truly understand the
issues and problems discussed, this study would be the first of many with the aim of understanding the emerging thoughts and attitudes of this population towards fertility awareness. In other words, this study would be the first in a longer iterative process spanning many studies.

This age range was chosen for the following reasons: the earliest that graduate education usually begins in the United States is at around age 21, and the higher age parameter of 35 years old excludes women of advanced maternal age. Although the age of 35 is neither a strict cut-off point in time nor the only factor associated with infertility, women of advanced maternal age are considered to be at higher risk for poor maternal and neonatal outcomes. Therefore, presumably the age range of 21 – 35 years old is the widest subset of women who are both fertile and highly educated in the United States. Prevalence of contraceptive use and number of contraceptive methods ever used is high among women of this age group. Highly educated women were chosen because it is assumed that of all women in the United States, highly educated women would have had the most exposure to education about and access to various family planning methods. This seems reasonable since highly educated women succeed at delaying childbirth and suppressing fertility.

Contraceptive Use in the United States

There is a high prevalence of contraceptive use among women of reproductive age in the United States. According to the most recent National Survey of Family Growth (2006-2010), 99.1% of women ages 15-44 have ever used any method of contraception in their lifetime, including condoms (93.4%), oral contraceptives (81.9%), withdrawal (59.6%), injectables (23.2%), emergency contraception (10.8%), the “calendar rhythm method” (18.1%), sterilization (male, 13.3%; female, 19.5%), and patches (10.4%). There is also a high prevalence of sexual activity among certain subsets of this population: 86.2% and 89.0% of women ages 20-24 years
have ever had sexual intercourse and have ever used contraception, respectively; 97.8% and 97.7% of women ages 25-44 have ever had sexual intercourse and have ever used contraception, respectively.6

Many women in the United States try a variety of contraceptive methods. Almost all women of reproductive age (99%) from 2006-2010 had ever had sexual intercourse use at least one contraceptive method at some point in their lifetimes.7 Sexually experienced women ages 20-24, 25-29, and 30-24 ever used a median of 2.8, 3.1, and 3.2 methods, respectively.7 Nearly 30% of all women of reproductive age have used 5 or more methods.7

There is not an overwhelming sense of satisfaction of use with many of the modern methods of contraception. Of the 45 million women who have ever used the pill, 30% discontinued use because of dissatisfaction.7 Nearly one-half of the 12.5 million women who had used Depo-Provera (46%) and the 5.6 million women who had used the contraceptive patch (49%) discontinued use due to dissatisfaction.7 Of the women who had ever used and discontinued using Depo-Provera, 74% cited side effects as the primary reason and that women did not like the changes to their menstrual cycles (31%) was the second most cited reason.7 Side effects were also the most commonly cited reason why women discontinued use of the other two hormonal methods (63% among those who discontinued using the pill and 45% among those who discontinued using the contraceptive patch).7

There are serious risks associated with hormonal contraception. A meta-analysis in 2013 found threefold-increased odds of venous thromboembolism among current compared with noncurrent oral contraceptive pill users (14 studies; OR 2.97, 95% confidence interval 2.46-3.59) and twofold increased odds of ischemic stroke (seven studies; OR 1.90, 95% CI 1.24-2.91).8 It is unknown whether women discontinued use of oral contraceptives due to fears of acute
thromboembolic events such as these.

**Fertility and Educational Attainment**

Fertility levels are known to vary across population subgroups such as race and ethnicity and educational attainment. Women with lower educational attainment have earlier and higher total fertility than those with more education. A significant proportion of this difference can be explained by higher levels of unintended births among women with less education. In addition, women with less education are less likely than others to use contraception. Therefore, the study focuses on a highly educated subset of women who typically do successfully use contraception to suppress fertility and do delay childbearing.

**Knowledge about Fertility**

Although more research is needed in this area, it seems women of reproductive age in the United States generally know very little about the physiology of their fertility. In an online survey in 2013 of 1000 women ages 18-40 in the United States, 40% percent of women across all age groups expressed concerns about their ability to conceive yet one-third of women were unaware of adverse implications of sexually transmitted infections, obesity, or irregular menses for procreative success, and one-fifth were unaware of the effects of aging. Approximately 40% were unfamiliar with the ovulatory cycle. There is stratification across age groups in some areas of knowledge: younger women demonstrated less knowledge regarding conception, fertility, and ovulation, whereas older women tended to believe in common myths and misconceptions. It is not known if similar trends in knowledge would be observed in the Triangle region of North Carolina among the study population.

**Fertility Awareness Based Methods of Family Planning**

Natural Family Planning (NFP) and Fertility Awareness Based Methods of Family Planning
(FABM) of family planning are general terms that apply to various methods that have been
developed to help women and men determine the fertile and infertile times of a woman’s
menstrual cycle. These methods can be used to achieve or avoid pregnancy. All of the methods
rely on the interpretation of biological signs or indicators of fertility. Implicit in these methods
are that couples abstain from intercourse during the fertile time of the woman’s cycle if they are
avoiding pregnancy.

There are two main types of FABM of family planning: 1) The Ovulation Method
(observing and recording the patterns and changes of cervical fluids) and 2) The Symptothermal
Method (combining daily waking temperature, changes in cervical fluid, cycle length and other
minor signs of fertility).

The Calendar (or Rhythm) Method is often conflated with these two FABM of family
planning, and sometimes leads to confusion over the meaning of the term “Natural Family
Planning”. The Calendar (or Rhythm) Method relies on counting cycle length and a simple
formula to determine the beginning and end of fertility. It does not rely on any biomarkers of
fertility other than the start of menses. It is a form of NFP, but not considered true fertility
awareness based method of family planning because it does not rely on biological fertility
markers like cervical mucus or basal body temperature.

Numerous studies have confirmed the accuracy in using biomarkers to determine the
fertile window. Standardized vulvar observations of vaginal mucus discharge identify the days
with the greatest likelihood of conception from intercourse in normal fertility and subfertility and
provide an indicator of the overall potential for conception in a given menstrual cycle in normal
fertility. 10 Focusing intercourse on high or peak fertile days during the estimated fertile window
enhances the probability of achieving a desired pregnancy. 11 However, as one would expect, high
motivation to avoid pregnancy by both the female user of a behavioral method of family planning and her male partner is required for high efficacy.\textsuperscript{12}

It is important to note that studies on FABM of family planning often have a high drop-out rate (as do many studies on all forms of contraception) and are also biased by the population who self-selected into this method of family planning.\textsuperscript{13} Perhaps future studies can begin to illuminate what may be different about women who choose to use these methods versus those who would choose a hormonal method.

**Relevance in the Triangle of North Carolina**

There is potential for fertility awareness based methods of family planning to attract a younger, technologically savvy population of women who desire to suppress fertility and delay childbearing. It has already been shown that fertility awareness-based online charting systems are effective in helping women to determine their fertile window and target intercourse accordingly to achieve or avoid pregnancy.\textsuperscript{11} New phone and computer applications such as Kindara and Glow boast helping thousands of women achieve or avoid pregnancy. There is also some evidence that once a new family planning method is introduced into a society, then consumers welcome a new method they had not wanted until it became realistically available, much like consumers welcome other new products and services.\textsuperscript{14}

There is a strong desire among many in the UNC research community to better understand fertility and fecundability in order to better serve the reproductive and sexual health needs of women and couples. Anne Steiner, MD (UNC Obstetrics and Gynecology Department, Chapel Hill, NC) has published numerous studies on factors leading to conception and currently leads the large Time to Conceive study at UNC.\textsuperscript{15, 16} Allen Wilcox, MD, PhD (National Institute of Environmental Health Sciences, Morrisville, NC) is a pioneer in assessing time to
pregnancy. This study will begin to provide an underlying story in women’s’ own words to the epidemiological findings by Wilcox, Steiner, and others at UNC.

Exploring the knowledge, feelings, and attitudes towards fertility and fertility awareness based methods of contraception will help researchers and physicians understand how to better serve this population of women in this area of North Carolina who are presumably fertile and sexually active, but may not have been exposed to fertility awareness as a method of family planning.

METHODS

Data Collection

An eligible participant for this analysis included any 21-35 year old women in the Triangle region of North Carolina who has completed or partially completed graduate education. A purposeful, criterion sample of women (n = 2 for pilot interviews, n = 20 for focus groups) was identified through chain sampling.

The author first conducted and audiotaped a one-on-one 1-hour interviews in April 2014 with each pilot interviewee using a different semi-structured focus group guide with each. Conducting the interviews with two different focus group guides provided a form of triangulation, since one guide asks about knowledge and attitudes without providing any education, and the other guide provides substantial education while also asking about knowledge and attitudes. It is important to note that these two guides did not differ in any way other than presence or lack thereof of an educational component. The author transcribed the audio and then destroyed the audiotaped and any identifying information. The author read and re-read transcripts, and then generated an initial set of themes that were revised as coding progressed.
with expert input from Dr. John Thorp using ATLAS.ti. The author recorded questions and observations throughout in memos throughout this inductive and iterative process.

The author then conducted 5 in-depth, semi-structured focus groups of 4 participants each in May-June 2014. Each focus group lasted 2 hours and took place in a private conference room in the University of North Carolina Gillings School of Global Public Health building. The author then conducted the same process as previously of transcribing the audiotapes, destroying identifying information, and generating codes and themes. Study rigor throughout the entire process was achieved through memoing, expert debriefing, and thick description of data.

During both the interviews and focus groups, study participants were invited to reflect upon the concept of their own fertility, fertility awareness, and asked for their thoughts on a proposed clinic centered on fertility awareness based methods of family planning. Concepts explored included fertility, fertility awareness, natural family planning, fertility awareness based methods of family planning, family planning, reproductive health, and subfertility. All participants received a $20 Starbuck’s gift card and refreshments during the focus group for their participation.

**Ethical Considerations**

The study was approved by and conducted in accordance with Institutional Review Board of the University of North Carolina at Chapel Hill. All participants provided informed consent. Personal identifiers were removed from interview transcripts to protect confidentiality.
RESULTS

Sample Characteristics

Basic sample characteristics of the participants, including confirmation of inclusion criteria and additional information of self-identified religion, self-identified race, marital status, and fields of study are located in Tables 3 and 4, Appendix B.

The interview participants were 25 and 28 years old, with in progress Master’s degrees, living in Chapel Hill and Carrboro. One was married, the other was cohabitating, one self-identified as Christian (Protestant), the other as unaffiliated, and both self-identified as white.

In the focus groups the median age of participants was 27. Most identified as white, non-hispanic (65%), but other races of white (hispanic), black, asian, and multi or biracial were also represented. Half of participants identified as Christian (50%), but a number of other religious beliefs were also represented including Jewish, Agnostic, Buddhist, and unaffiliated. Half of focus group participants were currently enrolled in a graduate program, and one-quarter of participants already completed a graduate degree at the time of the study. The remaining quarter had previously completed a graduate degree prior to the study, but were currently enrolled in their second graduate program. Most participants (70%) obtained or are obtaining one graduate degree only: a Master’s only (45%), a Doctor of Philosophy only (20%), or a Doctor of Physical Therapy only (5%). The remainder of participants (30%) obtained or are obtaining two graduate degrees (including the combinations of Master’s/JD, Master’s/PhD, Master’s/MD, and PhD/MD). Fields of study represented included maternal and child health, medicine, molecular biology, translation, musicology, law, nutrition, health administration, genetics and genomics, molecular genetics, microbiology, social and behavioral health, social work, nursing, and physical therapy. Focus group participants were living in the following areas of the Triangle
region at the time of study: Durham (60%), Chapel Hill (25%), and Carrboro (15%). Half of participants were single at the time of study (making no distinction between those currently in relationships or those not). Of the others, 3 were cohabitating, 2 were engaged, and 5 were married.

Findings

Inductive analysis identified major codes revealing overarching themes about the two primary aims of the study. Some of the same codes arose inductively in both the interviews and the focus groups. Pilot Interview (PI) themes are summarized in Table 1 below:

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<th>Pilot Interview (PI) Themes</th>
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<td>Knowledge</td>
<td>1. Uncertainty and Lack of Knowledge</td>
<td>Inaccurate and/or unconfident responses</td>
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<td>2a. Conflation of Terms</td>
<td>General conflation of terms related to both the physiology of fertility and FABM</td>
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<td></td>
<td>3a. Relation to Artificial Methods</td>
<td>A tendency to define fertility inasmuch as its concepts relate to what they already know about artificial methods, without any prompting to do so</td>
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<td>Attitudes</td>
<td>1. Receptivity</td>
<td>Expression of interest in learning more about FABM</td>
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<td>2. Conditionality</td>
<td>Interest in FABM tempered by certain contingencies</td>
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Table 1. Five major pilot interview (PI) themes organized by study aim addressed

In the focus groups, Conflation of Terms and Relation to Artificial Methods, although important, did not arise as major themes. In their place, Unawareness of Personal Fertility and Regret were more prevalent and influential. See Table 2 below:
Table 2. *Five major focus group (FG) themes organized by study aim addressed*

Uncertainty and Lack of Knowledge, Receptivity, and Conditionality remained as major themes in both the interviews and the focus groups.

**Aim 1: Knowledge of Physiology**

1. **Uncertainty and Lack of Knowledge**

   Inaccurate, unconfident responses generally characterized participants’ responses to the following discussion topics: define ovulation, describe when ovulation happens during the menstrual cycle, attribute variability in the luteal or follicular phases of the menstrual cycle, explain hormonal involvement in the menstrual cycle, describe cervical mucus, describe temperature change post-ovulation, and describe the fertile window, among other areas. Their responses were not always entirely incorrect by any means, but many inaccuracies and half-truths abounded. Even when the participants’ responses were correct, they usually expressed uncertainty and hesitancy. For example, regarding ovulation, one of the more accurate responses was still presented with a degree of uncertainty:
So, I think there's like the luteal phase and the follicular phase? After ovulation that phase for everyone intends to be the same number of days? But when you get your period up until when you ovulate again that period is a little bit different. It's variable depending on whether you had like a lot of stress during that period. But the phase after ovulation tends to be like the same number of days, I think.

[FG, Age 28]

Partially correct responses were also expressed with uncertainty in the pilot interviews. For example, regarding ovulation:

It’s that part of your cycle when, well, I just think of when your eggs are like - well I guess I really don’t know scientifically. I just have this image in my head of what’s going on. But then I also think of ovulation as what’s kind of happening when you’re having your period and you release however many [eggs]. I don’t think it’s the same amount [of eggs] each month.

[PI, Age 25]

Ovulation does not happen during a healthy woman’s period, and the release of two or more eggs during one cycle (which would produce multiples if fertilized) is a relatively rare event.

Participants in both interviews and focus groups thought that there could be a certain amount of variability in the length of a menstrual cycle and the day of ovulation, but weren’t confident on how much variability would be normal, or if this is connected to the overall health of the woman:

I heard like 60 days could also be normal. If it’s regular it’s okay.

[FG, Age 28]
One of the areas where uncertainty was most apparent was in conversations regarding when during a cycle a woman is more likely to get pregnant. When asked if a woman is more fertile during a certain part of the menstrual cycle, participants in one session had the following exchange:

[FG, Age 24]: I would think you’re most fertile when you’re ovulating than when you’re not.

[FG, Age 23]: Is that true? I don’t know, I mean I think…I was always told you can always get pregnant any point, as long as you have eggs in your body!

[FG, Age 24]: I don’t know, that’s just what I’ve always thought!

One of the interviewees, said the following about the fertile window, expressing a similarly unconfident, inaccurate response:

[The fertile window is] at least a few hours after she starts to ovulate. At least a few hours after the egg is released from the ovary. You can get pregnant while on your cycle. It just really depends. It’s not an on/off sort of thing, but you can get pregnant anytime. But I’m sure there are studies and biological proof that there might be a certain end time? Maybe? I’m not sure.

[PI, Age 28]

She contradicts herself and expresses uncertainty. There is definitely “biological proof” of a fertile window. The encouraging thing about all these responses, however, is that it would not be difficult to educate them both on what ovulation is or when the fertile window occurs – or even how to identify both of these phenomena in their own bodies.

2a. Conflation of Terms – PI’s only

Both interviewees tended to conflate terms related to both the physiology of fertility and
FABM. For example, “[The menstrual cycle] is literally the shedding of your uterus lining every month” [FG, 28] She is stating that “cycle” is synonymous with the period of time also known as a “period” or “menses”, whereas other women might refer to a “cycle” as the entire menstrual cycle, including menses, ovulation, and the post-ovulatory phase. It is not known if other women in the study population would refer to menses with similar terminology, although anecdotally, that is not an uncommon tendency. It was important to define these terms for the focus groups at the outset of the conversation to avoid further conflation of these terms. Although it did not hinder progress of our interview because I could quickly clarify with the participant, in a group setting it may be confusing.

A major concern of proponents of FABM of family planning is that women often conflate the Rhythm Method and Natural Family Planning. Responses from both interviewees confirmed this concern:

I was kind of thinking of all this as the Rhythm Method. I was thinking the Rhythm Method is a type of Natural Family Planning. But, for example, if someone uses cycle beads, I would consider that the Rhythm Method. You know what I mean? But I would consider cycle beads to be a part of Natural Family Planning.

[PI, Age 25]

Similarly, when asked how the Calendar Method, Rhythm Method, and Natural Family Planning may relate to another, the other interviewee stated:

I don’t really know what the Calendar Method is, but I would say that Rhythm Method and Natural Family Planning are the same.

[PI, Age 28]

Admittedly, the names of different methods can be confusing and misleading. Perhaps there is a
need for a new term that describes a method using true biomarkers of fertility (cervical mucus, temperature, and other observable signs), rather than counting days on a calendar or a string of beads. This new term should be straightforward and self-explanatory, and discovering it should be part of future research.

Although focus group participants were asked these same questions, the author did not spend as much time asking follow up questions and exploring their responses as deeply as during the interviews, which likely contributed to Conflation of Terms not arising as a major theme during the focus groups.

2b. Unawareness of Personal Fertility – FGs only

Most of the participants had very little awareness or concrete evidence of their own personal fertile window: “I honestly would have no idea,” [FG, Age 29] or “I don’t know. I never ever think about it. This makes me realize maybe I should,” [FG, Age 23] or “I don’t really pay attention on days when I don’t have my period…so I only notice my actual period.” [FG, Age 24]. When asked to discuss the association between cervical mucus and the physiology of fertility, one participant said:

I am completely perplexed by all female secretions. I know nothing about that and just hope that mine are normal.

[FG, Age 23]

Some participants who did not outright say they do not know when, if at all, they are more fertile during the menstrual cycle offered ambiguous symptoms as proof instead.

I don’t think I know either, but it’s more about how I feel. Especially after my period, that’s when I feel I’m fertile. I feel calm. And I feel good about myself.

[FG, Age 24]
[During a certain part of the cycle] my breasts hurt which means I’m probably not fertile.

[FG, Age 25]

Seven of the participants disclosed that they are currently attempting to track their cycles using apps on their phones (Period Tracker and Kindara were mentioned) or by self-taught reading of fertility signs according to Taking Charge of Your Fertility, by Toni Weschler, MPH, with varying degrees of success. Those using the Period Tracker app stated that they know exactly the day they ovulate, based on the number of days after their period. However, this sort of calendar method would give a window of fertility based on a normal cycle, but could not possibly provide the exact day of ovulation without physiological biomarkers.

The five participants who were familiar with recognizing fertile cervical mucus had the most in-depth knowledge about their personal fertile window. One participant accurately described the association between egg-whitey mucus and ovulation:

I can also tell when I’m ovulating because my face breaks out and I have egg-whitey mucus.

[FG, Age 28]

However, she did not express the knowledge of how to know when ovulation occurs over the period of time when one is observing this type of mucus. In other words, a healthy woman should see several days of this type of mucus, but on which day is she ovulating? Another participant did recognize that the observation of this type of mucus is the beginning of a more fertile window, not necessarily the day of ovulation:

I just look for egg-whitey mucus, and oh! I must be starting my window! I don’t count on it. I’m not trying to get pregnant and I’m not counting on it to not get pregnant. I just kind of look at it for personal information and wanting to get to know my body better.
The author spent more time exploring this concept of personal fertility awareness with the focus group participants because of the off-line conversations with interviewees post-interview. There was not enough time to probe this issue fully during the interviews, but interviewees volunteered information afterwards, informally. Their feedback on personal awareness, therefore, did arise as an official theme of the pilot interviews, but helped the author to realize that it would be worthwhile to explore this area further in the focus groups.

3a. Relation to Artificial Methods – PIs only

Interviewees tended to describe fertility inasmuch as its concepts relate to artificial methods of contraception, and did so without prompting. Regarding whether hormones are involved in the menstrual cycle:

I know that’s how a lot of birth control methods work, like estrogen or progestin combinations, for example. Those hormones are what can trick your body into thinking you’re pregnant for a while.

[PI, Age 28]

When asked to describe the menstrual cycle (and there was not yet any discussion of or mention of any contraceptive methods) the other interviewee stated:

I could get much more specific about different birth controls and what happens to the lining [of the uterus]. Some birth controls that are hormone-regulated absorb the lining so that women actually don’t have a period every month.

[PI, Age 25]

There was definitely an unprompted association between basic physiology and the function of artificial contraceptive methods showing the blurred lines between the concepts of
sexual/reproductive health and the basics of normal physiology. Conversely, focus group participants did not express this unprompted association.

3b. Regret – FGs only

Without prompting, individuals in all 5 focus groups expressed regret regarding the quality of reproductive health education they received in school and from healthcare providers. There were no questions in the focus group guide about how participants learned information about the physiology of fertility or about how they feel about any lack of knowledge. A common sentiment was echoed across several focus groups:

They would just say, ‘Once you get your period, you can get pregnant.’

[FG, Age 28]

My recollection of sex. ed. was very like anti [sic]. like this is how you prevent STIs, this is how you prevent pregnancy… and it’s like, talk about this beautiful, complicated process! It’s seen as like a pain in the neck. It’s just like very negative. And I mean, I get that, but sometimes it seems like they’re just trying to scare you. A lot. Scare you into not having sex and then being totally freaked out.

[PI, Age 30]

Again, I just wish [the physiology of fertility] was just more integrated into health and health awareness.

[PI, Age 25]

Conversely, interviewees did not express this unprompted association.
**Aim 2: Attitudes towards Fertility Awareness Based Methods (FABM) of Family Planning**

1. Receptivity

   All 20 focus group participants and the 2 interviewees expressed an interest in learning more about FABM by expressing this sentiment during the study or requesting additional information. Participants listed many reasons indicating their receptivity such as increasing knowledge about their own body, creating feelings of empowerment around one’s own fertility, and increasing communication with one’s partner. When asked what they envision such services looking like, participants indicated that classes or one-on-one sessions facilitated by knowledgeable medial professionals and researchers would be essential. Participants also expressed support for services supporting FABM in the Triangle:

   I’m interested! I don’t need any convincing to access these services if they were available!

   *[PI, Age 28]*

   I think it would be a good idea because there are a lot of people who maybe want to use it but don’t have [sic] there’s not a resource or a person who [sic] a medical professional or people who were very knowledgeable about fertility and hormone cycles. A lot of doctors just don’t get it so you can’t go to your gynecologist and be like, ‘I want to learn about Natural Family Planning. Tell me how.’ They may or may not be comfortable with that.

   *[FG, Age 30]*

An interviewee indicated accessing such services would be a new experience for her, stating:

I don’t think I’ve ever had a women’s health appointment where anyone has talked to me about fertility - you know what I mean? It’s mostly like, “Oh, so you want to use that for birth control? Great. Have a good day!”
This receptivity was further illustrated by participants’ reaction when other focus group members’ with experience charting described this experience to the group. Participants who had any sort of familiarity with charting anything at all about their cycles – from simple things like keeping track by counting days or recording feelings throughout the cycle, to more specific signs like observing physiological biomarkers – were often immediately regarded in awe by their fellow focus group members. For example, one participant kept track of her cycle for a few months several years ago and said the following regarding the timing of her fertile window:

I don’t know. I once thought that [it was] probably correlated to my sexual desire, but I found there’s no real correlation. So, I know, I mean, I don’t really know when I can get fertile [sic], but if I calculate and kind of make records I found it’s [sic] no correlation with my sexual desire and my period and my cycle.

When probed further, this individual was not tracking any physiological biomarkers, but simply counting the days of the cycle. But even with this very limited (and in the end, unsuccessful per the participant) attempt at charting, the other focus group participants responded with interest (“You did that?” and “Wow!”). Even very little insight into one’s cycle, even when such an endeavor reveals no new information, seemed to be fascinating to those with no such experience.

There was also a general sense of respect for other women and their contraceptive choices in both the interviews and focus groups, as illustrated nicely by one interviewee:

I wasn’t aware of this, but I’m sure there are other women who know a lot more about it - especially around the world. I feel like the people who know a lot about the Rhythm Method – or at least the friends I know that have used it and were able to control when
they got pregnant - it seemed like they really knew what they were doing. It makes me feel like they know something that I don’t.

[PI, Age 25]

2. Conditionality

Participants’ receptivity towards FABM was not without certain conditions and concerns. For example, participants stated that if practicing FABM was expensive, time-consuming, or inconvenient, their interest would wane. For example, the act of having to check one’s temperature was often mentioned as particularly cumbersome:

For me personally, I’m not interested in checking my temperature every morning…I mean, it’d be interesting for like a month or so but I’m really not interested.

[FG, Age 28]

An interviewee explained that these services would need to be part of a regular health visit in order to be more convenient:

I really don’t like hormonal things in general. I think if I could access a service that would really educate me on how to use that kind of method I’d be open to it. I guess logistically I would be more prone to access them if they were a part of like a health visit that I had already scheduled … If I went in for a women’s health appointment and someone told me about it or was really excited about it or incorporated it into a part of an appointment, it would probably get my interest.

[PI, Age 25]

Participants felt that services that support FABM should be scientifically and medically backed, and free from any political or religious bias. Even though she was quite enthusiastic about learning more about FABM, one participant said:
I think if [the services] were religiously driven or politically driven or pro-life, I would not be interested at all. And again, I would want to go there and see that it’s acceptance and neutrality and education based, not so much political gain based.

[PI, Age 28]

Another participant emphasized the need for evidence-based credibility:

I’d be really interested if they offered some kind of class, and also if there was the opportunity to individually sit with someone. Like say you’ve been charting for a couple months [sic] being able to bring in your chart and have someone kind of like one-on-one, or also having your partner being able to sit down with that person, hearing the science behind it and someone knowledgeable [sic], like having a PhD behind it to give it more credibility.

[FG, Age 28]

Being able to be truly confident about one’s observations would also be a condition to be able to practice this method:

I guess I would question myself. Like, are you sure this is the consistency of the mucus you saw or felt? Or are you certain that’s not the temperature from yesterday? Or, you know? So, I just feel like the user error for that is probably really high. Just talking about myself as the user, not anybody else. That would be really the barrier for me to kind of really believe in it.

[FG, Age 28]

There were also variations in receptivity conditional upon the underlying reason for use. Overall there was more receptivity towards personal use of FABM for achieving pregnancy and
to simply become more aware of one’s body, than there was interest in use for avoiding pregnancy:

I would also be interested just to get the baseline knowledge. Like the facts we missed in sex. ed. For me, those services would serve both purposes – education plus trying to become pregnant.

[FG, Age 31]

And finally, some participants felt that although interesting and beneficial, these services may be more of a privilege, contingent upon the cooperation of one’s partner, than a universal possibility for all women:

I guess I was just thinking that this is really great, but it wouldn’t really work if somebody’s partner wasn’t respectful of when they did or did not want to have sex. So, I don’t know, it almost seems like a privilege. It would seem like a privilege to use this method.

[PI, Age 25]

**DISCUSSION**

This is the first study that has explored knowledge about the physiology of fertility and attitudes towards fertility awareness based methods of family planning among the very specific demographic of 21-35 year old women with a completed or partially completed graduate level education in the Triangle region of North Carolina. It is the first of many studies to be conducted by the author with the aim of understanding the emerging thoughts and attitudes of this specific population towards fertility awareness. This project served the very valuable purpose of informing the development of a quantitative survey for the next phase of this project. The
qualitative data obtained, in addition to findings from memos, will substantially improve the
direction of the larger study and inform clinical services in a practice in Chapel Hill.

Memoing throughout this process was an incredible useful experience. The most
important information revealed through memoing (and also reflected in participant feedback)
was that the education provided in the second focus group guide during the pilot interviews was
too much and too broad. There was not enough time to go deep into discussion about knowledge
and attitudes while also trying to provide education – but both pilot interviewees had a strong
interest in learning more. Because assessing knowledge and attitudes were the primary aims of
this study, not education of the participants, education was removed in revisions of the focus
group guides. In fact, the second guide was eliminated entirely and the questions condensed so
that only one, concise guide was used for the focus groups (Appendix A). However, education
will not be forgone entirely – instead, the author invited all focus group and pilot interview
participants to a webinar she would host later in the summer. To do the education well, it must
be done separately from this research. All participants expressed interest in learning more and
attending this webinar, and provided their email addresses to be contacted when it is scheduled.

It is important to note that the findings of this study must be understood within the study
context. The small sample size is a limitation. This study is not generalizable, nor was it
intended to be. However, findings would certainly be strengthened with the analysis of
additional focus groups and interviews. Time and resources are limited, however, and these
findings still provided a wealth of information to inform the larger study moving forward.

The presence of selection bias is actually more concerning than the small sample size.
Sixteen of the 22 total participants shared that they previously discontinued hormonal
contraceptives for reasons ranging from relatively less serious side effects such as acne, to more
disturbing symptoms such as constant nausea, severe depression, and even pelvic floor muscle pain resulting in several months of pelvic physical therapy. As one participant pointed out:

> There are so many people with, you know, comorbidities that can’t use birth control pills or can’t get an IUD. Or people with latex allergies. There’s a certain population of people who just can’t use birth control.

[FG, Age 30]

Although it is known that there is not an overwhelming sense of satisfaction of use with many of the modern methods of contraception in the US (as described in the introduction), it is possible that this sample of women is substantially different than the rest of the population of women ages 21-35, living in the Triangle region, and with a completed or in progress graduate education in 1) the severity of side effects experienced with hormonal contraception, 2) their interest in natural methods, or 3) other unknown ways. Did interested participants self-select into this study because of difficulty with hormonal contraceptives, hoping to learn more about natural methods? (Or alternatively, perhaps this study actually underrepresents, rather than over represents the number of women who have discontinued hormonal methods in the Triangle region. There is no data on this very specific population either way.) Were these participants already biased toward an interest in natural methods because of previous experience? Are women with an interest in natural methods more likely to talk to each other about women’s health and recruit each other to the study (recruitment was done through chain sampling)? Additionally, the theme of uncertainty and lack of knowledge may be an artifact of the women’s’ highly educated status. Are they too used to being confident in what they know? It would be worthwhile to know if this, and indeed if all other themes throughout the study, hold true in the general population.

There is not enough literature yet to answer these questions.
It is interesting to note that the format of a focus group, rather than an interview, survey, or other qualitative method of inquiry, created group dynamics that provided another layer of rich data to the study. It was interesting to observe how women talk to one another about these topics, and the results vindicated choosing this format. Women’s interactions had a variety of effects, such as propagating myths, clarifying knowledge, challenging beliefs, and creating bonds. It is possible that the uncertainty expressed by participants regarding their knowledge of the physiology of fertility was exacerbated by this format, since perhaps participants did not want to seem like they knew more than everyone else. More than anything though, the group dynamics hopefully recreated what it is like when women speak to one another about their reproductive health in real life. A more in-depth study of these interactions will be of particular use to the co-author, Dr. Thorp, as he begins advertising for his new clinic in cooperative reproductive health.

Overall, there is a definite need and desire for provision of evidence-based reproductive health education and services in the area of the physiology of fertility and FABM among the study population. Participants’ responses were characterized by a lack of knowledge, conflation of terms, unawareness of personal fertility, unprompted association to artificial methods, regret regarding education received, and receptivity towards FABM tempered by certain conditions. Further studies could illuminate ways to reach this population through programs and policy in order to increase knowledge and make FABM more attractive, and a better understood, option.
APPENDIX A: FOCUS GROUP GUIDE

University of North Carolina at Chapel Hill
Focus Group Guide

**IRB Study:** #14-0387

**Title of Study:** A mixed methods study of knowledge about fertility and attitudes towards fertility awareness based methods of family planning among 21-35 year old women in the Triangle region of North Carolina who have completed or partially completed graduate education

**Principal Investigator:** Nancy DeMaria
**Principal Investigator Phone number:** (336) 392-1879
**Principal Investigator Email Address:** demaria@email.unc.edu
**UNC-Chapel Hill Department:** Maternal and Child Health
**Faculty Advisor:** Sherri L. Green, PhD, LCSW
**Co-Investigator:** John M. Thorp, Jr., MD
**Research Assistant:** Erica Farley, RN, BSN

This is a semi-structured focus group guide. Use the questions to guide conversation, but follow other lines of inquiry as they arise. Follow up by asking “how” or “why” whenever possible. With the exception of consenting procedures, this script should not be followed verbatim. Begin by offering refreshments and address the participants:

> This session will be audiotaped and last 2 hours. Today’s focus group will be about your knowledge of fertility and family planning. I want to concentrate on what you are saying rather than trying to write everything down, so I’ll be recording our conversation just so I don’t miss anything. Do you have any questions or concerns about this process?

Review and answer any questions about the informed consent. Ask participants to sign if they are willing to participate, and collect signed consents. Begin.

> Let’s begin by introducing ourselves. My name is Nancy DeMaria and I am a second year MCH MPH student at UNC. This research is part of my Master’s Paper project. I am grateful for your willingness to share your opinions and experiences with me. Your responses have no effect on my grade for this project.

> Please state your name, age, and a little bit about your educational background (where you attended graduate and undergraduate studies, your major and academic interests), current occupation, and marital status (single, cohabitating, married, etc.).

Take notes as participants introduce themselves, and make note of where they are sitting at the table, so that you can remember their names as you address them throughout the session.

> We’ll begin with questions about general fertility and family planning. Let’s get started.
1. Describe what happens during a woman’s menstrual cycle.
   • How long is a healthy woman’s menstrual cycle?
   • How long is the average menstrual cycle?
   • Describe ovulation.
   • When does ovulation occur in a healthy woman?
   • If a couple were trying to get pregnant, what are some things they would try?
   • Are there any symptoms or signs (other than not getting pregnant) of infertility?
   • Are there any causes of female infertility that you know about?

2. Is a woman more or less fertile during certain times of the month?
   • When are these times?
   • How long are these periods of fertility?
   • Is there any way for a woman to know when these times are?
   • Can anyone tell me what cervical mucus is? Is it related to the menstrual cycle?
     o Describe words or concepts you associate with cervical mucus.
     o Do you associate cervical mucus with fertility?
   • Can anyone tell me what basal body temperature is? Is it related to the menstrual cycle?
     o Describe words or concepts you associate with basal body temperature.
     o Do you associate basal body temperature with fertility?

3. For those of you currently using contraception, what was important to you when choosing this method?
   • How do you feel about your current method? (Top two benefits, and top two drawbacks?)
   • What types of contraceptives have you used in the past?
   • How do you feel about the types of contraception you have used in the past?
   • Describe why you discontinued use of other methods in the past.
   • What might make you consider other methods of contraception?

4. Do you think you are more fertile during certain times of the month?
   • How do you know when you are fertile?
   • How do you know when you are not fertile?
   • Have you ever had sex at a certain time because you thought you couldn’t get pregnant?

Break.

5. Have you ever heard of NFP?
   • Have you ever heard of Fertility Awareness Based Methods of Family Planning?
• Do you think women see (the methods participants mention) as the same thing as Natural Family Planning?
• Do you remember where you heard about (methods participants mention)
• Are there any words or concepts you associate with ...
  i. ...NFP?
  ii. ...Fertility Awareness Based Methods of Family Planning?
  iii. ...The Calendar Method?
  iv. ...The Rhythm Method?
• How effective do you think any of the methods we’ve discussed are at preventing pregnancy?
• Would periodic abstinence be a major factor in your level of interest?
  o What do you think might be some drawbacks to practicing fertility awareness based methods of family planning to avoid pregnancy?
  o What do you think might be some advantages to practicing fertility awareness based methods of family planning to avoid pregnancy?
• What do you think about this method of family planning for those who are trying to get pregnant?
  o What might be some advantages to this method?
  o What might be some disadvantages?

6. What would you think about UNC making services available for support in fertility awareness?
• What would you imagine these services could look like?
• What, if anything, would make you interested in accessing these services?
• What, if anything, would make you not interested in accessing these services?
• Are you interested in trying a fertility awareness based method of family planning now after this discussion?
• Were you interested in trying a fertility awareness based method of family planning before this focus group?
• Have you ever discussed any of what we’ve talked about today with your provider?

7. Are there any further insights you would like to share? Do you have any questions for me? Is there anything I should have asked today that I didn’t?

Close with the following statement.

Thank you very much for taking the time to tell me about your opinions and experiences! Please accept this $20 Starbuck’s gift card in gratitude for your time, and sign indicating you’ve received this compensation.

Pass around sheet to sign. End focus group.
APPENDIX B: SOCIO-DEMOGRAPHICAL SAMPLE CHARACTERISTICS

Table 3: Socio-demographical Sample Characteristics of Pilot Interviewees

<table>
<thead>
<tr>
<th>Age</th>
<th>Self-identified Race (number, percent)</th>
<th>Self-identified Religion (number, percent)</th>
<th>Graduate Education (number, percent)</th>
<th>Degree* (number, percent)</th>
<th>Triangle Region (number, percent)</th>
<th>Marital Status (number, percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>White (non-Hispanic)</td>
<td>Christian (Protestant)</td>
<td>Currently enrolled</td>
<td>Master’s only</td>
<td>Chapel Hill</td>
<td>Married</td>
</tr>
<tr>
<td>28</td>
<td>White (non-Hispanic)</td>
<td>Unaffiliated</td>
<td>Currently enrolled</td>
<td>Master’s only</td>
<td>Carrboro</td>
<td>Cohabitating</td>
</tr>
</tbody>
</table>

Table 4: Socio-demographical Sample Characteristics of Focus Group Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, in years</td>
<td>Median: 28, Average: 27, Range: 23 – 31</td>
</tr>
<tr>
<td>Self-identified Race (number, percent)</td>
<td></td>
</tr>
<tr>
<td>White (non-Hispanic)</td>
<td>13 (65%)</td>
</tr>
<tr>
<td>White (Hispanic)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Black</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Asian</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Multi or biracial</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Declined to respond</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Self-identified Religion (number, percent)</td>
<td></td>
</tr>
<tr>
<td>Christian (Protestant)</td>
<td>8 (40%)</td>
</tr>
<tr>
<td>Christian (Catholic)</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Religion</td>
<td>Number (Percent)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Jewish</td>
<td>3 (15%)</td>
</tr>
<tr>
<td>Agnostic</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Unaffiliated</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Buddhist</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Declined to respond</td>
<td>1 (5%)</td>
</tr>
</tbody>
</table>

Graduate Education (number, percent)

<table>
<thead>
<tr>
<th>Status</th>
<th>Number (Percent)</th>
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<tbody>
<tr>
<td>Completed</td>
<td>5 (25%)</td>
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<tr>
<td>Currently enrolled</td>
<td>10 (50%)</td>
</tr>
<tr>
<td>First graduate degree completed, currently enrolled in a second graduate program</td>
<td>5 (25%)</td>
</tr>
</tbody>
</table>

Degrees (number, percent)*

<table>
<thead>
<tr>
<th>Degree</th>
<th>Number (Percent)</th>
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</thead>
<tbody>
<tr>
<td>Master’s only</td>
<td>9 (45%)</td>
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<tr>
<td>PhD only</td>
<td>4 (20%)</td>
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<tr>
<td>Doctor of Physical Therapy</td>
<td>1 (5%)</td>
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<tr>
<td>Master’s/JD</td>
<td>1 (5%)</td>
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<tr>
<td>Master’s/PhD</td>
<td>3 (15%)</td>
</tr>
<tr>
<td>Master’s/MD</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>PhD/MD</td>
<td>1 (5%)</td>
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Area of the Triangle Region (number, percent)

<table>
<thead>
<tr>
<th>Area</th>
<th>Number (Percent)</th>
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</thead>
<tbody>
<tr>
<td>Chapel Hill</td>
<td>5 (25%)</td>
</tr>
<tr>
<td>Durham</td>
<td>12 (60%)</td>
</tr>
<tr>
<td>Carrboro</td>
<td>3 (15%)</td>
</tr>
</tbody>
</table>

Marital Status (number, percent)
<table>
<thead>
<tr>
<th>Status</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>12</td>
<td>60%</td>
</tr>
<tr>
<td>Cohabitating</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>Married</td>
<td>5</td>
<td>25%</td>
</tr>
</tbody>
</table>

*Fields represented include the following:

*Maternal and Child Health, Medicine, Molecular Biology, Translation, Musicology, Law,*
*Nutrition, Health Administration, Genetics and Genomics, Molecular Genetics,*
*Microbiology, Social and Behavioral Health, Social Work, Nursing, and Physical Therapy.*
REFERENCES