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Lactational Amenorrhea Method as a Contraceptive Strategy in Niger

Heather L. Sipsma · Elizabeth H. Bradley · Peggy G. Chen

Abstract If used properly, the lactational amenorrhea method (LAM) can be a valuable family planning tool, particularly in low-income countries; however, the degree to which LAM is used correctly and characteristics associated with its use have not been well documented. We therefore sought to use nationally representative data from Niger, where fertility rates are high and women may have limited access to alternative contraceptive methods, to describe the proportion of women who use LAM correctly and the characteristics associated with LAM use. We utilized cross-sectional data from the 2006 Niger Demographic Health Survey. Our sample included all sexually active, non-pregnant, breastfeeding women using some form of contraception (N = 673, unweighted). We used weighted frequencies to describe the correct use of LAM and logistic regression models to describe women who chose LAM for contraception. Among our sample, 52 % reported LAM as their primary method of contraception, but only 21 % of the women who reported using LAM used it correctly. Women who reported using LAM were more likely to live in certain regions of the country, to have no formal education, and to have delivered their most recent baby at home. They were also less likely to have discussed family planning at a health facility or with their husband/partner in the past year. Results indicated that few women in Niger who reported using LAM used it correctly. Our findings reinforce the need to address this knowledge gap, especially given Niger's high fertility rate, and may inform efforts to improve family planning in Niger and in other low-income countries.

Keywords Lactational amenorrhea method · Family planning · Contraception

H. L. Sipsma (✉)
Department of Health Policy and Administration, School of Public Health, Yale University, 2 Church Street South, New Haven, CT 06519, USA
e-mail: heather.sipsma@yale.edu

E. H. Bradley
Department of Health Policy and Administration, School of Public Health, Yale University, 60 College Street, New Haven, CT 06510, USA

P. G. Chen
RAND Corporation, RAND Health, Santa Monica, CA, USA

Introduction

Unintended pregnancies, those that are either unwanted or mistimed, may lead to unsafe abortions which can increase the risk for morbidity and mortality among women. Unintended pregnancies may also lead to unintended births, which can have negative consequences for mothers and their families, including increased risk for poor maternal and child health outcomes, financial and emotional strain, and limited educational and economic opportunities [1]. In low-income countries, however, these consequences may be further exacerbated by the comparative lack of resources. The most common reasons for unintended births in low-resource settings are women not understanding their risks for getting pregnant, lack of available contraception, and opposition to family planning by a woman, her partner or other close family member [2].

Given these considerations, the lactational amenorrhea method (LAM) may be particularly valuable to women in low-resource settings, as it is highly effective in preventing repeat pregnancies in the first 6 months postpartum [3–6]. Furthermore, this approach to contraception is inexpensive, is safe for mothers, and provides ideal nutrition and defense

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against disease for infants [7, 8]. Using LAM correctly requires three criteria to be met: (1) postpartum amenorrhea, (2) full or nearly full breastfeeding, which means that the infant must breastfeed at least every 4 h during the day and every 6 h during the night, and (3) the infant must be less than 6 months old [9]. Several studies have demonstrated LAM effectiveness at 98 % or higher among women who meet all these conditions [10–12].

Although LAM is commonly reported as a contraceptive method in low-resource settings [13, 14], little is known about who is choosing LAM for contraception and to what degree these women are using it correctly. Only two previous studies have examined the issue of correct use of LAM [14, 15]. Evidence from these studies indicates that less than 20 % of women using LAM were using it correctly; however, both studies were from middle-income countries and neither study used a nationally representative sample. To our knowledge, no previous study has been conducted on the African continent, where fertility rates are generally high and health resources extremely limited.

We therefore sought to explore the use of LAM in Niger, an African country with one of the highest fertility rates in the world (7.4 children born per woman), low per capita income (more than 60 % live on less than US$1 per day), and insufficient access to alternative contraceptive methods, as results in this context may be particularly important for informing future family planning efforts. Furthermore, a recent review suggested that LAM may be a good contraceptive choice for many women in Niger, given the country's poor access to health facilities, poor road infrastructure, and high rates of breastfeeding (98 % initiate breastfeeding and more than 90 % are still breastfeeding at 1 year) [16, 17]. Last, the Niger Demographic and Health Surveys included our variables of interest [17], including husbands' approval of family planning. We believed this variable to be particularly important to our analysis, given the nature of LAM and the family and cultural dynamics in Niger, where women have little control over their own fertility and family planning decisions. Although only 10 % of women report currently using contraception [17], less than half (42 %) of the demand for family planning is satisfied [18]. Consequently, we believe that efforts to promote LAM may be particularly relevant in this context. We therefore aimed to describe (a) the prevalence of reported LAM use in Niger among women for whom LAM is a reasonable choice; (b) the proportion of these women who use LAM correctly; and (c) the characteristics associated with LAM use using nationally representative data. Given the increased efforts to promote LAM as an effective contraception method particularly in low-income countries, it is vital to better understand who is using LAM and the degree to which they are using it correctly.

Methods

Study Design and Sample

We conducted a cross-sectional study using self-reported data from the Demographic and Health Surveys (DHS) collected in Niger during 2006 by the National Institute of Statistics with support from Macro International Inc and the US Agency for International Development (USAID; [17]). The DHS is a household survey designed to collect nationally representative estimates of population, health and nutrition indicators. Its sampling uses a 2-stage stratified cluster design in which enumeration areas, stratified by region and area type (urban/rural), are selected and then households are sampled from each of these areas. All eligible members of the selected household were asked to participate in face-to-face interviews. This analysis used data from the DHS women's questionnaire, which was administered to women ages 15 through 49 and collected data on a wide range of reproductive health and background characteristics.

To examine the prevalence of LAM as a contraceptive strategy, we limited our sample to women for whom LAM was a reasonable choice. Therefore, our sample was limited to women who were sexually active, non-pregnant, breastfeeding and reported using some form of contraception (N = 673 women, unweighted).

Measures

All measures were derived from the 2006 Niger DHS.

Our primary outcome measure was reported LAM use, derived from a single question from the DHS asking respondents to select their current contraceptive method. Responses included female sterilization, male sterilization, pill, IUD, injections, implants, condom, female condom, diaphragm, tablets/foam/jelly, lactational amenorrhea, periodic abstinence, and withdrawal. Only one response was allowed. We created a dichotomous variable to indicate whether or not each woman reported LAM as her contraceptive strategy.

To examine the extent to which LAM was used correctly, we measured whether women met all three criteria for effective LAM use by their responses to DHS survey questions. Women reported whether or not they were amenorrheic, the number of times they breastfed during the day, and the number of times they breastfed during the night. The age of each woman's youngest child was calculated using the difference in months between the interview date and the most recent date of birth to create a binary variable describing whether or not the youngest child was less than 6 months of age. We created a dichotomous "correct use" variable to indicate whether or

not the woman (a) was amenorrheic, (b) breastfed at least four times during the day, (c) breastfed at least once at night and (d) had an infant less than 6 months of age. Only women who met all four criteria were classified into the "correct use" category.

To examine characteristics associated with reported LAM use, we selected a series of socio-demographic, reproductive health, and family planning variables from the DHS hypothesized to be relevant to understanding this subpopulation. Basic socio-demographic characteristics included age, education level (none, primary, above primary), marital status (married or not) and employment status (employed or not) as well as region and area (urban or rural) of residence, wealth and religion (Muslim vs. all others). The DHS derived a wealth index by using a combination of reported household assets, services and amenities and divided into quintiles [19]. Women reported age at first birth and total number of children ever born. With regard to their most recent pregnancy, women indicated whether they had received prenatal care, the number of antenatal visits, whether they had delivery assistance and whether they had delivered at home. The survey also assessed whether or not women heard family planning information on the radio, on TV, and/or in the newspaper or magazines during the past month; whether or not women had been visited by a family planning worker in the past year; and whether or not women had discussed family planning at a health facility in the past year. Last, women indicated whether or not their husband or partner approved of family planning and whether or not she had discussed family planning with him in the past year.

Statistical Analysis

We first generated weighted frequencies to describe characteristics of our sample population. We also used frequencies to determine the reported prevalence of LAM as a contraceptive strategy and to identify the proportion of women who used LAM correctly. We then assessed the unadjusted associations between sample characteristics and reported LAM use bivariate regression models and Rao-Scott Chi-square tests for continuous and categorical variables, respectively. To assess the adjusted associations between sample characteristics and LAM use, all variables were simultaneously entered into a weighted logistic regression model and a backwards selection procedure was used to fit the most parsimonious model. Non-significant variables were removed one by one, beginning with the one with the largest p value until all variables included in the model were significant ($p < 0.05$). All analyses accounted for the sample weighting and complex survey design, which ensures that women in our analytic sample are representative of similar women in Niger. Cases with missing data (<5 %) were excluded, and SAS 9.2 (Carey, NC) was used to complete all analyses.

Results

Sample Characteristics and Prevalence of LAM Use

The average age of women in our sample was 29 years; almost all were married and 80.5 % had no formal education (Table 1). Half of the women were employed, and almost all were Muslim. The average age of women when their first child was born was 18 years. In their most recent pregnancy, one-third of women had no prenatal care, and the majority delivered their infants at home. Half of the women had heard about family planning on the radio in the last month and one-fourth of the women had spoken with someone about family planning at a health facility in the last year. Sixty percent of women reported that their husbands approved of family planning. Approximately 52 % of our sample reported using LAM, 25 % reported using a modern contraception method, and 23 % reported male or female sterilization.

Correct LAM Use

Only 21 % of women who reported using LAM met all four criteria for correct use (Table 2). More than 90 % of women who reported using LAM were amenorrheic, 95 % breastfed at least four times during the day, and almost all women breastfed at least once during the night; however, only 22 % had a baby less than 6 months of age.

Characteristics Associated with LAM Use

In the unadjusted analysis, women who reported using LAM compared with those who reported using other forms of contraception were more likely to reside in the Diffa, Dosso, and Tillaberi regions; to be living in rural areas; and to have no formal education (Table 1). They also tended to be less wealthy, younger at first birth, and have more children. Additionally, they were less likely to have had prenatal care and more likely to have had delivered at home in their most recent pregnancy. Compared with women who reported using other forms of contraception, women who reported using LAM had less exposure to family planning information in the last month, were less likely to have talked about family planning at a health facility in the last year, were less likely to have a husband or partner who approved of family planning, and were less likely to have discussed family planning with her husband or partner in the last year (all $p < 0.05$).

Table 1 Sample characteristics of sexually active, non-pregnant, breastfeeding, and contracepting women (weighted)

	Overall[a]	Using LAM (51.7 %)	Using other contraception (48.3 %)	*p* value[b]
Age	29.0 ± 0.36	29.6 ± 0.51	28.4 ± 0.43	0.079
Region				<0.001**
Agadez	2.7 %	1.4 %	4.1 %	
Diffa	1.0 %	1.6 %	0.4 %	
Dosso	25.6 %	34.6 %	16.0 %	
Maradi	9.2 %	0.6 %	18.4 %	
Tahoua	15.1 %	12.1 %	18.3 %	
Tillaberi	30.9 %	43.4 %	17.5 %	
Zinder	4.1 %	3.8 %	4.5 %	
Niamey	11.4 %	2.5 %	20.9 %	
Urban	24.7 %	10.0 %	40.4 %	<0.001**
Married	99.7 %	99.5 %	100 %	–
Educational attainment				<0.001**
No education	80.5 %	91.3 %	68.9 %	
Primary	12.6 %	7.8 %	17.8 %	
Above primary	6.9 %	0.8 %	13.4 %	
Employed	48.6 %	46.7 %	50.6 %	0.495
Wealth index				<0.001**
Poorest	22.0 %	28.1 %	15.4 %	
Poorer	17.3 %	22.1 %	12.1 %	
Middle	14.2 %	20.2 %	7.7 %	
Richer	19.5 %	17.5 %	21.6 %	
Richest	27.1 %	12.1 %	43.1 %	
Muslim	98.9 %	99.2 %	98.4 %	0.386
Age at first birth	18.2 ± 0.15	17.8 ± 0.18	18.6 ± 0.23	0.009**
Total children ever born	4.7 ± 0.12	5.1 ± 0.16	4.4 ± 0.17	0.004**
No prenatal care	36.3 %	47.1 %	24.8 %	<0.001**
No delivery assistance	17.6 %	21.3 %	13.7 %	0.069
Delivered at home	74.3 %	89.3 %	58.2 %	<0.001**
Number of antenatal visits during pregnancy	2.0 ± 0.19	1.7 ± 0.31	2.4 ± 0.12	0.028*
Heard of family planning on radio (last month)	52.2 %	47.8 %	57.1 %	0.057
Heard of family planning on TV (last month)	17.2 %	9.9 %	25.1 %	<0.001**
Heard of family planning in newspapers or magazines (last month)	4.9 %	2.6 %	7.5 %	0.002**
Visited by family planning worker (last year)	20.2 %	19.3 %	21.2 %	0.656
Talked about family planning at health facility (last year)	25.9 %	18.8 %	33.7 %	0.002**
Husband/partner approves of family planning	61.0 %	45.2 %	77.8 %	<0.001**
Discussed family planning with husband/partner (last year)	59.7 %	40.5 %	80.1 %	<0.001**

[a] Overall descriptive characteristics presented are N (%) for categorical variables and mean ± SE for continuous variables

[b] *p* values derived from Rao-Scott Chi-square tests for categorical variables and weighted regression models for continuous variables

* $p < 0.05$; ** $p < 0.01$

In our multivariate analysis, women living in the Diffa, Dosso, Tillaberi, and Zinder regions had greater odds of reporting LAM use than women living in Niger's capital district of Niamey; conversely, women living in Maradi had significantly lower odds of reporting LAM use (Table 3). Additionally, compared with women who had no formal education, women with more than primary education had lower odds of LAM use and women who delivered their most recent baby at home had greater odds of reporting LAM use compared with women who delivered

Table 2 Characteristics of LAM users (weighted)

	Overall (%)
Currently amenorrheic	92.4
Breastfeed at least four times during the day	95.2
Breastfeed at least once during the night	99.9
Youngest child under 6 months	22.1
Correctly use LAM	21.3

Table 3 Multivariate logistic regression models examining characteristics associated with reported LAM use

	OR (95 % CI)
Region	
Agadez	1.41 (0.42, 4.72)
Diffa	11.15 (3.18, 39.06)**
Dosso	7.51 (2.98, 18.91)**
Maradi	0.10 (0.02, 0.55)**
Tahoua	2.02 (0.71, 5.75)
Tillaberi	5.38 (2.07, 14.00)**
Zinder	4.12 (1.01, 16.85)*
Niamey	1.00
Educational attainment	
No education	1.00
Primary	0.67 (0.35, 1.27)
Above primary	0.29 (0.09, 0.95)*
Delivered at home	2.59 (1.48, 4.55)**
Talked about family planning at health facility (in the last year)	0.51 (0.30, 0.86)*
Discussed family planning with husband/ partner (in the last year)	0.24 (0.15, 0.39)**

* $p < 0.05$; ** $p < 0.01$

elsewhere. Furthermore, women who spoke about family planning at a health facility in the last year and women who discussed family planning with their husbands had significantly lower odds of reporting LAM use than women who did not discuss family planning at a health facility and with their husbands, respectively.

Discussion

Our findings indicate that in Niger, where fertility rates are among the highest in the world, more than half of breastfeeding women who were using some form of contraception reported using LAM, but less than a quarter of these women used LAM correctly. The high prevalence of LAM use indicates that it may be particularly valuable as an early family planning approach in Niger, as it is readily available and does not require partner or other family support. Furthermore, compared with other forms of contraception, such as birth control pills or injections, LAM is substantially lower in cost and does not have the barriers to access posed by other forms of contraception. LAM may be the optimal form of contraception when all criteria can be met.

Our findings suggest that the need for education about LAM is substantial, given that only 21 % of the women who reported using LAM met all the criteria for effectiveness. The most central concern was that LAM users reported having infants older than 6 months of age, after which time LAM is substantially less effective as a contraceptive method. The results highlight the importance of offering early education and discussing alternative forms of contraception for women who report using LAM. Given that these nationally representative data indicate that almost 40 % of husbands or partners overall and more than 50 % of husbands or partners of women using LAM do not approve of family planning, educating women without the presence of their husbands or partners may have a substantial benefit when teaching family planning strategies. Among women whose husbands or partners do approve of family planning, however, educating their partners about the proper use of LAM is an important step to preventing unintended pregnancy.

The accessibility of LAM is particularly important considering that this method is already being used among women who may be at risk for unintended births. In our sample, LAM users had less education and less utilization of reproductive health services. The regional variation likely supports this premise that LAM is used among subpopulations of women where access to alternative methods of contraception is low. For instance, regions with lower population densities and less health infrastructure, such as Diffa and Tillaberi, had greater odds of LAM use compared to the capital region of Niamey. The reason that the region of Maradi had lower odds of LAM use when compared to Niamey is not entirely clear, although its extensive health and physical infrastructure may be one explanation. Women who had greater odds of using LAM were also less likely to have discussed family planning with their husbands or partners. Although having a husband who approved of family planning was associated with decreased likelihood of LAM use in the unadjusted analysis, it was not significantly associated with LAM use in the multivariate model, after controlling for discussing family planning with a husband or partner. It is possible that women may not be discussing family planning with their partners in part because their partners do not approve of family planning. Although partner cooperation is helpful for the use of LAM, we do not believe the partner necessarily needs to be cooperative or even aware of its use for LAM to be used effectively, as the activities required of LAM are likely to be occurring even in the absence of its

purposeful use as a contraceptive method. Thus, educational efforts should focus on ensuring that breastfeeding is occurring with the appropriate intensity and timing in order to provide effective contraception, particularly among women whose husbands or partners may not be open to family planning discussions.

Our study fills a gap in the peer-reviewed literature by identifying subpopulations of women in Niger who may benefit from additional education about LAM and its correct use. Women who report using LAM in this low-income setting also appear to be some of the most vulnerable to unintended births, compounding the importance of these education efforts. Furthermore, our research calls attention to the low percentages of women who use LAM correctly and suggests the need to educate women in their homes during pregnancy, delivery or in the immediate postpartum period by community health workers and through community advocacy. We have employed a large, nationally representative dataset from an African country with high fertility rates, low per capita income, and poor access to alternative contraceptive methods, making our findings particularly relevant. Furthermore, the prevalence of LAM in Niger suggests that it is already accepted by women and therefore provides a strong potential for intervention.

Our study, however, does have its limitations. First, the analysis uses self-reported data; however, these data are the most common form of reporting about breastfeeding and contraception use, particularly in low-income settings where medical records may not be readily available or reliable. Second, we were restricted to the data available in the DHS from Niger. Although the measures provided in this survey were quite extensive and arguably provided sufficient measures for our analysis, we were not able to assess dual contraception use. If more than one contraceptive method was mentioned, however, interviewers were instructed to select the first method that appeared on the list, which listed more modern methods (e.g., condoms and oral contraception) earlier than LAM. In fact, LAM was listed as the 11th of the 13 possible choices. As a result, LAM may have been used in combination with periodic abstinence and/or withdrawal. Additionally, we were unable to assess the association between religion and reported LAM use, because Niger is a predominantly Muslim country. Last, this study did not consider exclusive breastfeeding or whether a woman gave her baby supplemental food or formula. We believed that this component was unnecessary, given research supporting the adequacy of "nearly full breastfeeding" for effective LAM use and the inclusion of measures about the frequency of breastfeeding during both day and night [5].

Although our analytic sample uses a small number of the total number of women participating in the Niger DHS, our results are meant to be representative and generalizable to similar women throughout the country. These women include those who are sexually active, not pregnant, breastfeeding, and using some form of contraception, as we believe these are the women for whom LAM is a reasonable choice and the potential targets for intervention. Furthermore, results may be relevant to other low-income countries that have similar social and cultural dynamics as Niger, including countries with high fertility rates, similar breastfeeding behaviors, low per capita income, and patriarchal societies where women have little control over their own fertility. Several African countries, such as Mali, Burundi, and Burkina Faso, generally fit this profile. As a result, our findings may be broadly generalizable to similar populations in these countries.

Of note, this analysis considers correct use as LAM use with a child less than 6 months old. This criterion was chosen based on widespread family planning literature; however, some studies support the use of LAM beyond 6 months [13, 20–23]. Studies have suggested that as long as lactational amenorrhea is still present—even with supplemental feeding—pregnancy rates remain low at 12 months (7 %; [22, 23]). With more relaxed criteria, these rates are still lower than the typical use of other contraception such as barrier methods [24]. In our sample, if we had relaxed the age criteria to 12 months or younger, approximately 40 % of LAM users would have been considered correct users. However, these data still suggest that more than half of women are not using LAM correctly and therefore are at risk for unintended births and potential negative health and economic consequences.

In light of the high prevalence of LAM in Niger and the corresponding costs of incorrect use to both women and their families, the need for more education among women is substantial. Innovative approaches include early awareness of the LAM criteria, education focused on the woman alone and improved access to reproductive health services. These components may be significant steps for improving family planning efforts and for ensuring the health of women and their families in Niger and potentially in other low-income countries.

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