Measuring the use of the Lactational Amenorrhea Method as a postpartum family planning method in urban Nigeria: challenges in measurement and recommendations for future MIYCN-FP integrated programs
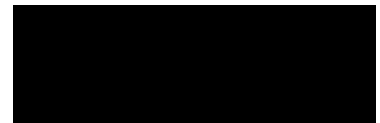
By

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ABSTRACT

Objective: The objective of this study is to describe the use postpartum contraception, particularly LAM, among urban women with a birth in the 24 months prior to their interview, including women who actively report LAM use and those who report Passive LAM practices (i.e., EBF or Full BF, no menses return, and <6 months postpartum, but no FP method).
Methods: This study uses endline household survey data for 2,765 women with a birth in the past two years from the Measurement, Learning and Evaluation Project (MLE) for the Nigerian Reproductive Health Initiative (NURHI) which was collected in 2014. Women's knowledge and use of LAM, and possible factors associated, were explored. Descriptive analysis to describe study variables and F-tests were conducted to determine significant differences between groups.
Results: Knowledge of all three LAM criteria was very low among this population. Passive LAM practices were evident among women reporting no use of a family planning method, and accurate use of LAM among those who did report LAM as their current method was low. Place of delivery and counseling on exclusive breastfeeding as a form of contraception was explored among these women. Prolonged LAM use beyond 6 months was also prevalent within this study population.
Conclusions: Knowledge of LAM criteria and accurate use of LAM is low among urban postpartum women in Nigeria. The integration of MIYCN-FP programs can improve the health and nutrition of women, especially through the promotion of LAM for postpartum women.

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LIST OF ABBREVIATIONS

CPR Contraceptive Prevalence Rate

DHS Demographic Health Survey

EBF Exclusive Breastfeeding

FP Family Planning

Full BF Full breastfeeding

IUD Intrauterine Contraceptive Device

LAM Lactational Amenorrhea Method

MIYCN Maternal, Infant, and Young Child Nutrition

MLE Measurement, Learning, and Evaluation

MEC Medical Eligibility Criteria

MDGs Millennium Development Goals

M&E Monitoring and Evaluation

NURHI Nigerian Urban Reproductive Health Initiative

PPFP Postpartum Family Planning

TO Tubal Occlusion

WHO World Health Organization

1. INTRODUCTION
1.1 Background information

Maternal, infant and young child nutrition (MIYCN) and reproductive health services, including family planning (FP), are crucial elements to improving the health of women and children globally. Birth spacing, which refers to the time interval between one child's birth and the next, is an important factor for the health and nutritional status of mothers and their children. Closely spaced pregnancies put mothers at risk of under nutrition, including nutritional anemia and other micronutrient deficiencies, and increase the risk for poor birth outcomes, such as preterm birth, low birth weight, and small for gestational age. [1-6] All of these adverse outcomes affect breastfeeding initiation and continuation. [7,8] Improving MIYCN practices, especially infant feeding practices, and increasing the use of modern FP methods are two strategies that have been promoted and used towards achieving Millennium Development Goal (MDG) 4, reducing child mortality, and MDG 5, improving maternal health. Together, promotion of exclusive breastfeeding (EBF), defined by the World Health Organization (WHO) as no other food or drink, not even water, for 6 months of life, but allows ORS, drops and syrups, and appropriate FP methods during the postpartum period can work synergistically to improve the health and nutrition of women and children.

Exclusive Breastfeeding

Exclusive breastfeeding is recommended for 6 months with continued breastfeeding and appropriate introduction of complementary foods for two years and beyond. [9] It provides the child with irreplaceable and essential nutrition for their growth and development and has the largest potential impact on child mortality than any other intervention. [10] Among a multitude of other health benefits, it is well established that infants who are EBF experience a reduction in mortality and morbidity from life-threatening diseases such as respiratory infections and

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diarrheal disease, which are vital for infants living in countries with high infant mortality.[11] Breastfeeding also contributes to healthy and adequate birth spacing for women, achieved by the anovulation that women experience when lactating that is associated lactational amenorrhea. While anovulation is associated with lactational amenorrhea, the relationship between them varies with feeding behavior. Studies from the 1970's and 1980's found that in fully lactating women, the return of menses precedes the resumption of adequate ovulation, due to the prolactin levels of breastfeeding women inhibiting the ovarian response to follicle stimulating hormone (FSH), but this effect usually decreases by 6 months; these studies also showed, however, that ovulation generally precedes the return of menses in women who are not fully breastfeeding, which can occur as early as 4 weeks postpartum.[12,13] Fully lactating, or full breastfeeding (Full BF) refers to infants who are exclusively or almost exclusively breastfed, meaning they receive no other liquids or solids, except vitamins, mineral water, juice, or ritualistic feeds given infrequently, and "nearly full" breastfeeding refers to infants whose the majority of feeds are breastfeeds and have no intervals greater than 4-6 hours between breastfeeds.[14] Based on these and similar studies, several as yet unpublished, a meeting of interdisciplinary international researchers was held in 1988 in Bellagio, Italy with the purpose to create a consensus of the conditions in which breastfeeding can be used as an effective and safe FP method.[15-17] The results of this meeting, referred to as the "Bellagio Consensus" stated "the maximum birth spacing effect of breastfeeding is achieved when a mother fully or nearly fully breastfeeds and remains amenorrhoeic. When these two conditions are fulfilled, breastfeeding provides more than 98% protection from pregnancy in the first six months."[15] This set of criteria was later developed as an algorithm and given the name Lactational Amenorrhea Method.[14] This format serves as a guide for LAM use. If, and only if, a woman can answer "no" to the following three

questions then the woman meets the requirements for LAM: 1) has there been a menstrual bleed? (or any two consecutive days, within 2 months after the birth) 2) is the infant receiving regular supplementary foods or fluids in addition to breastmilk?; and 3) is the infant older than 6 months of age? [14] If the woman responds yes to any of the three questions, her chance of pregnancy is increased, and for continued protection the woman should be advised to begin using a complementary FP method and to continue breastfeeding for the child's health. [14]

Despite the immense benefits EBF has for maternal and child health and survival, the global rate of EBF among all children under 6 months of age was only 38 percent (2008-2012). [18] In Western and Central Africa, rates of exclusive breastfeeding are currently even lower, at only 25 percent (2008-2012). [18] In 2012 the Sixty-fifth World Health Assembly endorsed the *Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition*, which advocates to increase the rates of global EBF to 50 percent by 2025, and urged member states to include nutrition actions in the overall country health and development policy. [19] To achieve the goals of the *Comprehensive Implementation Plan*, the *Essential Nutrition Actions* (ENA) guidelines were released in 2013 to provide program implementers and policy-makers with a package of essential nutrition interventions that utilize a life-course approach for improving EBF and focus on the 1,000 days of life, from conception till the child's second birthday. [20,21] These ENA strategies outline various integrated interventions at the health facility and community level, including counseling for pregnant and postpartum women. [20] To protect women against unintended pregnancies, reproductive health and FP programs that promote contraceptive methods during the postpartum period should be considered as a potential integrated intervention area for the promotion of EBF. This partnership would provide women with the most accurate

information for healthy birth spacing methods and options during the postpartum period as well as optimal nutrition for the infant.

Postpartum Family Planning

Reproductive and sexual health programs and services have increased globally due to the human rights-based strategies endorsed at the 1994 International Conference on Population and Development (ICPD) held in Cairo. This Programme of Action declared that couples and individuals have the basic right to decide freely and responsibly the number, spacing, and timing of their children and to have the information and means to do so.[22] Countries were called upon to provide reproductive health services such as FP counseling, information, education, communication, and services accessible to all individuals by 2015. A comprehensive review of the implementation of the Programme of Action in 2014 noted overall gains for FP method use, however, also noted prevailing low contraceptive prevalence rates (CPR) and high unmet need in sub-Saharan African countries, especially in West Africa.[23] Unmet need is a measure defined on the basis of survey data as the percentage of women who are sexually active, fecund, not currently using a method of contraception and want to stop or delay childbearing.[24] The use of FP not only helps women and their families meet their fertility desires but can also indirectly reduce maternal deaths, particularly in developing countries.[25] Globally, women in the postpartum period are among those with the highest unmet need.[26] Postpartum family planning (PPFP) refers to strategies for the prevention of unintended and closely spaced pregnancies through the first 12 months after pregnancy.[26] The unique FP needs for women during the postpartum period are recognized in the 2013 WHO *Programming Strategies for Postpartum Family Planning*. Given that a woman's individual breastfeeding practices can impact her duration of amenorrhea, the WHO strategies for PPFP state that an important consideration is the

clinical safety of certain methods given the mother's breastfeeding status, based on the WHO

Medical Eligibility Criteria (MEC). The WHO recommends the following regarding use of

contraception for postpartum women,: [26]

- LAM immediately after birth and for up to 6 months

- Copper-bearing intrauterine contraceptive device (IUD) inserted immediately or up to 48
  hours after birth, or after 4 weeks postpartum; or Tubal Occlusion (TO) can be performed
  immediately or up to 4 days after birth or any time after 6 weeks postpartum.

- For non-breastfeeding women: In addition to IUD and TO, progestogen only-methods
  immediately after birth and combined oral contraceptive pills starting 3 weeks after birth

- For breastfeeding women: all progestogen only-methods (pills, injections, implants) can
  be initiated at 6 weeks following birth; combined oral estrogen and progestin pills cannot
  be used until 6 months after delivery.

- All women, regardless of breastfeeding status, can initiate use of condoms immediately,
  emergency contraception after 4 weeks, and the diaphragm or cervical cap after 6 weeks.

For women who do choose to use LAM as their contraceptive method, the PPFP guide also

encourages that the mother be provided with timely counseling to choose and transition to

another modern method by the time her infant is 6 months of age.

MCH indicators and policy in Nigeria

      Nigeria, located in West Africa, is the most populous African country and has some of

the poorest reproductive health outcomes in the region. The 2013 DHS survey revealed a low

CPR, only 15 percent among married women, and a high total fertility rate of 5.5 births per

woman. [27] Despite high knowledge of contraceptive methods among women (85 percent), CPR

remains low, and unmet need for FP was 16 percent. In the five years preceding the 2013 DHS

survey, nearly one quarter (23 percent) of the births were spaced less than 24 months apart

among women ages 15-49, and the median birth interval was 32.3 months when the sibling was

living (slightly shorter when the sibling has died, 27.3 months). According to the 2013 DHS

survey, among women in urban areas that are using FP methods, only 17 percent are using a

modern method[1] and nearly 10 percent are using traditional methods[2]. For urban women,

commonly reported FP methods include injectables (4.4 percent), male condoms (4.4 percent),

and the pill (3.2 percent) and IUDs (2.1 percent). Only 0.7 percent of women reported using

LAM as a modern method; LAM was slightly more prevalent among highly educated and

wealthy women (about 1 percent of each group). [27]

Infant and young child feeding (IYCF) practices in Nigeria are also poor and deviate

from WHO IYCF recommendations. Although nearly 98 percent of all infants are ever breastfed,

EBF remains extremely low at only 17 percent for infants 0-5 months old, and nearly two-thirds

receive a prelacteal feed (children given something other than breast milk during the first three

days of life). The median duration of EBF in Nigeria is 0.5 months and is only slightly higher in

urban areas (0.6 months); this remained unchanged since 2008. [27] (These poor feeding practices

adversely affect health and are reflected in the poor nutritional status of children, with a fairly

high stunting rate of 37 percent of children under 5, and a high infant and under-5 mortality rate,

69 and 128 deaths per 1,000 live births, respectively. [27]

In 2011, the federal government of Nigeria committed to investing in FP programs and to

distribute free FP supplies to public health facilities in order to reduce the country's unmet need.

[28,29] The Federal Ministry of Health also committed to increasing community awareness of the

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[1] Modern methods include female sterilization, pill, IUD, injectables, implants, male condom, Lactational Amenorrhea Method (LAM), Standard Days Method (SDM), male sterilization, female condom, diaphragm, and other modern methods
[2] Traditional methods include rhythm method, withdrawl, or other traditional methods

benefits of EBF and against harmful practices such as discarding colostrum, yet Nigeria still has one of the poorest EBF rates in Africa.[29] Despite the many policies, including the Integrated Maternal, Newborn, and Child Health Strategy from 2007, behavior change and delivery of FP and IYCF services in Nigeria have faced major challenges.

1.2 Prior Studies

Breastfeeding is an important factor for determining the need for a contraceptive method during the postpartum period. The use of LAM has been well studied and shown to have high acceptability and efficacy in multiple countries.[30] Some studies have even shown that women who use LAM are more likely to use a contraceptive method at 12 months postpartum.[31,32] Inconsistent measures of LAM in various international surveys, however, have left some to question the quality of data on LAM use and the reliability of its use among postpartum women.[33]

Literature on urban postpartum women's contraceptive use with consideration of their breastfeeding status is sparse for Nigeria. In a literature review of postpartum contraceptive use in urban Nigeria, breastfeeding practices were rarely included in analyses and had fairly small sample sizes.[34,35] One study with a sample of mothers who delivered at a Baby Friendly hospital, did consider breastfeeding practices, however LAM was not included in their analysis of contraceptive use.[36] LAM practices were discussed in one study from the semi-urban town of Ilesa, Nigeria, and found that over 60 percent of women who reported no FP method maintained their amenorrhea status while exclusively breastfeeding, few women (4.8 percent) reported LAM as a contraceptive method, and of those who did, not all met the criteria for LAM.[37] Only one study attempted to assess women's awareness and knowledge of LAM.[38] No studies were found

that investigated current contraceptive use among postpartum women at a population level in urban Nigeria while taking into consideration their breastfeeding practices.

1.3 Study Context

Nigerian Urban Reproductive Health Initiative (NURHI) and the Measurement Learning and Evaluation Project (MLE)

As part of the Reproductive Health (RH) strategy of the Bill and Melinda Gates Foundation (BMFG), the Urban Reproductive Health Initiative (URHI), a five year program (2010-2015), was implemented in four countries, including Nigeria, Kenya, Senegal, and Uttar Pradesh, India. The programs were implemented with the aim of reducing maternal and infant mortality and unintended pregnancy by increasing access to high-quality, voluntary FP services. In Nigeria, the Urban RH Initiative was implemented through the Nigerian Urban Reproductive Health Initiative (NURHI), led by the Johns Hopkins University Center for Communications Programs (JHU/CCP), in six selected cities: Abuja (FCT), Benin City, Ibadan, Ilorin, Kaduna and Zaria. The NURHI program areas include service delivery, demand generation, advocacy, and research, monitoring and evaluation. A particular focus of the project is to promote contraceptive methods for both spacing and limiting births, and increasing access to family planning among the lowest and second-lowest wealth quintile. One of the objectives of the NURHI program was to develop cost-effective interventions for integrating quality FP with maternal and newborn health, HIV and AIDS, post-partum and post-abortion care programs, which included training of FP providers on various postpartum methods such as postpartum IUDs and LAM. [39,40]

The Measurement Learning and Evaluation Project (MLE) is the external evaluation component of the URHI in all four countries and is implemented by the Carolina Population

Center at the University of North Carolina at Chapel Hill. It is a seven year project with evaluation data collected in each country every two years. To evaluate the NURHI program impact in Nigeria, baseline data were collected in 2010-2011, midterm data were collected in 2012, and endline survey data collection was recently completed in 2014. [39,41]

1.4 Study Rationale

The lactational amenorrhea method (LAM) provides women with a highly effective contraceptive method that can be initiated immediately after birth and also provides the infant with the optimal nutrition it needs for growth and development for the first six months. Given the benefits breastfeeding provides to protect mothers against unintended pregnancies and the numerous health benefits for the infants, further evidence of knowledge and use of LAM among postpartum women is needed, especially to support integrated FP programs. Understanding the knowledge and use of LAM is especially important for urban poor women who live in complex situations that can impact their breastfeeding practices and who generally have low access to health services and poor health outcomes. [42,43] Lastly, the quality in measurement of LAM needs to be assessed in order to provide recommendations for improving the monitoring and evaluation of integrated FP programs in regards to LAM.

1.5 Research Question and Hypothesis

Using data from the endline evaluation of a recent FP program, implemented in Nigeria, the objective of this study is to describe the use postpartum contraception, particularly LAM, among urban women with a birth in the 24 months prior to their interview, including women who actively report LAM use and those who report Passive LAM practices (i.e., EBF or Full BF, no menses return, and <6 months postpartum, but no FP method). Additionally, the study aims to investigate women's accurate and inaccurate use of LAM according to the criteria established by

the Bellagio Consensus. This study hypothesizes that active and accurate LAM use will be higher among those with high knowledge of the LAM criteria, deliver in a health facility and are counseled on EBF as a FP method. The study also aims to measure women's use of Prolonged LAM, or LAM beyond 6 months postpartum without return of menses, for continued protection.

1.6 Conceptual Framework

Numerous factors are involved with a woman's decision to use a contraceptive method after birth. This study is guided by a conceptual framework that assumes that a woman's individual and community level factors can influence her breastfeeding practices, therefore impacting her duration of amenorrhea, and postpartum contraceptive method use. Individual factors such as age, education, religion, SES, region of residence, demand for FP and knowledge of LAM can influence a woman's choice to breastfeeding and use a postpartum family planning method. Other community level factors include, supply of and counseling on FP methods, social and cultural norms, postpartum practices, and the surrounding political and social environments also contribute to a woman's choice to breastfeed and use a postpartum FP method.

Figure 1: Conceptual Framework of LAM use in urban Nigeria

Individual Factors:
- Age
- Education
- Religion
- SES
- Region of residence
- Knowledge of LAM criteria
- Demand for FP

Community Level Factors:
- Access to perinatal health services and FP
- Counselling on FP methods, including LAM
- Social/culturual norms and attitudes towards infant feeding and FP
- Political will and commitment to infant feeding and FP

Amenorrhea

Breastfeeding Practices

Postpartum Contraceptive Use

YES

Active use of LAM

Use of other PPFP method

NO

Passive use of LAM

No method use

2. METHODOLOGY

2.1 Design and Sample Size

This study uses endline household survey data from the Measurement, Learning and Evaluation Project (MLE) for the Nigerian Reproductive Health Initiative (NURHI) which was implemented in six urban cities, Abuja (FCT), Benin City, Ibadan, Ilorin, Kaduna and Zaria. The MLE project's quasi-experimental hybrid study design is intended to study program impact using longitudinal data from multiple time points (Technical working paper study design). Ethical approval for the MLE study protocol and tools were approved by the University of North Carolina Institutional Review Board (IRB) and the National Health Research Ethics Committee, Nigeria (NHREC) in Nigeria. The survey sample was drawn from the six study cities with the intention to measure specific indicators such as contraceptive prevalence and total fertility rate,
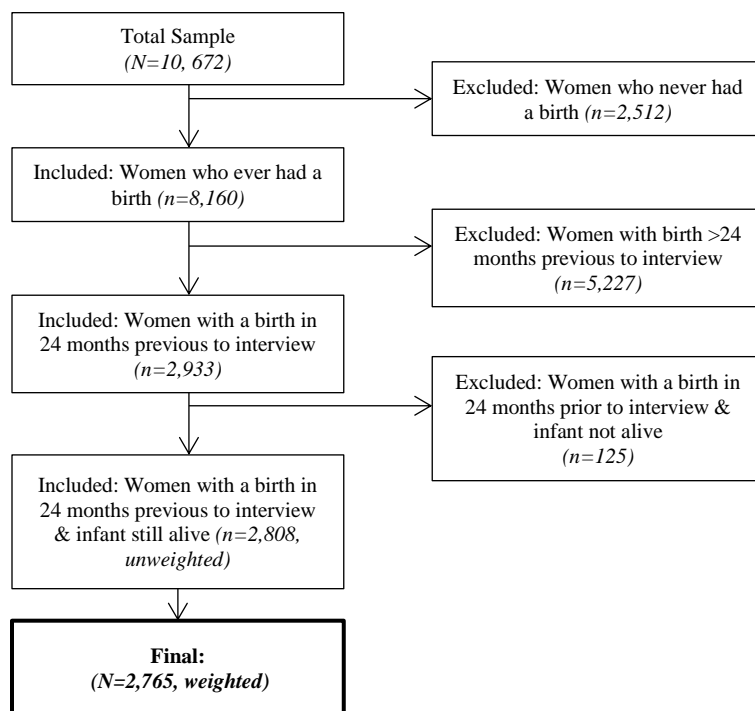
for each city. The sampling frame was constructed at baseline in 2010 and consisted of census enumeration areas (EAs) used for the 2006 Population and Housing Census of the Federal Republic of Nigeria, which was conducted by the National Population Council (Census citation). Only EAs that were classified as urban in this census for the study local government areas of study cities were included for the MLE survey, and served as the primary sampling unit (PSU), or cluster. A two-stage sampling design was used. First, a random sample of clusters were selected from a city, based on information from the 2008 DHS, then 41 households were randomly selected in each cluster to reach the final sample of about 3,000 households in each city. At baseline, all women ages 15-49 who were permanent residents of the household or visitors present on the night before the survey were eligible to be interviewed (MLE, baseline survey report).

The household survey consisted of two questionnaires, the Household Questionnaire, which was conducted first to identify eligible household members, and a Women's Questionnaire. The Household Questionnaire assessed household assets, environmental conditions, housing materials, and demographics of the household. The Women's Questionnaire asked comprehensive questions regarding the following topics: background characteristics, marital and cohabitation status, reproductive history, fertility preferences, knowledge and use of contraceptive methods, sexual history, maternal and child health, women's empowerment and spousal communication, media exposure to family planning messages, gender inequality, migration and movement history. At baseline a total of 19,556 households were selected and 16,118 eligible women were successfully interviewed between June and October of 2014. The endline household survey was conducted from June to October 2014 in the six urban cities of Abuja (FCT), Benin City, Ibadan, Ilorin, Kaduna and Zaria. At endline, 11,392 women were

successfully found during city tracking, and 10,672 women completed an interview, yielding an overall response rate since baseline of 66.2 percent.

The sample for this analysis includes women who had a live birth within the 24 months prior to their date of endline interview and whose infant was still alive (N=2,808, unweighted). Figure 2 illustrates the inclusion and exclusion criteria for this analysis. After applying sample weights to adjust for sample size in different cities and non-response rate for the analysis sample, the weighted analysis sample size is N= 2,765. See Table 1 for key demographic details of the sample of women with a birth in the last two years Ethical approval for this secondary analysis was obtained from the University of North Carolina Institutional Review Board.\

Figure 2: Inclusion criteria for analysis sample, MLE Nigeria 2014

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┌────────────────────────┐
│   Total Sample         │        ┌──────────────────────────┐
│   (N=10, 672)          │───────▶│ Excluded: Women who never│
└────────────────────────┘        │ had a birth (n=2,512)    │
            │                      └──────────────────────────┘
            ▼
┌────────────────────────┐
│ Included: Women who     │       ┌──────────────────────────┐
│ ever had a birth        │──────▶│ Excluded: Women with birth│
│ (n=8,160)               │       │ >24 months previous to    │
└────────────────────────┘        │ interview (n=5,227)       │
            │                      └──────────────────────────┘
            ▼
┌────────────────────────┐
│ Included: Women with a  │       ┌──────────────────────────┐
│ birth in 24 months      │──────▶│ Excluded: Women with a    │
│ previous to interview   │       │ birth in 24 months prior  │
│ (n=2,933)               │       │ to interview & infant not │
└────────────────────────┘        │ alive (n=125)             │
            │                      └──────────────────────────┘
            ▼
┌────────────────────────┐
│ Included: Women with a  │
│ birth in 24 months      │
│ previous to interview   │
│ & infant still alive    │
│ (n=2,808, unweighted)   │
└────────────────────────┘
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┌────────────────────────┐
│   Final:               │
│   (N=2,765, weighted)  │
└────────────────────────┘
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2.2 Data Measures

Various variables were constructed for this analysis, including postpartum month categories, feeding status, and LAM criteria knowledge, use of LAM, return of menses, and accurate use of LAM, all of the measures are defined and described below.

Months Postpartum

In order to analyze women by their duration since last birth (postpartum period) in months, two century month code (CMC) variables[3] were constructed for all women in the dataset. CMC was created for the woman's interview date and a second one for the date of birth of the woman's last child from the woman's birth history. Checks were conducted to ensure that each last child had a valid birthdate; only women who had a birth greater than 24 months prior to their interview date had missing data for the child's birthdate, and were thus excluded according to study inclusion criteria. To construct the months postpartum variable, the woman's last child CMC birthdate variable was subtracted from the woman's CMC interview date variable. The months postpartum were then recoded into a categorical variable, 0-5 months, 6-11 months, 12-17 months, and 18-23 months.

Breastfeeding Status

As previously mentioned, the WHO defines EBF, as no other food or drink, not even water, for 6 months of life, but allows ORS, drops and syrups.[9] Full breastfeeding refers to infants who are exclusively or almost exclusively breastfed, meaning they receive no other liquids or solids, except vitamins, mineral water, juice, or ritualistic feeds given infrequently, and "nearly full" breastfeeding refers to infants whose the majority of feeds are breastfeeds and have

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[3] As stated in the DHS Recode Manual, a century month code (CMC) is the number of the month since the start of the century. For example, January 1900 is CMC 1, January 1901 is CMC 13, January 1980 is CMC 961, September 1994 is CMC 1137. The CMC for a date is calculated from the month and year as follows: CMC = (YY * 12) + MM for month MM in year 19YY. The manual is available for download at http://dhsprogram.com/publications/publication-DHSG4-DHS-Questionnaires-and-Manuals.cfm

no intervals greater than 4-6 hours between breastfeeds. [14] Mixed feeding (MF) refers to the infant being fed both breastmilk and frequently receiving other supplementary foods or liquids. For this study, EBF, Full BF, and MF was assessed using 3 questions from the MLE Women's Questionnaire, 1) Are you currently breastfeeding (Name of last child), 2) How many times did you breastfeeding (NAME) in the last 24 hours?, and 3) In the last 24 hours, did (NAME) drink anything from a bottle with a nipple or eat any foods or liquids? A categorical "Feeding Category" variable was created using the results of these questions. If a woman was currently breastfeeding and had not given the infant anything from a bottle or other foods or liquids, she was recoded as "EBF." A proxy measure for Full BF was created if a woman was currently breastfeeding and had given a bottle or other foods or liquids, but had breastfed at least 8 times in the previous 24 hours; these women were recoded as "Full BF." Women were recoded as "MF" if they reported currently breastfeeding and had given a bottle or other foods or liquids and only breastfed 7 or fewer times. Women who answered "No" to currently breastfeeding were recoded as "No Breastfeeding." There were 11 women with missing data for their feeding status, and were recoded as "Missing."

LAM Criteria Knowledge

In the MLE Nigeria 2014 Woman's Questionnaire, knowledge of the LAM criteria was assessed through the use of three questions, which were based on questions from other international surveys. First, as part of the Reproduction module, women were asked, "Do you think that a woman who is breastfeeding her baby can become pregnant." If they answered "yes" or "depends," women were also asked "What are the criteria in which breastfeeding is effective as a family planning spacing method?" In the MLE survey, the three knowledge conditions for breastfeeding as a family planning method, or LAM, were defined and measured as: 1) Exclusive

breastfeeding (no supplements), 2) exclusive breastfeeding for up to 6 months, and 3) Menstrual period hasn't returned. Women could also answer "did not know", "no criteria/not a method," or propose an "other" criteria. The responses for women who listed "other" criteria were analyzed and recoded into "do not know" or "no criteria/not a method" since the answers did not refer to the conditions for LAM. In the Contraception module, women were asked to list the contraceptive methods they have heard of, and were then probed on method using a short description; LAM was described as "up to six (6) months after childbirth, a woman can use a method that requires that she feeds the baby with only breastmilk (no other formula, water or other food) and that her menstrual period has not returned."

To analyze women's knowledge of LAM criteria for this study, women's answers to these questions were tabulated and a categorical "LAM Criteria Knowledge" variable was created. Women who listed all three conditions for the criteria of LAM question were coded as having "Full Knowledge", if women indicated 2 out of the 3 conditions they were recoded as "Partial Knowledge", if women indicated 1 out of 3 conditions they were recoded as "Low Knowledge," and women who could not indicate any of the three conditions, they were recoded as "No Knowledge. Women's spontaneous and probed knowledge of LAM were already coded in the data set as "Yes" or "No."

Return of Menses

In the women's questionnaire, women who had a birth since 2012 were asked the date their menses had returned; other possible answers the question included "in menopause/has had a hysterectomy, before last birth, never menstruated, can't remember. For this analysis, a binary variable was created for "No Return of Menses." Women were recoded as 1 "No return of

menses" if they answered the question "before last birth." All other women were recoded as 0, "Menses has returned."

Use of LAM

For this study, women's use of LAM as a contraceptive method was analyzed in three ways. First by current contraceptive method use reported in the data set. Given the high reporting of no method and EBF or Full BF simultaneously, and the reporting of LAM beyond 6 months, the use of LAM was further analyzed in two ways: 1) the active use and passive practice of LAM, and 2) the accurate and inaccurate use of LAM.

First, in order to determine the use of LAM among postpartum women, a categorical variable for the "Women's use of LAM" was created. Women were recoded as "Active LAM" if their current reported contraceptive method was breastfeeding/LAM. Women were recoded as "Passive LAM" if their current reported contraceptive method was "no method" and feeding status was EBF or Full BF, and no return of menses, indicating passive LAM practices. All other women were recoded as "No LAM ."

Next, women's accurate use of LAM was recoded as a binary variable, "Acceptability of use of LAM." Women were recoded as "Inaccurate use of LAM" when women were either an active user of LAM, and indicated any of the following: greater than 6 months postpartum, MF or No Breastfeeding, and return of menses. Women were recoded as "Accurate use of LAM" when indicating the following characteristics: less than 6 months postpartum, EBF or Full BF, and had no return of menses.

Other variables analyzed in this study that were already constructed for analysis included age, marital status, religion, language, educational attainment, wealth quintile, city of residence and contraceptive method type. Contraceptive method types were categorized into two groups:

modern and traditional methods. Modern methods include female sterilization, male sterilization, daily pill, IUD, injectables, implants, male condom, female condom, emergency contraception, LAM/breastfeeding, and Standard Days method/cycle beads. Traditional methods include periodic abstinence and withdrawal. A wealth asset index was created at each survey round based on measurements from the household level data, such as ownership of durable goods and assets and the materials used in the construction of the household. Households were assigned a wealth score using principal components analysis and then quintiles (five categories) were created ranging from poorest to richest.

2.3 Analysis

The final analyses were conducted using STATA version 13.0 (StataCorp, 2012, College Station, TX). Descriptive statistics, particularly frequency distribution and cross-tabulations, were calculated and are used to describe the study variables. The sampling design was taken into account in analysis using the STATA 13.0 svy command, therefore all analyses are weighted. F-tests were conducted to test significant differences between groups of women.

3. RESULTS

A weighted total of 2,765 women who had a birth within 24 months prior to their interview date were selected for analysis. Table 1 shows the distribution of the women included in the analysis by key demographic information. The majority of women in the sample were young, between 20-34 years old (74.9 percent) and married (97.6 percent). Most women had high educational attainment; over 35 percent of the women had at least a secondary education, and another 25 percent of women had higher education. Most women reported speaking Hausa (40.9 percent) or Yoruba (34.2 percent) at home, and over 60 percent of the women were Muslim. Women from the poor and poorest wealth quintiles were slightly more represented (46.7 percent)

than the rich and richest wealth quintiles (32.6 percent), and as expected about 20 percent of

women were in the middle wealth quintile. Nearly three-quarters (72.7 percent) of women came

from the Northern region (Ilorin, Kaduna, Zaria, and Abuja) and only 27.3 percent were

currently living in the Southern Region (Ibadan and Benin City).

Table 1: Background characteristics of women with a birth in 24 months prior to interview, MLE Nigeria 2014

Background Characteristics	Percent(%)*	Weighted N (2,765)	Unweighted N (2,808)
Age			
15-24	16.0	445	509
25-34	59.4	1,641	1,564
35-49	24.4	675	732
50+	0.12	3	3
Marital Status			
Married	97.6	2,697	2,743
Never Married	1.1	30	27
Divorced/Separated	0.5	15	16
Widowed	0.8	23	22
Educational Attainment			
None	3.2	88	90
Quranic Only	9.1	252	354
Primary	17.0	469	514
Junior Secondary (JSS)	10.3	285	299
Senior Secondary (SSS)	35.3	975	907
Higher	25.1	696	644
Language Spoken at Home			
Hausa	40.9	1,130	1,411
Yoruba	34.2	944	833
Igbo	3.9	108	98
English	9.0	249	189
Pidgin English	4.6	128	96
Other	7.4	205	180
Missing	0.0	0.7	1
Religion			
Catholic	4.1	114	96
Protestant/other Christian	32.5	898	714
Muslim	63.3	1,750	1,994
No religion	0.1	3	4
Place of Delivery			
Public	39.6	1,094	1,036
Private	26.5	732	649
Home	25.8	713	941
Faith based	6.4	178	140
Other	1.2	33	29
Missing	0.5	15	13
Wealth Status			
Poorest	22.7	626	725
Poor	24.0	665	642
Middle	20.7	572	581
Rich	17.3	478	473

Richest	15.3	424	387
City of Residence			
Abuja	12.5	346	291
Benin	9.4	261	225
Ibadan	17.9	494	378
Ilorin	15.4	425	435
Kaduna	26.3	728	498
Zaria	18.5	511	981

*All percentages are weighted

A weighted analysis of breastfeeding practices was explored among the postpartum

duration categories, as illustrated in Figure 2. For women 0-5 months postpartum, 64 percent

reported EBF, which was much higher than the national DHS estimates for infants of these ages.

Full breastfeeding was also prevalent among the analysis sample, with 32 percent of women 0-5

months postpartum and 64 percent of women 6-11 months postpartum using this feeding method.

As expected, most infants are being fed food or beverages other than breastmilk after 6 months

of age, however a fair amount of women still report EBF until 18 months, and a very small

number report EBF at 18-23 months.

Figure 3: Percentage of breastfeeding status by women's postpartum duration among women with a birth in 24 months prior to interview, MLE Nigeria 2014
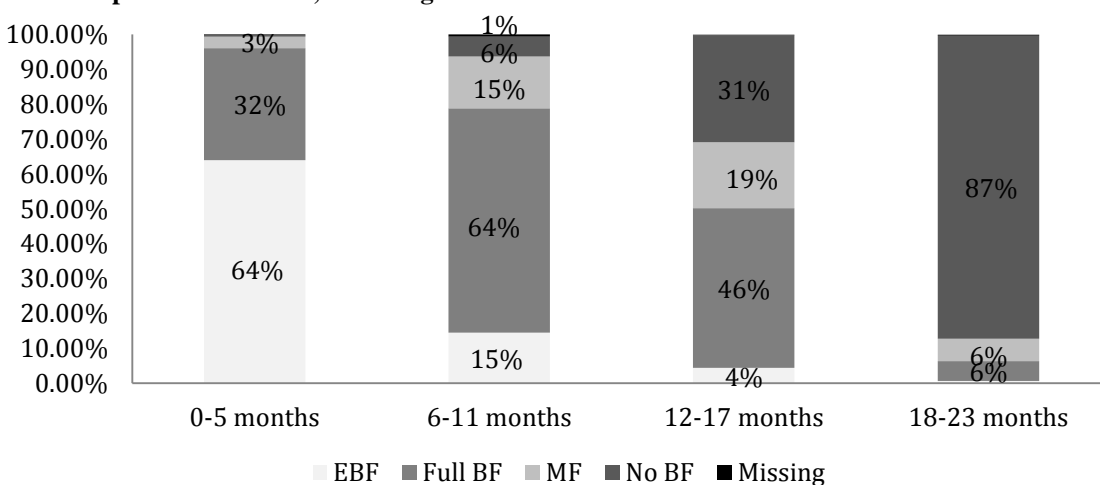
Postpartum family planning methods are recommended by the WHO based on

postpartum duration in the first 24 months after birth and breastfeeding status and fertility desires.

[26] At the time of interview, over 50 percent of women were currently using some contraceptive method during their postpartum period. Forty-two percent of women 0-23 months postpartum were currently using modern methods and about 14 percent were using traditional methods. Figure 3 shows current contraceptive method type use by women's duration of months postpartum. Among women with a birth in the 24 months prior to their interview, modern method use was most frequently reported by women 6-11 months postpartum. Interestingly, modern method use then slightly decreased among women 12-17 and 18-23 months postpartum, 46 and 39.3 percent, respectively. For these two groups, traditional method use increased slightly increased. For women under 6 months postpartum, most reported using no method (62.3 percent), nearly one-third reported using a modern method (32.5 percent), and few women reported using a traditional method (5.2 percent).

Figure 4. Current contraceptive method type by duration of months postpartum among women with a birth in 24 months prior to interview, MLE Nigeria 2014
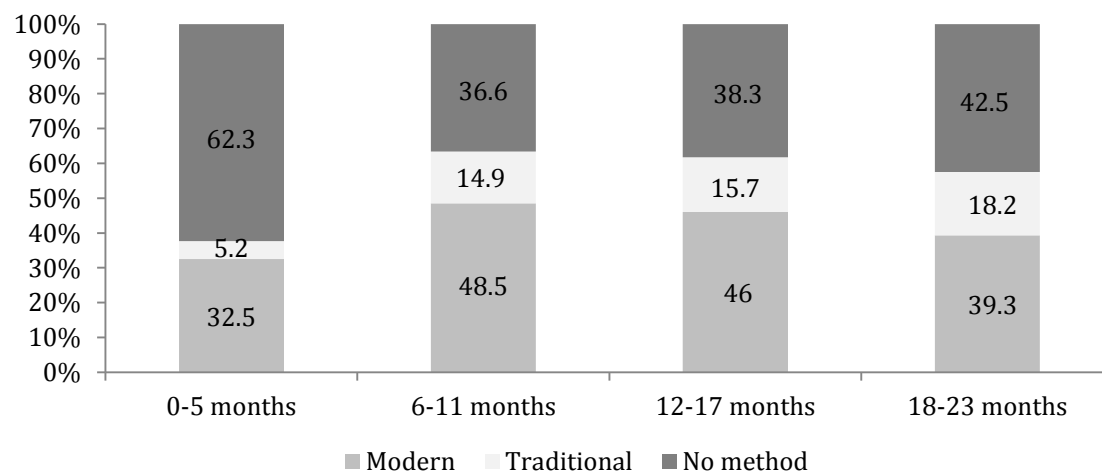

Table 2 displays the variables of interest for this study: duration of postpartum period in months, feeding status, contraceptive use, and in particular women's use of LAM. Women were fairly evenly distributed among the postpartum duration categories, with slightly more women in the 12-17 months postpartum group (28.1 percent). Nearly 20 percent of women reported EBF

and the majority of women were assigned Full BF status (38 percent); about one-third of women

were no longer breastfeeding (30.5 percent). Any contraceptive use was common among women,

however 44.5 percent of women still reported using no method. Methods that were most

commonly reported among these postpartum women included natural methods (12.4 percent),

LAM (12.3 percent), male condoms (8.7 percent) and injectables (8.3 percent). To determine if

women were using postpartum contraception appropriate to their duration postpartum and

breastfeeding practices, contraceptive use was explored by their breastfeeding status and duration

of postpartum period.

Table 2: Percentage of duration of months postpartum, feeding status and current contraceptive use among women with a birth in 24 months prior to interview, MLE Nigeria 2014

Background Characteristics	Percentage(%)*	Weighted N (2,765)
Months postpartum		
0 – 5	22.9	632
6 – 11	25.6	707
12 – 17	28.1	776
18 – 23	23.4	650
Breastfeeding Status		
Exclusive breastfeeding (EBF)	19.7	546
Full breastfeeding (Full BF)	38.0	1,050
Mixed feeding (MF)	11.4	314
No breastfeeding	30.5	844
Missing	0.4	11
Current Contraceptive Method Use		
No method	44.5	1230
Female sterilization	0.29	8
Implants	4.2	115
IUD	2.0	54
Injectables	8.3	229
Daily Pill	3.6	99
Emergency pill	1.4	38
Male condom	8.7	242
SDM	1.2	32
Breastfeeding/LAM	12.3	339
Natural methods	12.4	345
Other traditional method	1.2	33

* All percentages are weighted
Notes: EBF: defined as the infant is fed no other food or drink, not even water, for 6 months of life, but allows ORS, drops and syrups (WHO, 2003).
Full BF: defined as infants who are exclusively or almost exclusively breastfed, meaning they receive no other liquids or solids, except vitamins, mineral water, juice, or ritualistic feeds given infrequently, and "nearly full" breastfeeding refers to infants whose the majority of feeds are breastfeeds and have no intervals greater than 4-6 hours between breastfeeds (Labbok, et. al, 1994)

Table 3 shows the weighted percentages of women's contraceptive method mix (currently reported method used) by their postpartum duration in months and breastfeeding status. Any current contraceptive method use was reported most frequently by women who were MF (62.7 percent), followed by women who were Full BF (60.1), no breastfeeding (57.1 percent), and lastly, EBF (40.7 percent). For all feeding categories, women with the lowest contraceptive method use were women 0-5 months postpartum.

Any contraceptive use among women who were MF was highest among those 6-11 months postpartum (70 percent), with the most commonly reported methods being breastfeeding/LAM (17.9 percent), male condoms (16.1 percent) and injectables (14.7 percent). For women who were MF, method use was lowest among those 0-5 months postpartum (29.1 percent); the most frequently reported methods were similarly breastfeeding/LAM (12.6 percent), injectables (5.2 percent) and male condoms (5.0 percent).

Among women who were Full BF, any current contraceptive use was most frequently reported among women 12-17 months postpartum (63.7 percent). The three most reported methods for these women include breastfeeding/LAM (17.1 percent), male condoms (10.0 percent), and injectables (7.7 percent). Any current method use was lowest among Full BF women 0-5 months postpartum; the most commonly reported methods for these women were breastfeeding/LAM (24.1 percent), injectables (7.2 percent), and natural methods (5.8 percent).

For women who were not breastfeeding, any current contraceptive use was highest among those 12-17 months postpartum (59.6 percent), and the most commonly reported methods included natural methods (18.9 percent), male condoms (14.1 percent) and injectables (7.6 percent). Use was lowest for non-breastfeeding women 0-5 months postpartum, with no women using a contraceptive method, however this group consisted of only 3 women.

Lastly, among EBF women any current contraceptive method use was highest for those 6-11 months postpartum (65.1 percent), with the top three reported methods used being breastfeeding/LAM (22.7 percent), natural methods (11.8 percent) and injectables (11.2 percent). Any contraceptive use was lowest among EBF women 0-5 months postpartum (33.5 percent), with the top three methods being breastfeeding/LAM (17.9 percent), natural methods (4.1 percent) and male condoms (3.8 percent).

Table 3: Percentage of contraceptive method mix by women's breastfeeding status and postpartum duration in months among women with a birth in 24 months prior to interview, MLE Nigeria 2014

Method Type & Breastfeeding Status	0-5 mo. (%)	6-11 mo. (%)	12-17 mo. (%)	18-23 mo. (%)	Total (%)
EBF	**n=404**	**n=103**	**n=34**	**n=5**	**n=546**
No method	66.5	34.9	48.8	53.3	59.3
Female sterilization	1.3	0.0	0.0	0.0	1.0
Implants	1.5	2.9	0.0	15.2	1.8
IUD	0.0	3.6	0.0	0.0	0.7
Injectables	2.6	11.2	12.6	0.0	4.8
Daily Pill	0.7	3.0	8.5	20.8	1.8
Emergency pill	0.9	0.0	0.0	0.0	0.6
Male condom	3.8	7.0	7.1	0.0	4.5
SDM	0.3	1.5	0.0	0.0	0.5
Breastfeeding/LAM	17.9	22.7	17.6	10.8	18.7
Natural methods	4.1	11.8	5.4	0.0	5.6
Other traditional method	0.5	1.3	0.0	0.0	0.6
Full BF	**n=203**	**n= 454**	**n=356**	**n=37**	**n=1050**
No method	52.9	36.9	36.4	41.5	40.0
Female sterilization	0	0.3	0.2	0	0.2
Implants	3.6	5.1	2.0	7.8	3.8
IUD	0	1.4	1.6	0	1.1
Injectables	7.2	8.7	7.7	6.4	8.0
Daily Pill	0.3	2.3	6.9	1.7	3.4
Emergency pill	0.5	1.0	1.1	0	0.9
Male condom	2.2	10.2	10.0	6.1	8.4
SDM	2.7	1.0	0.4	0	1.1
Breastfeeding/LAM	24.1	17.3	17.1	20.7	18.7
Natural methods	5.8	14.5	14.0	10.8	12.5
Other traditional method	0.8	1.6	2.8	5.2	2.0
MF	**n=21**	**n=105**	**n=147**	**n=41**	**n=314**
No method	70.9	30.0	36.2	43.5	37.4
Female sterilization	0.0	0.0	0.0	0.0	0.0
Implants	3.2	6.7	5.9	2.5	5.5
IUD	0.0	3.8	4.4	0.0	3.3
Injectables	5.2	14.7	14.0	1.1	12.0
Daily Pill	0.0	1.1	3.8	4.0	2.6
Emergency pill	0.0	0.5	3.4	3.4	2.2
Male condom	5.0	16.1	12.0	7.6	12.3
SDM	0.9	0.0	1.7	0.0	0.8
Breastfeeding/LAM	12.6	17.9	8.4	15.4	12.8
Natural methods	0.0	8.4	10.2	22.5	10.6
Other traditional method	3.1	1.1	0	0	0.6
No Breastfeeding	**n=3**	**n=40**	**n=238**	**n=563**	**n=844**
No method	100	62.7	40.4	42.4	43.0

Female sterilization	0.0	0.0	0.3	0	0.1
Implants	0.0	6.7	3.3	6.5	5.6
IUD	0.0	1.2	3.2	3.5	3.3
Injectables	0.0	6.6	7.6	10.7	9.5
Daily Pill	0.0	1.2	4.9	5.5	5.3
Emergency pill	0.0	6.6	5.2	1.0	2.1
Male condom	0.0	5.5	14.1	9.8	10.7
SDM	0.0	0	1.6	2.2	1.9
Breastfeeding/LAM	0.0	3.2	0.0	0.1	0.4
Natural methods	0.0	10.7	18.9	17.5	17.5
Other traditional method	0.0	4.3	0.5	0.8	0.9

Notes: All percentages are weighted. Women with missing breastfeeding status are not shown
Full BF: defined as infants who are exclusively or almost exclusively breastfed, meaning they receive no other liquids or solids, except vitamins, mineral water, juice, or ritualistic feeds given infrequently, and "nearly full" breastfeeding refers to infants whose the majority of feeds are breastfeeds and have no intervals greater than 4-6 hours between breastfeeds (Labbok, et. al, 1994)

As seen by the reporting of LAM in all feeding groups and across postpartum duration groups, it is clear that use of LAM is poorly understood by many women. The last two criteria for LAM, 2) Is the infant receiving regular supplementary foods or fluids in addition to breastmilk? and 3) Is the infant older than 6 months of age?, are clearly violated by women who are not EBF or Full BF or are beyond 6 months postpartum. Nearly 20 percent of women who were EBF, reported using LAM between 6-11 months postpartum, and 16 percent of women 12-17 months were still reporting use of LAM while exclusively breastfeeding. Although women do meet the EBF criteria, the infant is clearly older than 6 months of age at this point in the woman's postpartum period. Likewise, women who are MF or not breastfeeding do not meet the criteria for LAM since the infants are receiving regular supplemental foods and or fluids in addition to breastmilk, yet over 10 percent of all women who are MF and a small number of non-breastfeeding women still reported LAM. The reported use of this method was high despite violations of the criteria necessary for proper use to protect against unintended pregnancy. Additionally, the high reporting of no method despite EBF and Full BF warranted a closer investigation into women's knowledge of the LAM criteria and their accurate versus inaccurate use of the method.

Most women in this sample had ever heard of LAM. When asked about what family planning/child spacing/birth spacing methods that a couple can use, or that they had ever heard of, 30 percent of women spontaneously mentioned LAM, while another 50 percent mentioned the method when probed. This is referred to as "Spontaneous" or "Probed" knowledge of LAM. When women were asked "Do you think that a woman who is breastfeeding her baby can become pregnant?" most women (84.5 percent) thought that a breastfeeding woman can get pregnant, 11.5 percent thought that it depends, 2 percent answered no, and 1 percent did not know. For women who said "yes" or "it depends," they were then asked the following question, "What are the criteria in which breastfeeding is effective as a family planning spacing method?" Table 4 shows the distribution of women in the analysis sample in groups of their full (3/3 criteria), partial (2/3 criteria), low (1/3 criteria), or no knowledge (0/3 criteria) of LAM criteria by their spontaneous and probed knowledge of LAM. Only 2 percent could correctly identify all three criteria of LAM and only 15.6 percent could identify two criteria. The majority of women only knew 1 criterion (59.2 percent) and over 20 percent had no knowledge of LAM criteria. More women with Spontaneous Knowledge of LAM had more Full (3.9 percent) and Partial (26.2 percent) knowledge of the LAM criteria than compared to women with Probed Knowledge (1.4 and 14.1 percent Full and Partial knowledge, respectively) and those who had never heard of LAM (0.3, 3.0 Full and Partial knowledge, respectively). These differences across the distributions of women with Spontaneous, Probed, or No knowledge and their knowledge of LAM criteria were found to be significantly different (p<0.001).

Table 4: Percentage of women who had ever hear of LAM and their knowledge of the LAM criteria among women with a birth in 24 months prior to interview, MLE Nigeria 2014[a]

Ever heard of LAM	Full Knowledge of LAM Criteria (3/3) (%)	Partial Knowledge of LAM Criteria (2/3) (%)	Low Knowledge of LAM Criteria (1/3) (%)	No Knowledge of LAM Criteria (0/3) (%)	Missing (%)	Weighted percent (%)	Weighted frequency (n)
Spontaneous knowledge of LAM***	3.9	26.2	62.8	7.1	0.07	**100**	**840**
Probed knowledge of LAM***	1.4	14.1	64.1	19.4	1.0	**100**	**1383**
Never heard of LAM***	0.3	3.0	40.4	51.4	4.9	**100**	**500**
Missing	0	0	0	100	0	**100**	**1**
Weighted n	**54**	**432**	**1,637**	**601**	**40**	**-**	**-**
Weighted %	**2.0**	**15.6**	**59.2**	**21.7**	**1.5**	**-**	**-**

[a] LAM Criteria questions were asked to women who thought a woman could get pregnant while breastfeeding; missing women include those who thought a woman could not get pregnant while breastfeeding and women with missing data
*** F-test, p<0.001; Significant difference across distributions by knowledge of LAM criteria

Given the low knowledge of LAM criteria, women's use of LAM and factors related to their delivery were analyzed. As discussed before, women who reported using LAM in the questionnaire were labeled, "Active LAM" and women who reported no method but were EBF or Full BF and had not returned to menses were labeled as "Passive LAM." Table 5 shows the distribution of these users by their breastfeeding status; only women who were currently breastfeeding had any LAM use or LAM practices. Among the 69.1 percent of women currently breastfeeding, 12.3 percent actively reported using LAM (Active LAM), while slightly more women, 14.0 percent, were passively practicing LAM (Passive LAM), and most (42.8 percent) women were either using a different contraceptive method or no method (No LAM). In order to determine whether women's active LAM use was accurate or not based on the criteria set in the Bellagio Consensus, return of menses was calculated for all women in the analysis sample (data not shown). Using this return of menses measure, breastfeeding status, and duration of months of postpartum, we were able to determine that of the 12.3 percent of women who actively report

using LAM, the majority of women do not use it according to the conditions (9.0 percent) and only 3.3 percent of active LAM users were accurately using the method (p<0.000).

Place of delivery and counseling on EBF after delivery for those who delivered in a facility was analyzed for these users. Overall, institutional delivery was high for this analysis sample (72.5 percent). Most women who were not breastfeeding had institutional deliveries (77.6 percent); among women who were currently breastfeeding many also had institutional deliveries (70.2 percent), yet over a quarter of these women had home births (28 percent); those women with missing feeding data also had high institutional deliveries (75.3 percent) (p<0.01). Current breastfeeding women reported more often that they received information on EBF after delivery (75.8 percent) than those women who were not breastfeeding (66.2 percent) or had missing feeding data (45.0 percent) (p<0.01). These differences in place of delivery were greater when looking only at currently breastfeeding women by their LAM use. Home births were most common among Active LAM users (44.3 percent), lower for women with Passive LAM practices (34.0 percent), and lowest among women with No LAM use (21.4 percent) (p<0.001). Interestingly, differences in counseling on EBF after delivery were not significant for these groups of Active, Passive and No LAM. Moreover, despite Accurate LAM users having more institutional deliveries than Inaccurate LAM users (63.4 percent and 51.7 percent, respectively) and reporting EBF counseling after delivery more often (75.6 percent vs 69.1 percent, respectively), these differences were not found to be significant.

Table 5. Use of LAM among women with a birth in the 24 months prior to their interview, MLE Nigeria 2014[a]

Breastfeeding Status and LAM use	Percentage	Freq.	Place of Delivery			Received info on EBF as FP after delivery		Total (%)
			Facility	Home	Other/missing[b]	Yes	No	
	(%)	(n=)	(%)	(%)	(%)	(%)	(%)	100
**No Breastfeeding **	**30.5**	**844**	77.6	20.9	1.5	66.2	33.8	100
**Currently Breastfeeding (EBF, Full, MF) **	**69.1**	**1910**	70.2	28.0	1.8	75.8	24.2	100
No LAM***	42.8	1186	76.6	21.4	2.0	66.8	33.2	100
Passive LAM ***	14.0	386	63.7	34.0	2.3	71.1	28.9	100
Active LAM***	12.3	338	55.1	44.3	0.64	60.4	39.6	100
Missing	**0.4**	**11**	75.3	24.7	0	45.0	55.0	
Total	**100**	**2765**	**72.5**	**25.8**	**1.7**	**69.2**	**30.8**	**100**
Among Active LAM users								
Accurate***	3.3	91	63.4	35.7	0.88	75.6	24.45	100
Inaccurate* **	9.0	248	51.7	47.7	0.64	69.1	30.9	
								100
Total	**12.3**	**339**						

a) All n's and % are weighted
b) Other facilities include: work site, NGO facility, mosque and posts of individuals (e.g., TBA, CHW)
c) Among those who delivered in a facility, had missing facility, and 1 woman with a home birth, n=2044
 ** Significant differences found across the distributions by place of delivery and EBF counseling at delivery, using F-test at p<.01
*** Significant difference across distribution of women's active use of LAM by their accurate and inaccurate use; Significant differences found across the distributions of No LAM, Passive LAM, and Active LAM by place of delivery, using F-test at p<.001
Notes: Passive LAM: defined as women who report no current FP method, but meet the criteria for LAM practices, EBF or full breastfeeding, no menses return, and <6 months postpartum.
EBF: defined as the infant is fed no other food or drink, not even water, for 6 months of life, but allows ORS, drops and syrups (WHO, 2003). **Full BF:** defined as infants who are exclusively or almost exclusively breastfed, meaning they receive no other liquids or solids, except vitamins, mineral water, juice, or ritualistic feeds given infrequently, and "nearly full" breastfeeding refers to infants whose the majority of feeds are breastfeeds and have no intervals greater than 4-6 hours between breastfeeds (Labbok, et. al, 1994)

Lastly, despite the Bellagio Consensus definition of LAM being up to 6 months

postpartum, some studies have considered that women beyond 6 months postpartum can

effectively use LAM if their menses has not returned and continue to breastfeed. [30,44] As an

exploratory analysis, effective "Prolonged LAM use" among accurate active users and passive

users of LAM were tabulated for any duration of postpartum of period beyond six months only if

their menses had not yet returned and were still EBF or Full BF. Table 6 shows that many

women who had not returned to menses were still effectively using LAM beyond 6 months. Of

all accurate and Active LAM users (n=216) and women with Passive LAM practices (n=386)

34.7 percent and 57.8 percent, respectively, were using effectively Prolonged LAM beyond 6

months postpartum.

Table 6. Prolonged LAM use beyond 6 months postpartum among women with a birth in the 24 months prior to interview, MLE Nigeria 2014[a]

Months Postpartum	Weighted percent (%)	Weighted frequency (n)	Unweighted frequency (n)
Passive Use of LAM			
0-5 months	65.3	252	270
6-11 months	24.3	94	117
12-17 months	9.0	35	45
18-23 months	1.4	6	10
Total	100	386	442
Active use of LAM (Accurate)			
0-5 months	42.2	91	136
6-11 months	33.3	72	108
12-17 months	21.2	46	64
18-23 months	3.3	7	9
Total	100	216	317

a. Among women who have had no return to menses and are still breastfeeding and were considered Accurate Active LAM or Passive LAM

Another factor that could affect a woman's ability to get pregnant during the prolonged

postpartum period is postpartum abstinence. Women who were not using a FP method were

asked in the survey for reasons why. For those women with Passive LAM practices, reasons as to

why they were not using a FP method were explored for patterns of postpartum abstinence. Table

7 shows reasons related to postpartum abstinence or breastfeeding for all women who reported

currently not using any FP method by their duration of the postpartum period. Many other

reasons were noted by women, but these responses were of interest for postpartum abstinence

and breastfeeding.

Table 7: Select reasons for not using FP method associated with postpartum abstinence or breastfeeding among women with Passive LAM practices, MLE Nigeria 2014

Reason for not using FP method	0-5 mo. (%)	6-11 mo. (%)	12-17 mo. (%)	18-23 mo. (%)
	n=252	n=94	n=35	n=6
No sex/infrequent sex/no partner/not married	13	17.5	14.5	20.1
Away from spouse	3	3	0	0
Breastfeeding/recently had a child	71	20	8	1

Note: Percentages may not sum to 100% because multiple responses could be given; not all possible responses shown

4. DISCUSSION AND CONCLUSION

4.1 Discussion

The main findings of this study not only highlight the issues in the measurement of LAM use in program evaluations, but also reveal that women's knowledge and understanding of LAM criteria is very low. This study also reveals that a woman's knowledge and use of LAM may be affected by her place of delivery. It is troubling that women who deliver at a health facility and are counseled on EBF after delivery are still inaccurately using LAM. Additionally, this study shows that Prolonged LAM can be effectively used by women beyond six months postpartum if they are still breastfeeding and have not returned to menses.

The low knowledge of LAM criteria and fairly high use of LAM suggests that many women may not fully understand the mechanisms in which breastfeeding can protect against unintended pregnancies. If women do not know to transition to a different contraceptive method once any condition for LAM is not met, this could lead to shorter birth intervals or unintended pregnancies. Low knowledge also highlights areas in which health service training for providers and lay health people, such as traditional birth attendants or community health workers, can be improved for EBF and LAM counseling. Although this survey only captures EBF counseling for

contraceptive purposes after delivery, this counseling should also be done at other health service points, such as child health visits, immunization visits, and maternal health visits. Counseling at these points is especially important for women who may be using LAM inaccurately or for those women who need to transition to another method.

The role of postpartum abstinence among this population of postpartum women cannot be ignored. In many societies, including in Nigeria, postpartum abstinence is common and often a reason for not using a FP method, regardless of breastfeeding practices. Although LAM delays the return to menses, whereas postpartum abstinence alone does not, special considerations for FP counseling for women who are practicing both are needed. A possible explanation for women's high spontaneous or probed knowledge of LAM compared to their low knowledge of LAM criteria could be due to the fact that questions about LAM criteria appeared in the survey before questions about their knowledge of LAM as a method, therefore a women might have remembered the question from earlier and mentioned it as a method. The order of these questions should be considered in future surveys to provide accurate measurements of knowledge of LAM.

This study has high public health relevance since EBF and adequate birth spacing is important for both the mother and child's health and nutritional status, and the promotion and use of LAM can help ensure the best start to life for infants and continued health of the mother. The use of FP can affect the nutritional status of women and their families, and thus contribute to the overall nutrition security of that family, community, and country.

The results of this study are similar to those of where they found low awareness, knowledge of criteria and use of LAM in Nigeria (42 percent, 23 percent, and 13 percent, respectively), however this was also from a rural and urban sample of all women of reproductive age 15-49. [38] One study in Egypt found that 80 percent of women with an unplanned pregnancy

were breastfeeding at the time of conception. None of these women met all conditions of LAM at conception; however, over 60 percent of the women thought that the breastfeeding would protect them from a pregnancy. [45] Although no women in this study with Active LAM use or Passive LAM practices were pregnant at the time of interview, it is interesting that many women who actively reported using LAM were actually inaccurately using the method. This may be because the women, similar to the study in Egypt, thought that breastfeeding would protect them from pregnancy regardless of their duration postpartum or menses return. This study also found similar results to that Labbok, et al. (1997) that women beyond 6 months postpartum can effectively use Prolonged LAM. [30]

This study has certain limitations that cannot go without being acknowledged. One such limitation is that this is a cross-sectional study of LAM use and therefore is not generalizable. Although the data comes from a larger longitudinal sample, breastfeeding questions were not included in the baseline or midterm survey, which makes it impossible to examine LAM use and transition to other FP methods with the longitudinal data. Another such limitation includes recall bias. Although women were asked about current FP and breastfeeding practices, how many times a woman breastfed in the previous 24 hours, which women may under or over-report. Since this reporting was used to create a proxy for Full BF, the recall of number of times could have potentially limited or overinflated the sample analyzed for LAM use. Another limitation of this study is that EBF counseling could only be measured at one point of integrated care, after delivery, therefore it mostly captures women who delivered at a health facility, when LAM use was also high among women with home births. Information on counseling at different integrated care points could have revealed potential areas for strengthening messaging and counseling on LAM.

4.2 Recommendations for future programs and research

Training on LAM for health service providers should be a focus of future FP programs, as knowledge of LAM among women is very low. Future evaluations of FP programs should also include breastfeeding history and complete categorizations for current breastfeeding practices to better analyze LAM use among postpartum women. Other questions about attitudes and knowledge towards breastfeeding would also be helpful to further analyze characteristics of LAM users. Monitoring and evaluation of FP programs should also consider adding more breastfeeding focused questions to surveys, like a woman's breastfeeding history, to their questionnaires to enrich the evidence on LAM use and knowledge among postpartum women. Measuring the counseling of EBF and LAM at integrated health points is vital as well. Additionally, when measuring LAM as contraceptive method in surveys, answers should only include the word "LAM," not "Breastfeeding/LAM" to avoid confusion that breastfeeding alone can be considered a method. Tools for monitoring and evaluation of LAM exist for programs wanting to integrate FP and MIYCN and can be accessed through the MYICN-FP working group online toolkit (https://www.k4health.org/toolkits/miycn-fp).

To provide evidence for programs, future research on LAM should be a priority. Future studies should include analysis on women with Passive LAM practices to further understand their practices and acceptance of family planning. The transition from LAM should also be studied further to understand LAM's role as a "gateway method" for FP method users.

4.3. Conclusion

To protect women against unintended pregnancies, reproductive health and FP programs that promote contraceptive methods during the postpartum period need to improve their training and counseling in EBF and LAM. Integrated MYICN and FP programs provide potential to

improve maternal and infant health and nutrition with improved counseling on LAM, and more effort should be made to combine these initiatives.

This partnership would provide women with the most accurate information for healthy birth spacing methods and options during the antenatal and postpartum period as well as optimal nutrition for the infant. An overall goal for any integrated FP program should include that antenatal and postpartum women are counseled on EBF and LAM during antenatal care and prior to discharge (WHO, 2013). For women who may not deliver in a facility, home-based care from midwives or community health workers (CHWs) is a vital point for mothers to receive information on EBF, LAM, and method transition. Growth monitoring, nutrition promotion, and other MIYCN interventions and activities are other key points of integration for PPFP messages, for mothers under 6 months postpartum and even those beyond 6 months postpartum.

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