To my father, mother, husband, daughters, sisters, and brother, who have always inspired by example.
ACKNOWLEDGMENTS

I thank my mentors, Doctors David Levine, Janet Serwint, Maureen Novak, Becca Beyth, and Marian Limacher for their patient and continuous support. I thank Mr. Dan Neal and Ms. Amanda Bertram for their invaluable assistance with the statistical analysis. I thank Mrs. Eve Johnson for invaluable assistance with manuscript preparation and editing.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>4</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>7</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>8</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>9</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>1 INTRODUCTION</td>
<td>11</td>
</tr>
<tr>
<td>Current Infant Feeding Recommendations</td>
<td>11</td>
</tr>
<tr>
<td>Current Breastfeeding Rates and Goals</td>
<td>11</td>
</tr>
<tr>
<td>Physician Mothers’ Breastfeeding Behavior</td>
<td>12</td>
</tr>
<tr>
<td>2 METHODS</td>
<td>14</td>
</tr>
<tr>
<td>Survey Instrument Development</td>
<td>14</td>
</tr>
<tr>
<td>First Survey Instrument</td>
<td>14</td>
</tr>
<tr>
<td>Second Survey Instrument</td>
<td>15</td>
</tr>
<tr>
<td>Eligibility Criteria</td>
<td>15</td>
</tr>
<tr>
<td>Recruitment</td>
<td>16</td>
</tr>
<tr>
<td>Johns Hopkins University School of Medicine Study</td>
<td>16</td>
</tr>
<tr>
<td>University of Florida College of Medicine Study</td>
<td>17</td>
</tr>
<tr>
<td>Analysis</td>
<td>17</td>
</tr>
<tr>
<td>3 RESULTS</td>
<td>19</td>
</tr>
<tr>
<td>Characteristics of Mothers and Children in the Overall Study</td>
<td>19</td>
</tr>
<tr>
<td>Work-Place Characteristics</td>
<td>19</td>
</tr>
<tr>
<td>Infant-Feeding Intentions and Behavior</td>
<td>20</td>
</tr>
<tr>
<td>Breastfeeding Promotion and Advocacy</td>
<td>22</td>
</tr>
<tr>
<td>Predictors of Breastfeeding Duration</td>
<td>24</td>
</tr>
<tr>
<td>Qualitative Data</td>
<td>26</td>
</tr>
<tr>
<td>4 DISCUSSION AND CONCLUSION</td>
<td>34</td>
</tr>
<tr>
<td>Physician Mothers' Infant-Feeding Intentions and Behavior</td>
<td>34</td>
</tr>
<tr>
<td>Work-Site Predictors of Breastfeeding Duration</td>
<td>34</td>
</tr>
<tr>
<td>Physician Mothers' Breastfeeding Advocacy</td>
<td>36</td>
</tr>
<tr>
<td>Limitations</td>
<td>37</td>
</tr>
<tr>
<td>Directions for the Future</td>
<td>38</td>
</tr>
<tr>
<td>Conclusion</td>
<td>39</td>
</tr>
</tbody>
</table>
APPENDIX

A  JOHNS HOPKINS UNIVERSITY SURVEY INSTRUMENT ........................................ 41
B  UNIVERSITY OF FLORIDA SURVEY INSTRUMENT ........................................ 47
LIST OF REFERENCES .................................................................................................. 55
BIOGRAPHICAL SKETCH .............................................................................................. 60
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-1</td>
<td>Maternal demographics</td>
<td>28</td>
</tr>
<tr>
<td>3-2</td>
<td>Specialties of physician mothers included in the study</td>
<td>29</td>
</tr>
<tr>
<td>3-3</td>
<td>Duration of personal breastfeeding and breastfeeding advocacy</td>
<td>30</td>
</tr>
<tr>
<td>3-4</td>
<td>Significant predictors of breastfeeding duration</td>
<td>31</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>3-1</td>
<td>Breastfeeding (BF) and exclusive breastfeeding (EBF) rates of physician mothers</td>
<td>33</td>
</tr>
</tbody>
</table>
Abstract of Thesis Presented to the Graduate School of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Master of Science

INFANT-FEEDING INTENTIONS AND BEHAVIORS OF PHYSICIAN MOTHERS

By

MARYAM SATTARI

May 2013

Chair: Marian Limacher
Major: Medical Science – Clinical and Translational Science

Background: The strongest predictor of a physician advocating for breastfeeding is her personal breastfeeding experience. Previous literature has shown that physician mothers have excellent breastfeeding initiation rates, but very low breastfeeding continuation rates. However, these studies have not investigated breastfeeding intentions of physician mothers. We conducted 2 cross-sectional, institutional studies of physician mothers to determine their infant feeding intentions, behavior, clinical breastfeeding advocacy, and predictors of their personal infant-feeding behavior.

Methods: Data on 238 children were obtained from 130 physician mothers, 50 whose main affiliation was with Johns Hopkins University (Baltimore, MD), and 80 whose main affiliation was with University of Florida (Gainesville, FL). The R statistical software package (V.2.15.0; R Foundation for Statistical Computing, Vienna, Austria, 2012) was used to generate means, standard deviations and frequencies of all demographic variables in the data set, and to conduct univariate tests. To account for the clustering of observations on mothers, we used generalized estimating equations to evaluate potential predictors of breastfeeding duration.
Results: While physician mothers intended to breastfeed 56% of the infants for at least 12 months, and while 97% of infants were breastfed at birth, only 34% continued to receive breastmilk at 12 months. Physician mothers who reported actively promoting breastfeeding among their female patients had significantly longer personal breastfeeding duration compared with physician mothers who denied actively promoting breastfeeding (10 months versus 6 months, \( p = 0.001 \)). Similarly, reporting active breastfeeding promotion among female housestaff was associated with longer personal breastfeeding duration (10 months versus 3 months, \( p < 0.001 \)). Duration of lactation among physician mothers correlated with the following work-site factors: 1) length of maternity leave, 2) not having to make up missed call/work that occurred as result of pregnancy or maternity leave, 3) perceived level of support of breastfeeding efforts at work from colleagues, program directors, and chiefs, and 4) sufficient time at work for milk expression.

Conclusion: Our findings emphasize the discrepancy between physician mothers' breastfeeding duration goal and their actual breastfeeding duration and highlight the association between their personal breastfeeding success and their own active breastfeeding advocacy. Furthermore, our results support the importance of work-related factors in breastfeeding maintenance among physician mothers and suggest that a tailored intervention, providing time and institutional encouragement, might result in significant extension of the duration of breastfeeding.
CHAPTER 1
INTRODUCTION

Current Infant Feeding Recommendations

Many health organizations recommend exclusive breastfeeding for the first 6 months of life, followed by continued breastfeeding for the first year and beyond.\textsuperscript{1,2} Exclusive breastfeeding is defined as infant not receiving any nutrition except breastmilk (with the exception of vitamins and medications). These recommendations are based on extensive evidence of health benefits for both breastfed infants and breastfeeding mothers.\textsuperscript{3} Breastfeeding has been shown to protect infants against necrotizing enterocolitis, otitis media, gastroenteritis, hospitalization for lower respiratory tract infections, atopic dermatitis, sudden infant death syndrome, type 1 diabetes mellitus, and childhood asthma, leukemia, and obesity.\textsuperscript{4-8} Maternal benefits include reduced risk of diabetes mellitus and malignancy of breast and ovaries.\textsuperscript{3} In fact, with obesity and diabetes rates increasing more than ever in the United States, breastfeeding may be considered a cornerstone of preventive medicine. Furthermore, breastfeeding benefits extend beyond the mother and child dyad and include environmental, economic and health care cost savings.\textsuperscript{9-11} For example, some estimate that the United States could save $13 billion and prevent 911 deaths (95\% of which would be of infants) in one year if 90\% of families could comply with medical recommendations to breastfeed exclusively for 6 months.\textsuperscript{9}

Current Breastfeeding Rates and Goals

Current breastfeeding rates in the United States are 76.9\% at birth, 47.2\% at 6 months, and 25.5\% at 12 months.\textsuperscript{12} Exclusive breastfeeding rates are 36.0\% at 3 months and 16.3\% at 6 months.\textsuperscript{12} Although breastfeeding rates have been increasing
in the United States, rates of continuation and exclusive breastfeeding are still below desired levels. The Healthy People 2020 (HP2020) objectives, released by the U.S. Department of Health and Human Services, contain aims to increase breastfeeding rates to 82% ever-breast-fed, 61% for 6 months, and 34% for 12 months. Goals regarding exclusive breastfeeding include increasing rates to 46% at 3 months and 26% at 6 months.

Interventions targeted at exclusive breastfeeding and breastfeeding duration are needed in order to achieve the HP2020 goals for breastfeeding. Physician breastfeeding counseling is one of the interventions that successfully increase breastfeeding initiation and duration.

Physician Mothers’ Breastfeeding Behavior

A strong predictor of physicians' breastfeeding advocacy is their successful personal or spousal breastfeeding experience. These observations are consistent with findings by Frank that physicians’ personal healthy behavior is a powerful predictor of counseling patients about preventive issues. As such, strategies to enhance breastfeeding in physician families are important, not only for their own breastfeeding success and health of their child, but this behavior may also affect how well they can serve as role models and information sources of breastfeeding for their patients. To date, our understanding of breastfeeding among physicians in the United States has been based on cross-sectional questionnaire surveys administered to residents and/or practicing physicians.

Results of these studies suggest that while female physicians have excellent breastfeeding initiation rates, their continuation rates are lower than the general population. Previous studies identified return to work, work schedule, diminishing
milk supply, and lack of adequate time for milk expression as reasons for breastfeeding cessation among this population. In fact, Miller et al. reported that 50% of resident mothers who had initiated breastfeeding weaned around the time of returning to work from maternity leave at a mean of 7 weeks postpartum. Physician mothers who continued to breastfeed after return to work identified insufficient time and lack of appropriate place at work for milk expression as obstacles to breastfeeding continuation. However, because of lack of data about breastfeeding intentions of surveyed mothers, definitive conclusions could not be made regarding whether the drop in physician mothers' breastfeeding rates after return to work resulted from their decision to wean earlier than recommended or whether it reflected the influence of workplace-related factors that discouraged breastfeeding maintenance despite maternal intention to continue.

The purpose of this cross-sectional survey study was to determine (1) personal infant feeding intentions and behavior, (2) clinical breastfeeding advocacy, and (3) predictors of personal infant-feeding behavior among a convenience sample of physician mothers. Based on results of previous studies, we hypothesized that physician mothers would have excellent breastfeeding initiation rates and that they would be at risk of not maintaining desired breastfeeding practices because of personal and institutional factors.
CHAPTER 2
METHODS

Survey Instrument Development

First Survey Instrument

Previous studies published on breastfeeding among physicians in the United States were reviewed, and questionnaires utilized for these investigations were requested. After review of published data and questionnaires that were made available, areas pertaining to breastfeeding among physicians were identified. Survey items and response scales were developed to assess those areas, including breastfeeding intentions. The questionnaire was piloted in 2008 among 20 internal Medicine and pediatric research fellows and faculty at Johns Hopkins University School of Medicine (Baltimore, MD) to ensure clarity. The criteria for participation in the pilot were (1) being present at a meeting of "Research in Progress" attended by faculty members and research fellows in General Internal Medicine and Pediatrics during which the survey was piloted and (2) volunteering to participate. The survey was administered in an interview setting to all volunteers, regardless of their gender, stage of career, having had biologic children, and infant feeding method. We sought feedback to improve the survey instrument and considered all suggestions, including those to improve clarity and readability. The questionnaire was revised based on suggestions of participants. Pilot participants were not included in the subsequent studies. The final instrument contained 48 items and took approximately 15–30 minutes to complete (Appendix A). Questions included demographic information and previous breastfeeding education. Participants were asked a series of questions for each of their children, including current age, infant-feeding intention, breastfeeding duration goal, whether or
not the infant was ever breastfed, age at which the infant first received any nutrition other than breastmilk, age at which the infant was weaned from breastmilk completely, as well as work-related factors and other enablers and obstacles of breastfeeding.

**Second Survey Instrument**

Further survey items and response scales were developed in 2009 and incorporated into the questionnaire mainly to assess breastfeeding advocacy of participants. A new yes/no question was added to assess if breastfeeding was discontinued “due to demands at work.” Another yes/no question was developed to inquire whether a participant reported actively promoting breastfeeding among their female patients. For the purposes of this study, we have defined this as clinical breastfeeding advocacy. Workplace breastfeeding advocacy was defined as active promotion of breastfeeding among female housestaff. To assess workplace breastfeeding advocacy, all participants were asked about active breastfeeding promotion among female housestaff. Participants who reported not actively promoting breastfeeding among patients or housestaff were then asked the reason(s) for not doing so. While they were given a choice of possible reasons for not actively advocating breastfeeding, such as lack of time or expertise, they also had the option of choosing “other” and explaining their reasons. This modified instrument contained 54 items and took approximately 20-30 minutes to complete (Appendix B).

**Eligibility Criteria**

Criteria for participation included being a female physician (MD or DO) and having at least one biological child. Eligible participants were included whether they were in training (e.g., resident or fellow) or had completed training (e.g., faculty at academic site or community practice). Participants were included regardless of their
infant-feeding methods (formula, breastmilk, or combination). While recruitment efforts only focused on physicians affiliated with Johns Hopkins University School of Medicine (JHU) and University of Florida College of Medicine (Gainesville, FL), we included physicians not affiliated with either institution if they contacted us to express interest in the study and were otherwise eligible to participate. All such physicians had spouses or friends who were affiliated with one of the study institutions and had forwarded the recruitment e-mail to them.

**Recruitment**

The institutional review boards at JHU and University of Florida College of Medicine (UF) approved the protocols for this study. At both institutions, Maryam Sattari, the principal investigator (PI) initiated recruitment through a recruitment e-mail that contained information about the study and contact information for the PI.

**Johns Hopkins University School of Medicine Study**

We sent the recruitment e-mail once to the head of the Institution's Women's Task Force as well as residency program directors affiliated with JHU, with a request for dissemination to their respective programs. Physicians interested in participating in the study were instructed to contact the PI. We intended to interview as many participants as possible with the goal of completing all interviews in August 2009, the latest date the PI would be able to conduct the interviews in person.

The PI set up interviews with potential study participants as they responded via e-mail or telephone to express interest in the study. Every attempt was made to conduct all the interviews in person. However, when not possible to meet in person, participants were also interviewed by telephone (n=10). Eleven participants completed
the paper questionnaire and were then interviewed in person or by telephone to confirm and verify answers. The PI conducted all of the by-phone and in-person interviews.

**University of Florida College of Medicine Study**

At UF, the recruitment e-mail was sent once in 2009 to residency and fellowship program directors and once in 2010 to the institution’s listserv for housestaff and faculty. The PI set up interviews with potential study participants as they responded to express interest in the study. All participants were interviewed in person between October 2009 and July 2011 by the PI.

**Analysis**

Study data were collected and managed using REDCap electronic data capture tools hosted at UF. The primary outcomes were (1) personal infant feeding intentions, (2) breastfeeding initiation and continuation behavior, (3) exclusive breastfeeding rates, (4) clinical breastfeeding advocacy, and (5) predictors of breastfeeding duration in our study sample. We used the R statistical software package for descriptive statistics, including means, standard deviations and frequencies of all demographic variables in the data set, and to conduct univariate tests. We used the infant as the unit of analysis for calculation of rates because breastfeeding practices of some multiparous participants varied with different offspring. All comparisons were performed at a 95% confidence level.

We created a series of models, each with age of complete weaning or breastfeeding duration as the outcome variable. We transformed maternal specialty to a dichotomous variable by assigning it as surgical if associated mainly with procedures, and labeled all other specialties as non-surgical. We included the following variables as primary predictors: maternal age at the time of study, stage of career at the time of
study, number of biological children, study location (JHU or UF), specialty (surgical or nonsurgical), marital status, breastfeeding education in medical school and residency, and birth year of child, age of child at the time of mother’s participation in the study, partner work status, maternal work environment, maternal stage of career at the time of childbirth, breastfeeding duration goal, maternal reasons for decision to breastfeed, duration of maternity leave, duration of paid leave, maternity leave makeup, return to work, and reasons for return to work.

In subsequent multivariate analysis, we used a mixed linear model to determine which survey responses were significant predictors of breastfeeding duration when controlling for maternal demographics and taking into account the clustering of observations on study location and mothers. We controlled for the covariates that were not significant predictors of breastfeeding duration (i.e., mother’s age, stage of career, number of biological children, specialty (surgical or nonsurgical), marital status, medical school breastfeeding education, residency breastfeeding education and birth year of child; all p-values>0.25). Study location and mother were considered random factors. We modeled the mother as a repeated factor, used an exchangeable working covariance structure, and excluded subjects still being breastfed at the time of the study. We considered any variable with a p-value less than 0.05 a significant predictor of duration of breastfeeding/age of weaning.
CHAPTER 3
RESULTS

Characteristics of Mothers and Children in the Overall Study

One hundred and thirty interviews were included in this analysis. Eighty participants (61.5%) were recruited at UF or affiliated institutions and 50 (38.5%) at JHU or affiliated institutions (Table 3-1). The participants’ ages ranged from 26 to 60 years at the time of the study, with a mean age of 37.6 years (Table 3-1). Thirty seven (28.5%) were still in training, and 93 (71.5%) had completed training. Additional demographics are characterized in Table 3-1. Participants' specialties are described in Table 3-2. Eighty five (65.4%) participants were in non-surgical fields and 45 (34.6%) in surgical fields. Only 21.5% (n=28) of participants reported receiving breastfeeding education in medical school and fewer still (19.2%; n=25) in residency.

The 130 physicians included in the study had a total of 238 children, ranging in age from 6 weeks to 28 years old. One-hundred-and-sixty-nine (71%) of the children were born in or after 2003, the year that the 80-hour work week was implemented, and 69 (29%) were born before 2003 (19). Six of the children (3%) were born prior to the mother entering medical school, 16 (5%) during medical school, 62 (29%) during residency, 41 (15%) during fellowship, 104 (43%) after maternal completion of medical training, and 9 (5%) in other stages of maternal career.

Work-Place Characteristics

At the time of the study, two participants had not returned to work (at 12 and 18 weeks postpartum). While 15 (6.3%) participants reported missing call as a result of pregnancy or maternity leave, 30 (12.6%) reported being required to make up missed call. Participants reported returning to work as planned after 211 (88.7 %) births and
returning full-time in 194 (81.5%) cases. Maternal full-time return to employment postpartum occurred in 75 cases (72% of faculty) while faculty, 40 (98% of fellows) during fellowship, 52 (84% of residents) during residency, and 27 (87%) in other stages of maternal career.

Participants reported return to work was different than originally planned after 25 (10.5%) childbirths. While return was required by mother’s work earlier than desired in 15 cases, one participant reported returning earlier due to maternal preference and two reported doing so secondary to financial reasons. Seven participants returned to work later than expected, four due to infant health and three due to maternal health. Participants reported flexibility in their postpartum work schedule in 112 instances (47.1%), somewhat flexible schedules in 29 (12.2%) cases, and no flexibility in 94 (39.5%) cases. Of the 62 participants who experienced childbirth during residency, 18 (29%) reported flexibility in their work schedule postpartum, 11 (18%) reported some flexibility, and 33 (53%) no flexibility. Of 41 participants who gave birth to a child during fellowship, 28 (68.29%) reported work schedule flexibility, 3 (7.31%) some flexibility, and 10 (24.4%) no flexibility. Of 104 participants who gave birth after completion of medical training, 56 (53.84%) reported having flexibility in their postpartum schedule, 12 (11.54%) some flexibility, and 36 (34.62%) no flexibility.

**Infant-Feeding Intentions and Behavior**

All 130 participants reported planning to breastfeed after all 238 pregnancies. The two most frequent reasons cited for breastfeeding intention were infant health (98%; n=226) and bonding (84%; n = 150). Other reasons for breastfeeding intention included maternal health, convenience and cost compared to formula, friends, family expectations (including spouse and mother), health care recommendations
(pediatricians, obstetricians, official guidelines, and lactation consultants), breastfeeding class, wanting to be a role model to patients, and the desire to contribute to baby’s well-being while working. In 215 pregnancies (90.3%), participants expressed numerical goals for breastfeeding duration, ranging from one to 24 months, and in 134 cases (56.3%) planned to breastfeed for at least 12 months. In 23 pregnancies, participants either reported not having a goal regarding the length of breastfeeding or stated that they had hoped to breastfeed until return to work or as long as possible.

Using the infants as the unit of analysis, breastfeeding initiation rate was 96.6%. Immediately after birth, 186 (78.2%) children were exclusively breastfed, 44 (18.5%) received a combination of breastmilk and formula, and eight (3.4%) received formula only. Participants reported that three infants did not receive breastmilk secondary to maternal health (one mother was diagnosed with Grave’s disease, another one with Group B strep infection and postpartum fever, and a third with Sheehan syndrome), two due to infant health reasons (jaundice and infant hyperbilirubinemia), and three because of lack of breastmilk. One hundred and forty two infants continued to receive breastmilk exclusively at 3 months and 59 at 6 months. Exclusive breastfeeding rates were 78.2%, 59.7%, and 24.8% at birth, 3 months, and 6 months (Fig. 3-1). The mean duration of exclusive breastfeeding was 3.49 months (standard deviation of 2.43 and range of 0-13 months). The mean duration of breastfeeding was 9.91 months (standard deviation of 6.34 and range of 0-36). A total of 152 infants (63.9%) continued to receive some breastmilk at 6 months, and 81 (34.0%) at 12 months (Fig. 3-1).
Participants continued to breastfeed 212 (89.1%) of the infants after return to work and reported expressing milk or breastfeeding at work in 202 (84.9%) cases. Thirty participants were breastfeeding at the time of study.

**Breastfeeding Promotion and Advocacy**

Work-place breastfeeding advocacy was assessed at UF by asking participants whether they actively promoted breastfeeding among female housestaff. We considered a participant to demonstrate work-place breastfeeding advocacy if they answered yes or provided examples of their advocacy. Participants who reported advocating breastfeeding among housestaff had longer durations for personal breastfeeding (10.1 months vs. 3.1 months) and exclusive breastfeeding (3.8 months vs. 1.7) compared to participants who reported not advocating breastfeeding among housestaff (Table 3-3).

Clinical breastfeeding advocacy was assessed by asking about breastfeeding promotion among patients. We considered a participant to have active clinical breastfeeding advocacy if she answered yes or provided examples of breastfeeding advocacy among patients. Nine participants reported that they did not have breastfeeding patients and were eliminated from this part of the analysis (Table 3-3). Participants who reported clinical breastfeeding advocacy breastfed an average of 4 months longer than the participants who did not actively promote breastfeeding among their patients (p<0.001). The main reasons for not wanting to advocate breastfeeding among patients and housestaff were avoidance of “being judgmental,” “putting pressure on other mothers,” or “making mothers feel guilty.” Many of these participants identified feeling pressure, guilt, or being judged when they had to start supplementation with formula or to completely terminate their breastfeeding efforts.
Using Fisher’s exact test, breastfeeding advocacy was also associated with maternal specialty (p=0.0154). Pediatricians, obstetricians, and family practitioners consistently reported active breastfeeding promotion. Interestingly, participants in less obvious specialties, such as internal medicine, anesthesiology, psychiatry, and general surgery, reported actively promoting breastfeeding. For example, many internal medicine physicians reported discussing infant feeding choices with patients prior to pregnancy, in early pregnancy (before referral to obstetricians), and post-partum, after female patients are released from their obstetricians. Anesthesiologists who reported active promotion considered pharmacotherapy choices in their lactating patients and also educated them about “pumping and dumping,” if necessary. A female general surgeon reported providing breast pumps for lactating patients admitted to her service. Psychiatrists reported discussing the safety of psychotropic agents with their lactating patients.

Maternal goal for breastfeeding duration was also significantly associated with clinical (p<0.001) and workplace (p<0.001) breastfeeding advocacy. Participants who reported that their breastfeeding cessation was work-related were significantly less likely to report workplace breastfeeding advocacy (p=0.001), but not clinical breastfeeding advocacy (p=0.458). Participants who did not continue breastfeeding after return to work were significantly less likely to report clinical breastfeeding advocacy (p=0.031) and workplace breastfeeding advocacy (p<0.001). We did not find an association between participants’ clinical and workplace breastfeeding advocacy and maternal age at the time of study, marital status, breastfeeding education (medical school or residency), partner work status, perceived level of support at work.
environment during pregnancy, length of maternity leave, duration of paid leave, maternal leave type, work schedule flexibility, breastfeeding method at birth, maternal mental health postpartum, maternal energy level postpartum, maternal stress level postpartum, satisfaction with personal breastfeeding duration, availability of time or place at work for milk expression, or workplace support for breastfeeding efforts.

**Predictors of Breastfeeding Duration**

None of the maternal demographic variables were significant predictors of breastfeeding duration. However, a number of factors were significantly associated with breastfeeding duration (Table 3-4). Mothers were asked the reason for breastfeeding cessation for each of their children. The choices were “mother not interested in breastfeeding,” “mother not comfortable with breastfeeding,” “lack of adequate milk supply,” “too stressful,” “lack of time,” maternal health,” “infant health,” “infant not interested in breastfeeding,” and “other.” While reporting “other” reasons for breastfeeding cessation than those listed was associated with a 3.3-month increase in breastfeeding duration, four reasons for breastfeeding cessation had a negative association with breastfeeding duration: infant health, lack of infant interest in breastfeeding, inadequate milk supply, and inadequate time for milk expression at work. Citing inadequate time as a reason for complete breastfeeding cessation was associated with an average 2.9-month decrease in breastfeeding duration (p=0.013). Citing inadequate milk supply as reason for complete breastfeeding cessation was associated with an average 3.3-month decrease in breastfeeding duration (p=0.001). Participants who reported they encountered non-support at work due to perceived special favors by their colleagues had an average 3.5 month decrease in breastfeeding...
duration compared to participants who did not report perception of perceived special favors by their colleagues (p = 0.037).

Potentially modifiable work-site factors that were associated with breastfeeding duration consisted of (1) a requirement to make up missed work or call that occurred as a result of pregnancy or maternity leave, (2) duration of maternity leave, (3) availability of time at work to express milk or breastfeed, and (4) mother’s perception of level of support for her breastfeeding efforts at work from her colleagues and program director or chief. Not being required to make up work or call missed as a result of pregnancy or maternity leave was associated with an average 3.6-month increase in breastfeeding duration (p = 0.016). Mean duration of breastfeeding for participants who reported having to make up missed call or work was 8.0 months, compared to 10.1 months for participants who reported not having to make up missed call or work (p=0.043). A one week increase in total maternity leave (paid and unpaid) was associated with 0.14 month increase in breastfeeding duration (r=0.16, p=0.022). To assess availability of time at work for milk expression, participants chose between “never,” “occasionally,” “sometimes,” “often,” and “always.” Each increase in score in response to this question (e.g., occasionally compared to never) was associated with a 1.1-month increase in breastfeeding duration (r=0.029, p <0.0001). Similarly, participants were asked to rate the support that they felt they received for their breastfeeding efforts while working from colleagues, attending physicians if appropriate, and program director or chief. Participants could choose “always opposed my efforts,” “usually opposed my efforts,” “neither supportive nor oppositional,” “usually supportive,” and “always supportive.” While attending support initially had a statistically significant association with
breastfeeding duration \( (r = 0.17, \ p = 0.028) \), the correlation was no longer significant in the multivariate analysis. Each unit increase in reported collegial support was associated with 1.3-month increase in breastfeeding duration \( (r = 0.19, \ p = 0.011) \) and each unit increase in reported support from chief or program director was associated with 1.1-month increase in breastfeeding duration \( (p=0.010) \) in the multivariate analysis.

**Qualitative Data**

The one-on-one interaction with the survey participants allowed for collection of descriptive and qualitative data, even in response to forced response items in the questionnaire. Participants in surgical specialties and procedure-based subspecialties (e.g., gastroenterology) reported one of their main challenges to be unavailability of lactation rooms close to operating or procedure rooms. Furthermore, participants in surgical-based fields universally reported less perceived support of their breastfeeding efforts at work as well as more employment-related obstacles. One faculty physician expressed her opinion that it would be impossible for anesthesiology housestaff to continue breastfeeding after return to work due to logistics of patient flow and availability of coverage for operating rooms.

Participants who were residents at the time of delivery provided many examples of the influence of specific rotations on their milk supply. For example, one participant reported having no trouble maintaining breastfeeding during one rotation that “did not involve overnight call,” while experiencing a significant drop in her milk supply during a different rotation that involved overnight call and was more stressful.

The one-to-one interaction also revealed lingering ambivalence about childbearing and breastfeeding during training. For example, one faculty member reported being supportive of breastfeeding among both patients and housestaff, but
also stated that she delayed having children during training, because “it would not be fair to put fellow housestaff through her pregnancy and childbirth.”

Another consistent theme discussed by this study’s participants was lack of formal maternity leave. With the exception of the handful of participants who had experienced childbirth while employed in New York or California, most participants in this study reported using sick leave, vacation time, unpaid leave, or a combination thereof as their maternity leave. Participants also volunteered information about lack of accommodations for breastfeeding mothers when taking medical boards for different specialties.
Table 3-1. Maternal demographics (n = 130)

<table>
<thead>
<tr>
<th>Category</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years) at time of study</strong></td>
<td></td>
</tr>
<tr>
<td>Mean +/- standard deviation</td>
<td>37.55 ± 6.67</td>
</tr>
<tr>
<td>Range</td>
<td>26-60</td>
</tr>
<tr>
<td><strong>Study location</strong></td>
<td></td>
</tr>
<tr>
<td>Johns Hopkins University School of Medicine</td>
<td>50 (38.5%)</td>
</tr>
<tr>
<td>University of Florida College of Medicine</td>
<td>80 (61.5%)</td>
</tr>
<tr>
<td><strong>Career stage at time of study</strong></td>
<td></td>
</tr>
<tr>
<td>In training (residency or fellowship)</td>
<td>37 (28.5%)</td>
</tr>
<tr>
<td>Had completed training</td>
<td>93 (71.5%)</td>
</tr>
<tr>
<td><strong>Specialty (surgical or non-surgical)</strong></td>
<td></td>
</tr>
<tr>
<td>Surgical</td>
<td>46 (35.4%)</td>
</tr>
<tr>
<td>Non-surgical</td>
<td>84 (64.6%)</td>
</tr>
<tr>
<td><strong>Number of biological children</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>47 (36.2%)</td>
</tr>
<tr>
<td>2</td>
<td>63 (48.5%)</td>
</tr>
<tr>
<td>3</td>
<td>15 (11.5%)</td>
</tr>
<tr>
<td>4</td>
<td>5 (3.8%)</td>
</tr>
<tr>
<td><strong>Age of children (months)</strong></td>
<td></td>
</tr>
<tr>
<td>Mean +/- standard deviation</td>
<td>73.24 ± 48.00</td>
</tr>
<tr>
<td>Range</td>
<td>1.5 - 336.0</td>
</tr>
<tr>
<td><strong>Breastfeeding education during medical school</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28 (21.5%)</td>
</tr>
<tr>
<td>No</td>
<td>102 (78.5%)</td>
</tr>
<tr>
<td><strong>Breastfeeding education during residency</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>25 (19.2%)</td>
</tr>
<tr>
<td>No</td>
<td>105 (80.8%)</td>
</tr>
<tr>
<td><strong>Maternal stage of career at childbirth</strong></td>
<td></td>
</tr>
<tr>
<td>Before medical school</td>
<td>6 (3%)</td>
</tr>
<tr>
<td>During medical school</td>
<td>16 (5%)</td>
</tr>
<tr>
<td>During residency</td>
<td>62 (29%)</td>
</tr>
<tr>
<td>During fellowship</td>
<td>41 (15%)</td>
</tr>
<tr>
<td>After completion of training</td>
<td>104 (43%)</td>
</tr>
<tr>
<td>Other stages of medical training</td>
<td>9 (5%)</td>
</tr>
<tr>
<td>Specialty</td>
<td>Number</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>Surgical</strong></td>
<td></td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>8</td>
</tr>
<tr>
<td>Ear, nose &amp; throat</td>
<td>1</td>
</tr>
<tr>
<td>General surgery and subspecialties</td>
<td>6</td>
</tr>
<tr>
<td>Medicine/interventional cardiology</td>
<td>8</td>
</tr>
<tr>
<td>Medicine/gastroenterology</td>
<td>7</td>
</tr>
<tr>
<td>Medicine/pulmonary and critical care</td>
<td>1</td>
</tr>
<tr>
<td>Obstetrics gynecology</td>
<td>6</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>1</td>
</tr>
<tr>
<td>Pediatrics/gastroenterology</td>
<td>1</td>
</tr>
<tr>
<td>Pediatrics/pulmonary</td>
<td>1</td>
</tr>
<tr>
<td>Radiology</td>
<td>4</td>
</tr>
<tr>
<td>Urology</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total surgical</strong></td>
<td>45</td>
</tr>
<tr>
<td><strong>Non-surgical</strong></td>
<td></td>
</tr>
<tr>
<td>Dermatology</td>
<td>1</td>
</tr>
<tr>
<td>Family medicine</td>
<td>4</td>
</tr>
<tr>
<td>*General internal medicine and subspecialties</td>
<td>55</td>
</tr>
<tr>
<td>Internal medicine/pediatrics</td>
<td>1</td>
</tr>
<tr>
<td>Neurology</td>
<td>4</td>
</tr>
<tr>
<td>Pathology</td>
<td>2</td>
</tr>
<tr>
<td>*Pediatrics and other pediatric subspecialties</td>
<td>13</td>
</tr>
<tr>
<td>Physical medicine and rehab</td>
<td>1</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>3</td>
</tr>
<tr>
<td>Radiation oncology</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total non-surgical</strong></td>
<td>85</td>
</tr>
</tbody>
</table>

*Procedure-based subspecialties, such as gastroenterology, interventional cardiology, and pulmonary in internal medicine and pediatrics were categorized as “surgical,” and other subspecialties (e.g., endocrinology) were categorized as “non-surgical.”
Table 3-3. Duration of personal breastfeeding and breastfeeding advocacy (assessed only at UF)

<table>
<thead>
<tr>
<th></th>
<th>Workplace breastfeeding promotion (n=80)</th>
<th></th>
<th>Clinical breastfeeding promotion (n=71)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>P value</td>
</tr>
<tr>
<td>Mean duration of breastfeeding (months)</td>
<td>10.05</td>
<td>3.11</td>
<td>0.000</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>6.26</td>
<td>2.31</td>
<td>6.34</td>
</tr>
<tr>
<td>Mean duration of exclusive breastfeeding (months)</td>
<td>3.77</td>
<td>1.66</td>
<td>0.002</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>2.45</td>
<td>1.90</td>
<td>2.49</td>
</tr>
</tbody>
</table>

Nine participants reported that they did not have breastfeeding patients and were eliminated from analysis as far as clinical breastfeeding promotion (n=71).
Table 3-4. Significant predictors of breastfeeding duration (BFD) (controlling for maternal demographics)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimated effect on BFD in months (mo.)</th>
<th>95% CI for the effect</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal BFD goal</td>
<td>0.86 increase in BFD for each 1 mo. increase in BFD goal</td>
<td>(0.642, 1.08)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Infant feeding method at birth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exclusive BF</td>
<td>8.2 increase in BFD compared to formula only</td>
<td>(4.17, 12.10)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Combination (BF &amp; formula)</td>
<td>3.0 increase in BFD compared to formula only</td>
<td>(0.951, 4.95)</td>
<td>0.003</td>
</tr>
<tr>
<td>Infant-feeding method consistency</td>
<td>2.5 increase in BFD if reported consistent infant feeding method during 30 days postpartum</td>
<td>(0.589, 4.37)</td>
<td>0.011</td>
</tr>
<tr>
<td><strong>Work-related variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternity leave</td>
<td>0.14 increase in BFD for each week increase in total maternity leave (paid and unpaid)</td>
<td>(0.042, 0.233)</td>
<td>0.005</td>
</tr>
<tr>
<td>Maternity leave make-up</td>
<td>3.6 increase in BFD if mother did not report requirement to make up missed call or work</td>
<td>(0.690, 6.54)</td>
<td>0.016</td>
</tr>
<tr>
<td>Collegial support of Milk Expression at Work (MW)</td>
<td>1.3 increase in BFD for each unit increase in score on this question</td>
<td>(0.366, 2.25)</td>
<td>0.007</td>
</tr>
<tr>
<td>Program director or chief's support of MW</td>
<td>1.1 increase in BFD for each unit increase in score on this question</td>
<td>(0.263, 1.90)</td>
<td>0.010</td>
</tr>
<tr>
<td>Reported “perceived special favors” influenced collegial non-support of MW</td>
<td>3.5 decrease in BFD if answered “yes”</td>
<td>(-6.77, -0.145)</td>
<td>0.041</td>
</tr>
</tbody>
</table>
Table 3-4. Continued

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimated effect on BFD in months</th>
<th>95% CI for the effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weaning-related variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BF weaning due to infant health</td>
<td>6.6 increase in BFD if answered “no”</td>
<td>(1.57, 11.7)</td>
</tr>
<tr>
<td>BF weaning due to infant lack of interest in BF</td>
<td>2.17 decrease in BFD if answered “yes”</td>
<td>(-4.16, -0.200)</td>
</tr>
<tr>
<td>BF weaning for inadequate time</td>
<td>2.9 increase in BFD if answered “no”</td>
<td>(0.616, 5.12)</td>
</tr>
<tr>
<td>BF weaning for inadequate milk</td>
<td>3.3 increase in BFD if answered “no”</td>
<td>(1.32, 5.29)</td>
</tr>
<tr>
<td>BF weaning due to other reason</td>
<td>3.4 increase in BFD if answered “yes”</td>
<td>(1.70, 5.01)</td>
</tr>
</tbody>
</table>
Figure 3-1. Breastfeeding (BF) and exclusive breastfeeding (EBF) rates of physician mothers
CHAPTER 4
DISCUSSION AND CONCLUSION

Physician Mothers’ Infant-Feeding Intentions and Behavior

Our data demonstrate that despite high breastfeeding initiation rates among physician mothers in both institutions, there was a significant discrepancy between their breastfeeding duration goals and actual breastfeeding duration. This discrepancy and the reasons for cessation (lack of time and adequate milk supply) between 1 and 12 months suggest that work-related factors not only influence physician mothers’ breastfeeding behavior, but might have a larger impact on their breastfeeding behavior than their previous education and intentions on their breastfeeding duration. Physician mothers in both our pilot studies universally reported their intention to breastfeed as well as awareness of benefits of breastfeeding and current recommendations. Their intentions and knowledge correlated with their breastfeeding initiation practices. However, their breastfeeding maintenance was then determined by the interaction of personal factors, such as intent and knowledge, with work-related issues.

Work-Site Predictors of Breastfeeding Duration

Previous studies have cited maternal postpartum employment as a major obstacle to exclusive breastfeeding and breastfeeding continuation.\textsuperscript{15, 34, 37-41} Availability of worksite lactation facilities, support from coworkers and supervisors, and length of maternity leave have been associated with breastfeeding success in working mothers, while inflexible work schedules have been associated with breastfeeding cessation.\textsuperscript{35, 42-49} We expected similar associations among physician mothers, as they have reported lack of sufficient time and appropriate place for milk expression at work as well as inadequate milk supply as obstacles to breastfeeding continuation after return to work or
as reasons for breastfeeding cessation. However, we did not find a statistically significant correlation in our multivariate analysis between availability of worksite lactation facilities and breastfeeding duration of physician mothers. From our qualitative data, we believe that physician mothers often overcome the barrier of appropriate space at work for milk expression by creatively using unconventional locations, such as spaces in unused patient rooms, call rooms, or recovery rooms, to express milk.

The work-site variables that showed significant associations with breastfeeding duration might reflect the flexibility of a physician mother’s work schedule as well as the level of overall support in her immediate work environment. Non-clinical duties when physician mothers first return to work, protected time for milk expression during work hours, and work site support are modifiable factors that might influence physician mothers’ breastfeeding duration after return to work. To date, randomized trials have not been conducted that evaluate the effectiveness of workplace interventions in promoting breastfeeding among women returning to paid work after the birth of their child.

As women now make up almost half of the American workforce and more mothers of infants are participating in the workforce, scientific evaluation of the effectiveness of workplace interventions in promoting breastfeeding among working mothers is an important next step in developing evidence-based and cost-effective health policy change to improve their breastfeeding continuation and exclusive breastfeeding rates. Availability of time at workplace for milk expression/breastfeeding is a modifiable work-site factor that might impact duration of breastfeeding among physician mothers. Interestingly, availability of time also
correlated with breastfeeding duration among lawyer mothers in one of our pilot studies. Protected time at work might be easier and more cost-effective to modify than other potential work-site factors, such as length of maternity leave. Our results support further study to determine if protected time at workplace for milk expression and breastfeeding as well as other programs to promote breastfeeding duration among physician mothers returning to work will increase the frequency and duration of their breastfeeding.

**Physician Mothers' Breastfeeding Advocacy**

Another interesting and perhaps even more important result of our study was the positive association between physician mothers’ personal breastfeeding duration and their self-reported clinical breastfeeding advocacy. Frank et al. have reported a similar association between physicians’ other healthy personal habits and their preventive counseling practices. In 1995, Freed et al. found that among a large national sample of physicians in training and practice, previous personal or spousal breastfeeding experience was the greatest predictor of physician self-confidence in effective breastfeeding counseling. Our data expand on the results of Freed et al. and suggest that there might also be an association between the quality of a physician mother’s breastfeeding experience and her breastfeeding advocacy.

Our findings can be interpreted in several ways: If the association between personal breastfeeding experience and breastfeeding advocacy is causative, then interventions focused on promoting breastfeeding among physicians and enabling them to breastfeed successfully after return to work can potentially improve their attitudes toward advocating breastfeeding among their patients and society.
Alternatively, since we also found a correlation between maternal goal for breastfeeding duration with both actual personal breastfeeding duration and breastfeeding advocacy, the association between breastfeeding duration and advocacy might actually reflect the impact of these mothers’ original goals on their subsequent breastfeeding behavior as well as advocacy, rather than any direct link between duration and advocacy. Another possibility is that there might be a stronger, more primary factor, unidentified by our study, which independently affects maternal breastfeeding goals, actual duration and advocacy. The exact relationship between these factors would best be assessed by a prospective study of physician mothers.

**Limitations**

As this was a cross-sectional study, our findings do not imply causality. To assess causality between maternal work-site factors and breastfeeding behavior, prospective or interventional studies are needed. Another potential limitation is institutional bias, as the individual studies were mainly conducted in two academic medical centers. Although this allowed for detailed, in-depth analyses with extensive one-on-one interviews, our findings might not be applicable to all physicians in the United States.

The high percentage of participants from internal medicine or internal medicine subspecialties suggests a potential recruitment bias that might be associated with the PI’s affiliation with the internal medicine department. Uneven distribution of the recruitment e-mail by program directors in different specialties might have also contributed to the recruitment bias. Although we attempted to recruit physician mothers who had not breastfed as well as those who had, it is possible that mothers who had chosen to breastfeed and had achieved their goal were more likely to volunteer to
participate in the study. As such, another potential limitation of our study is selection bias resulting in over-representation of actual breastfeeding rates among physician mothers.

Another potential limitation of our study is recall bias, as we relied on mothers’ memories of previous breastfeeding behavior. Retrospective infant feeding data based on maternal recall is a valid and reliable estimate of breastfeeding initiation and duration, especially when the duration of breastfeeding is recalled within 3 years. However, validity and reliability of maternal recall for age of introduction of food and liquids other than breastmilk (e.g., duration of exclusive breastfeeding) are less satisfactory, and validity and reliability of maternal recall for breastfeeding intention are not clear.

**Directions for the Future**

Our findings have important implications for future prospective research, involving a larger and more diverse sample from various healthcare settings to determine whether significant differences exist in infant feeding behavior and breastfeeding advocacy of physician mothers in different healthcare settings, specialties, and those in training versus physician mothers in practice. The results of such a study, with a larger sample size of physicians from different institutions, would also be more generalizable. Cause and effect relationships between personal infant feeding behavior of physician mothers and their breastfeeding advocacy would best be assessed prospectively. Another area to further explore would be the relationship of physicians’ self-perceived clinical breastfeeding advocacy and their patients’ perception of effectiveness of the advocacy as well the patients’ actual breastfeeding behavior.
Interventional studies to assess affect of interventions on breastfeeding success of working mothers are also important. Physician mothers would be an ideal group for further interventional studies for several reasons. In our studies, physician mothers consistently reported 100% breastfeeding intention and high breastfeeding initiation rates.\textsuperscript{55, 56} Since these mothers have uniquely uniform infant-feeding intentions and behavior at birth, differences in their infant-feeding behavior and breastfeeding duration after return to work are mostly determined by work-site factors. Furthermore, intervening on and improving a physician mother’s breastfeeding success not only impacts her own well-being and the well-being of her family, but also the health of her patients and patients’ families. In addition to examining impact of protected time at work-place on breastfeeding behavior and breastfeeding advocacy of physician mothers, other variables such as infant outcomes and maternal utilization of sick days can be explored.

**Conclusion**

To our knowledge, this study is the second largest published multi-specialty physician breastfeeding study in the United States. Our findings emphasize the discrepancy between physician mothers’ breastfeeding duration goal and their actual breastfeeding duration and highlight the association between their personal breastfeeding success and their active breastfeeding advocacy. Furthermore, our results support the importance of work-related factors in breastfeeding maintenance among physician mothers and suggest that a tailored intervention, providing time and institutional encouragement, might result in significant extension of the duration of breastfeeding. We suggest that assigning non-clinical duties when physician mothers first return to work, offering collegial support for breastfeeding mothers, and providing
protected time at work for milk expression or breastfeeding are factors that will influence physician mothers’ breastfeeding duration after return to work.
APPENDIX A
JOHNS HOPKINS UNIVERSITY SURVEY INSTRUMENT

Section 1: Demographics
1.1 Age

1.2 Specialty:
   - Anesthesiology
   - Dermatology
   - Emergency Medicine
   - Family Medicine
   - General Surgery
   - Internal Medicine
   - Ob-gyn
   - Orthopedic Surgery
   - Pediatrics
   - Psychiatry
   - Radiology
   - Other (Please specify)

1.3 Current year in residency:
   - PGY 1
   - PGY 2
   - PGY 3
   - PGY 4
   - PGY 5
   - PGY 6
   - PGY 7
   - Other (Please specify)

1.4 Are you
   - Single, living without partner
   - Single, living with domestic partner
   - Married
   - Separated
   - Divorced
   - Widowed

1.5 If you have a spouse/partner, what was his/her occupation at the time of birth of each child?
   - Student
   - Physician
   - Other (Please specify)
1.6 Did your spouse/partner work outside the home after your children were born?
   YES
   NO

Section 2: Breastfeeding Education
2.1 Do you recall formal education about breastfeeding in medical school?
   YES
   NO

2.2 Do you recall formal education about breastfeeding in residency?
   YES
   NO

Section 3: Children
3.1 Do you have any biological children?
   YES- please complete the following questions for each child:
   NO- Thanks for completing the survey

3.2 Are you currently breastfeeding?

3.3 How many biologic children do you have?

3.4 What is the exact age of your child?

3.5 How would you describe your work environment during your pregnancy?
   Extremely hostile
   Somewhat hostile
   Neutral
   Somewhat supportive
   Extremely supportive

3.6 Did you plan for your child to be breastfed?
   YES. Please specify reasons
   NO. Please specify reasons

3.7 If yes, what was your original goal for length of breastfeeding?

3.8 In what stage of your career were you when your child was born?
   Before medical school
   During medical school
   During residency
   Other (Please specify)
3.9 How many total weeks of maternal leave did you take?

3.10 Of that total, how many weeks were paid leave?

3.11 Were you required to make up any missed call your maternal leave incurred?
   YES
   NO

3.12 Did you return to work when you wanted to / had planned?
   YES
   NO. If no, please specify reason
   Residency required it
   Personal preference
   Financial need
   Infant health
   Mother’s health
   Other (Please describe)

3.13 What was your schedule on return to work?
   Full-time
   Part-time (Please describe)
   Did not return

3.14 What year did you return to work?

3.15 Did you have flexibility to schedule your rotations upon return to work?

3.16 What type of rotation did you do after returning to work?
   Inpatient wards
   Outpatient rotation
   Consult rotation
   Research
   Other (Please specify)

3.17 What was your second rotation after returning to work?
   Inpatient wards
   Outpatient rotation
   Consult rotation
   Research
   Other (Please specify)

4. Breastfeeding
4.1 How was your infant fed immediately after birth?
Exclusively breastfed (with exception of medications and vitamins, infant only had breast milk)
  Combination of breast milk and formula
  Formula only
  Other (Please describe)

4.2 If infant was not breastfed at all, please describe why:
  Mother not interested in breastfeeding
  Mother not comfortable with breastfeeding
  Schedule would not permit
  Maternal medical reasons
  Infant not interested in breastfeeding
  Infant medical reasons
  Other (please describe)

4.3 At what age was the child first fed something other than breast milk or medication (e.g. formula, juice, solids, etc.)?

4.4 Why was formula/other food introduced?

4.5 At what age was your infant weaned from breast milk completely?

4.6 How would you scale your mental health / emotional state during your breastfeeding period?
  Severely depressed
  Mildly depressed
  Not depressed at all

4.7 How would you rate your energy level while breastfeeding?
  Often tired
  Sometimes tired
  Seldom tired

4.8 Why did you choose to wean your infant at that time?
  Mother not interested in breastfeeding
  Mother not comfortable with breastfeeding
  Lack of adequate milk supply
  Too stressful
  Lack of time
  Maternal health
  Infant health
  Infant not interested in breastfeeding
  Other (Please describe)
4.9 Were you satisfied with the duration that you actually breastfed?
   YES
   Somewhat
   NO

4.10 How long did you plan to breastfeed?

4.11 What were factors that encouraged you as a parent to start breastfeeding?

4.12 What were factors that discouraged you from initiating breastfeeding?

4.13 What were factors that encouraged you to continue breastfeeding?

4.14 What were factors that hindered breastfeeding continuation of your child?

4.15 Do you have any suggestions as to how a residency program can be supportive of breastfeeding efforts of new mothers upon returning to residency?

5. Breastfeeding and Working
5.1 Did you continue breastfeeding after you returned to work?
   YES- Please complete the following:
   NO- Thanks for completing the survey.

5.2 Did you pump milk while working?
   YES- Please complete the following:
   NO- Thanks for completing the survey.

5.3 Did you have sufficient time to express milk?
   Never
   Occasionally
   Sometimes
   Often
   Always

5.4 Did you have access to an appropriate place to express milk?
   Never
   Occasionally
   Sometimes
   Often
   Always

5.5 Name locations at work in which you have expressed milk in (check all that apply):
   Bathrooms
   Call room
5.6 Did you hand over your pager while expressing milk?
- Never
- Occasionally
- Sometimes
- Often
- Always

5.7 Please rate the support you felt from following people in your milk expression efforts while working:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td></td>
<td></td>
<td>neither</td>
<td>usually</td>
<td>always</td>
</tr>
<tr>
<td>Opposed</td>
<td></td>
<td></td>
<td>supportive</td>
<td>supportive</td>
<td>supportive</td>
</tr>
<tr>
<td>My efforts</td>
<td>my efforts</td>
<td>nor</td>
<td></td>
<td></td>
<td>Oppositional</td>
</tr>
</tbody>
</table>

Colleagues
Attendings
Program director

5.8 If your colleagues were other than supportive, please circle reasons you believe may have influenced this attitude (circle ALL that apply)

1. changes in the schedule
2. perceived special favors
3. lack of attending or residency director support
4. More work for others
5. Other (Please describe)

Thank you for completing the survey!
Section 1: Demographics

1.1 Age

1.2 Gender:
   - Male
   - Female

1.3 Specialty:
   - Anesthesiology
   - Dermatology
   - Emergency Medicine
   - Family Medicine
   - General Surgery
   - Internal Medicine
   - Ob-gyn
   - Orthopedic Surgery
   - Neurology
   - Pediatrics
   - Physical Medicine and Rehabilitation
   - Psychiatry
   - Radiology
   - Internal Medicine/Pediatrics
   - Other (Please specify)

1.4 Current year in residency:
   - PGY 1
   - PGY 2
   - PGY 3
   - PGY 4
   - PGY 5
   - PGY 6
   - PGY 7
   - Other (Please specify)

1.5 Are you
   - Single, living without partner
   - Single, living with domestic partner
   - Married
   - Separated
   - Divorced
   - Widowed
Other

1.6 Do you have any biological children?
   YES
   NO

Section 2: Breastfeeding Education
2.1 Do you recall formal education about breastfeeding in medical school?
   YES
   NO

2.2 Do you recall formal education about breastfeeding in residency?
   YES
   NO

If you do not have biological children, this concludes the survey. Thanks for completing the survey.
If you have biologic children, please complete the following:

Section 3: Children
3.1 How many biologic children do you have?

3.2 What is the exact age of each child (if age less than 2 years, please state in months)?

3.3 Are you currently breastfeeding?
   YES
   NO

3.4 If you have a spouse/partner, what was his/her occupation at the time of birth of each child?

3.5 Did your spouse/partner work outside the home after your child was born?
   YES
   NO

3.6 How would you describe your work environment during your pregnancy?
   Very unsupportive
   Somewhat unsupportive
   Neutral
   Somewhat supportive
   Very supportive
3.7 Did you plan for your child to be breastfed?

YES. Please check all that apply

Infant health
- Less infections/increased immunity
- Less allergies
- Increased IQ
- Decreased risk of obesity
- Decreased risk of diabetes

Maternal health
- Postpartum weight loss
- More convenient than formula
- Cheaper than formula
- Bonding with infant
- Lactation consultant recommendations
- Ob/Gyn recommendations
- Pediatrician recommendations
- Breastfeeding class
- Own mother
- Friends/other mothers
- Other (please specify)

NO. Please specify reasons

3.8 If yes, what was your original goal for length of breastfeeding?

- 3 months
- 6 months
- 12 months
- No goal
- Other (please specify)

3.9 In what stage of your career were you when your child was born?

- Prior to medical school
- During medical school
- During residency
- During fellowship
- Other (Please specify)

3.10 How many total weeks of maternity leave did you take?

3.11 Of that total, how many weeks were paid leave?

3.12 Were you required to make up any missed call your maternity leave incurred?

YES
NO
3.13 Did you return to work when you had planned?
   YES
   NO. If no, please specify reason
   Residency required it
   Personal preference
   Financial need
   Infant health
   Mother’s health
   Other (Please describe)

3.14 What was your schedule on return to work/residency?
   Full-time
   Part-time (Please describe)
   Did not return

3.15 What year did you return to work?

3.16 Did you have flexibility to schedule your rotations upon return to work?
   YES
   NO
   Not Available
   Somewhat

3.17 What type of rotation did you do after returning to work?
   Inpatient wards
   Outpatient rotation
   Consult rotation
   Research
   Other (Please specify)

3.18 What was your second rotation after returning to work?
   Inpatient wards
   Outpatient rotation
   Consult rotation
   Research
   Other (Please specify)

4. Breastfeeding
4.1 How was your infant fed immediately after birth?
   Exclusively breastfed (with exception of medications and vitamins, infant only had breast milk)
   Combination of breast milk and formula
   Formula only
Other (Please describe)

4.1a Was the above method consistent through first month of infant’s life?
   Yes
   No - Please explain

4.2 If infant was not breastfed at all, please describe why:
   Mother not interested in breastfeeding
   Mother not comfortable with breastfeeding
   Schedule would not permit
   Maternal medical reasons
   Infant not interested in breastfeeding
   Infant medical reasons
   Other (please describe)

4.3 At what age was the child first fed something other than breast milk or medication (e.g. formula, juice, solids, etc.)?

4.4 Why was formula/other food introduced?

4.5 At what age was your infant weaned from breast milk completely?

4.6 How would you scale your mental health / emotional state during your breastfeeding period?
   Severely depressed
   Mildly depressed
   Not depressed at all

4.7 How would you rate your energy level while breastfeeding?
   Often tired
   Sometimes tired
   Seldom tired

4.7a How would you rate your stress level while breastfeeding?
   Very stressed
   Somewhat stressed
   Seldom Stressed

4.8 Why did you choose to wean your infant at that time?
   Mother not interested in breastfeeding
   Mother not comfortable with breastfeeding
   Lack of adequate milk supply
   Too stressful
   Lack of time
Maternal health
Infant health
Infant not interested in breastfeeding
Other (Please describe)

4.8 a Was discontinuation of breastfeeding due to demands at work?
   YES
   NO

4.9 Were you satisfied with the duration that you actually breastfed?
   YES
   Somewhat
   NO

4.10 How long did you plan to breastfeed?

4.11 What were factors that encouraged you as a parent to start breastfeeding?

4.12 What were factors that discouraged you from initiating breastfeeding?

4.13 What were factors that encouraged you to continue breastfeeding?

4.14 What were factors that hindered breastfeeding continuation of your child?

5. Breastfeeding and Working
5.1 Did you continue breastfeeding after you returned to work?
   YES- Please complete the following:
   NO- Thanks for completing the survey.

5.2 Did you pump milk while working?
   YES- Please complete the following:
   NO- Thanks for completing the survey.

5.3 Did you have sufficient time to express milk?
   Never
   Occasionally
   Sometimes
   Often
   Always

5.4 Did you have access to an appropriate place to express milk?
5.5 Name locations at work where you have expressed milk (check all that apply; if more than one, please rank based on frequency of use with 1 being the most frequent):
- Lactation rooms
- Bathrooms
- Call rooms
- Private office spaces
- Shared office spaces
- Cars
- Other-specified

5.6 Did you hand over your pager while expressing milk?
- Never
- Occasionally
- Sometimes
- Often
- Always

5.7 In general, please rate the support you felt from following people in your milk expression efforts while working:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>Usually</td>
<td>Neither</td>
<td>Usually</td>
<td>Always</td>
<td>Didn’t</td>
<td>Know</td>
</tr>
<tr>
<td>Opposed</td>
<td>Opposed</td>
<td>Supportive</td>
<td>Supportive</td>
<td>Supportive</td>
<td>Know</td>
<td>Know</td>
</tr>
<tr>
<td>My efforts</td>
<td>my efforts</td>
<td>nor</td>
<td>nor</td>
<td>nor</td>
<td>nor</td>
<td>nor</td>
</tr>
</tbody>
</table>

- Colleagues
- Attendings
- Program director

5.8 If you encountered colleagues who were not supportive, please rank the reasons you believe may have influenced this attitude (1 – most important)

6. Changes in the schedule
7. Perceived special favors
8. Lack of attending or residency director support
9. More work for others
10. Other (Please describe)
5.9 Which one of the following would you suggest in a residency program as methods to effectively increase breastfeeding success of new mothers upon returning to residency? Check all that apply.

- Increased paid leave
- Formal maternity leave policy
- Non-clinical rotations upon return to work
- More lactation rooms
- Storage for breast milk
- Sinks inside/ close to lactation rooms
- Onsite daycare
- Shared /part-time residency

5.10 Do you actively promote breastfeeding amongst your women patients?
YES
NO
If No-The major reason for this is
- I don’t think it is possible for working women to continue to breastfeed
- I don't think it is important
- I think this is my patient’s decision and I should only respond if asked
- I don't have the time to address this with patients
- I don’t feel I am expert enough
- Other

5.11 Do you actively promote breastfeeding amongst female housestaff?
YES
NO
If No-The major reason for this is
- I don’t think it is possible for working women to continue to breastfeed
- I don't think it is important
- I think this is my patient’s decision and I should only respond if asked
- I don't have the time to address this with patients
- I don’t feel I am expert enough
- Other

Thank you for completing the survey!
LIST OF REFERENCES


BIOGRAPHICAL SKETCH

Maryam Sattari is an assistant professor in medicine in the University of Florida’s College of Medicine, Department of Medicine. She graduated from Berry College in 1995 with a B.S in mathematics and biochemistry. She received her M.D. in 1999 and completed her residency training in internal medicine in 2002, all at Emory University School of Medicine. Her primary research interest is in women’s health. This thesis completes the requirements for a Master of Science in Medical Science with a concentration in clinical and translational science, supported in part by the NIH/NCRR Clinical and Translational Science Award to the University of Florida, UL1TR000064.