

BMJ Open Knowledge and use of lactational amenorrhoea as a family planning method among adolescent mothers in Uganda: a secondary analysis of Demographic and Health Surveys between 2006 and 2016

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ABSTRACT

Objective To assess the level of knowledge and use of the lactational amenorrhoea method (LAM) among adolescents in Uganda between 2006 and 2016 using nationally representative data from Demographic and Health Surveys (DHS).

Design Cross-sectional design involving analysis of three DHS (2006, 2011, and 2016) in Uganda.

Setting The data collection took place in Uganda. The DHS are nationally representative surveys on a wide range of indicators including contraception knowledge and use.

Participants A total of 1948 (2006), 2026 (2011) and 4276 (2016) adolescents (15–19 years) and 1662 (2006), 1666 (2011) and 3782 (2016) young women (20–24 years) were included.

Primary outcome measure Use of LAM among adolescents and young women with a live birth within 6 months before each survey.

Results In 2016, less than 1.0% (95% CI: 0.2% to 3.5%) of eligible adolescents correctly used LAM, and 56.3% (95% CI: 48.8% to 63.6%) were passively benefitting from LAM. The median duration of postpartum amenorrhoea (PPA) among adolescents in 2016 was 6.9 months, declining from 8.3 months in 2006. Compared with adolescents (56.7%), eligible young women had higher knowledge of LAM (64.1%) and higher median PPA duration (8.0 months) in 2016. The percentage of eligible adolescents who met the LAM criteria irrespective of whether they reported LAM use (were protected by LAM) decreased from 76.4% (95% CI: 66.5% to 84.0%) in 2006 to 57.2% (95% CI: 49.5% to 64.6%) in 2016. More than 50.0% (95% CI: 49.2% to 63.8%) of eligible adolescents were aware of LAM in 2016, increasing from 6.0% (95% CI: 2.5% to 13.8) in 2006.

Conclusion Despite increasing awareness of LAM, reported and correct use of LAM was low among adolescents who could benefit from this method in Uganda, and declining over time. Support for adolescents to harness the benefits of correct LAM use should be increased. Additional research is needed to better understand the dynamics of LAM use in adolescents,

Strengths and limitations of this study

- The study used data from three standardised nationally representative surveys in Uganda, thus findings are generalisable and comparable over time and across age groups.
- The study used various indicators to assess the knowledge and use of lactational amenorrhoea method (LAM) among the population and separately among females able to use LAM at the time of the survey.
- Assessment of knowledge of LAM was affected by a change in the phrasing of the question in 2016, thus limiting comparability with previous surveys.
- The measurement of LAM use was based on self-report which may result in underestimation or overestimation due to differences in understanding of LAM.
- The surveys did not collect information about reasons for non-use of LAM or about follow-on contraceptive methods.

including the transition to use of other modern contraceptive methods.

INTRODUCTION

Reducing adolescent pregnancy rates is an important public health issue in sub-Saharan Africa (SSA), where high fertility and unmet need for family planning (FP) persist. Estimates show that 21 million adolescents aged 15–19 years in developing countries become pregnant every year.^{1,2} Of these, 2.5 million are younger adolescents 12–15 years and at least 10 million are unintended pregnancies.^{1,2} The prevalence of adolescent first births in SSA is estimated at 50%.¹ As of 2019 about 218 million women in low-income and

middle-income countries (LMICs) had an unmet need for FP.³ In SSA, 25% of women aged 15–49 years are estimated to have an unmet need for FP.⁴ In 2019, 43% of adolescents in LMICs were estimated to have an unmet need for FP.³ Tackling the unmet need for FP among adolescents is critical especially in LMICs because it has significant implications on their reproductive health and well-being.⁵ Adolescent childbearing has been associated with multiple adverse health outcomes,^{6–7} and the literature also shows several challenges of the motherhood transition period for adolescents, which leave them disempowered with feelings of shame and embarrassment.^{8–10} Specifically, concern has been raised about the unmet need for FP among postpartum women.¹¹ The acceptability and correct use of various FP methods among women during this period is affected by various sociocultural and structural factors.^{12–13}

Lactational amenorrhoea method (LAM) is a recognised modern contraceptive method where postpartum amenorrhoeic women depend on the contraceptive effect of breast feeding within the first 6 months after childbirth.¹⁴ LAM provides 98% protection against pregnancy if (1) the woman's menstrual period has not returned since childbirth, (2) the baby is fully or nearly fully breastfed and (3) the baby is less than 6 months old.^{14–15} The correct use of LAM provides an effective and affordable contraceptive option for breastfeeding women, while also providing an opportunity for linkage and transition of mothers to other FP methods and services. Furthermore, LAM use does not require replenishment of contraceptive supplies or a healthcare provider after appropriate LAM counselling is given. Therefore, LAM can play an important role in preventing unwanted pregnancies during the postpartum period and consequently maternal deaths.¹⁶ However, its effectiveness may be undermined by factors or practices that affect the three criteria, especially breast feeding. Evidence shows low breastfeeding rates,^{17–18} and a higher likelihood of exclusive breastfeeding (EBF) discontinuation before infants reach 6 months among adolescent mothers.¹⁹ A study of Nigerian adolescents found lower rates of early breastfeeding initiation and EBF compared with women 20–24 years.²⁰ Education level, mode of delivery, antenatal care attendance and postnatal breastfeeding counselling are some of the factors influencing breastfeeding practices among adolescents.^{18–20}

Uganda has one of the highest total fertility rates (5.4 children per woman), maternal mortality rates of 336/100 000 live births,²¹ and the youngest population with 78% under 30 years,²² in the world. About 25% of adolescent girls in Uganda have started childbearing, with about 360 000 teenage pregnancies occurring annually.^{21–23} Evidence shows that over 40% of pregnancies among Ugandan adolescents are unintended,²⁴ and there is an increasing occurrence of repeat adolescent births (<20 years) estimated at 56%, with a prevalence of short birth intervals of 5.4%.²⁵ Unmet need for child spacing among women with adolescent births or repeat adolescent births have also been reported.^{6–25} Lack of knowledge

and access to general health services and youth-friendly FP care, in particular, are some of the key challenges affecting adolescent health in Uganda.²⁶ Evidence on the use of LAM in adolescents in LMICs are still scarce. There is a need to better understand the duration, knowledge, and correct use of LAM as a postpartum FP method among adolescents.⁵

The main objective of this study was to assess the knowledge and use of LAM among adolescents in Uganda between 2006 and 2016 using nationally representative data from Demographic and Health Surveys (DHS).

METHODOLOGY

Data

This study is a secondary analysis of the cross-sectional data collected during Uganda DHS in 2006, 2011 and 2016. These are nationally representative household surveys carried out every 5 years. The DHS employs a stratified two-stage cluster sampling design to select participating households. In the first stage, enumeration areas (EAs) are selected and then the households are selected in the second stage from a complete listing of households. The 2016 Uganda Demographic and Health Survey (UDHS) included 697 EAs and a representative sample of 20 880 households (30 per EA). The 2011 UDHS selected 405 EAs and a representative sample of 10 086 households (all households in the selected EAs were included). In the 2006 UDHS, 321 EAs were selected and a representative sample of 9864 households were included (about 28 per EA).^{21–27–28}

All women of reproductive age (15–49 years) who are either permanent residents of the selected households or visitors who stayed in the household the night before the survey are eligible to be interviewed. The response rates (respondents interviewed/eligible respondents) for the eligible women in each of the three surveys were as follows: 97.0% (18 506/19 088) in 2016; 93.8% (8674/9247) in 2011; and 94.7% (8531/9006) in 2006. Across all three surveys, response rates were higher in rural compared with urban areas.^{21–27–28} The women interviewed provide, among others, self-reported information on their education, marital status, reproductive history, FP use, maternal health-seeking for recent live births and breastfeeding practices. Data were collected by trained data collectors using pretested tools.

Study population

Our analysis sample included women of reproductive age (15–49 years) at the time of each survey. The primary study population was adolescent girls aged 15–19 years, who were compared with young women aged 20–24 years and to all women of reproductive age 15–49 years. Within the sample, we also included a subgroup of adolescent girls and young women with a live birth in the 6 months before each survey as they are the population benefitting from LAM. The overall response rate of eligible women for the DHS surveys was generally over 90% (97.0% in

Table 1 Definitions of key study variables

	Indicator (estimate)	Definition (numerator/denominator)	Stratification by woman's age group (at time of survey)
1	Knowledge of LAM as FP method among all women (% with 95% CI)	Women who report ever hearing of LAM/all women	15–19.9 20–24.9 All women 15–49
2	Knowledge of LAM among eligible women (% with 95% CI)	Women with a child <6 months of age who report ever hearing of LAM/all women with a child <6 months of age	15–19.9 20–24.9 All women 15–49
3	Current reported use of LAM as FP method among all women (% with 95% CI)	Women who report using LAM as their FP method at time of survey/all women	15–19.9 20–24.9 All women 15–49
4	Current reported use of LAM as FP method among eligible women (% with 95% CI)	Women with a child <6 months of age who report using LAM as their FP method at time of survey/all women with a child <6 months of age	15–19.9 20–24.9 All women 15–49
5	Correct use of LAM among eligible women (% with 95% CI)	Women with a child <6 months of age who report using LAM and meet the three criteria/all women with a child <6 months of age	15–19.9 20–24.9 All women 15–49
6	Passive use of LAM among eligible women (% with 95% CI)	Women with a child <6 months of age who meet the three LAM criteria but do not report using LAM/all women with a child <6 months of age	15–19.9 20–24.9 All women 15–49
7	Protection by LAM among all women (% with 95% CI)	Women who meet the three LAM criteria regardless of whether they report the use of LAM or not/all women	15–19.9 20–24.9 All women 15–49
8	Protection by LAM among eligible women (% with 95% CI)	Women with a child <6 months of age who meet the three LAM criteria regardless of whether they report the use of LAM or not/all women with a child <6 months of age	15–19.9 20–24.9 All women 15–49
9	Duration of postpartum amenorrhoea in months (median + IQR)	Number of months before menstrual period returned after most recent birth in the 36 months before the survey	15–19.9 20–24.9 All women 15–49

FP, family planning; LAM, lactational amenorrhoea method.

2016, 93.8% in 2011 and 94.7% in 2006). This suggests a non-response rate of about 3%–6%. However, the response rates are not disaggregated by age group to represent the study population (15–19, 20–24).

Definitions

We estimated the following indicators capturing three dimensions of lactational amenorrhoea: (1) knowledge of LAM; (2) use of LAM—including reported, correct, passive and overall protection by lactational amenorrhoea; and (3) duration of postpartum amenorrhoea (PPA) (table 1).

Knowledge of LAM was defined as the respondent being aware of LAM as a method of FP, and was measured based on respondents' binary (yes, no) answer to 'Have you ever heard of lactational amenorrhoea as a family planning method?' It should be noted that, in the 2016 survey, this question was followed with a probe that describes LAM further, that is, 'Up to 6 months after childbirth, before the menstrual period has returned, women use a method requiring frequent breastfeeding day and night'. This probe was not used in the

2006 and 2011 surveys. We assessed knowledge of LAM among all women and among eligible women who could have been using this method at the time of the survey (those with infants below 6 months of age at the time of each survey).

The use of LAM was based on the reported current use of lactational amenorrhoea as a FP method at the time of each survey (yes or no). This was measured by asking women whether they were doing anything or using any method to delay or avoid getting pregnant; and if so, what method they were using (multiple responses were allowed, eg, LAM and male condoms). We examined the use of LAM through four indicators:

1. Current use of LAM: women who reported using LAM as their method of FP at the time of the survey. We applied two denominators: all women and eligible women (those with infants below 6 months at the time of the survey).
2. Correct use of LAM: women who reported LAM use and met the three LAM criteria, among eligible wom-

en (those with infants below 6 months at the time of the survey). The three criteria for correct use of LAM were (1) woman has a child <6 months of age at the time of the survey, (2) woman's menstrual period had not returned since the most recent birth and (3) her infant was being exclusively breast fed at the time of the survey. *Exclusive breast feeding* was defined as infants <6 months of age at the time of the survey who were fed exclusively with breastmilk, that is not given anything other than breastmilk in the 24 hours before the survey, except for oral medications.

3. Passive use of LAM: women meeting the three LAM criteria but who did not report LAM use, among eligible women (those with infants <6 months at the time of the survey).
4. Protection by LAM: women who met the three LAM criteria, regardless of whether they reported LAM use or not), among all women and eligible women.

Duration of PPA

PPA period was defined as the time to the resumption of the menstruation period following childbirth. This was captured by calculating the median duration in months using the child recode file, following the standard DHS method.²⁹

Other variables

We used data on women's sociodemographic characteristics at the time of the surveys, including women's age in years, marital status, education status, place and region of residence and household wealth quintile. Marital status was categorised as 'never in union', currently in union/living with a man, and formerly in union/living with a man. Education was categorised as no education, primary education, secondary education and higher education. Participants' place of residence was either urban or rural, and household wealth quintiles as produced by the DHS (we adapted wealth quintile categories for the 2006/2011, ie, poorest, poorer, middle, richer, richest). In the 2016 survey, Uganda had been divided into further regional units (15 subregions), which was an increase from the previous 9 and 10 used in the 2006 and 2011 surveys. For comparability, some subregions in 2016 were recategorised to have 10 regions as follows: West Nile (west Nile), North (Acholi+Lango), Karamoja (Karamoja), Western (Bunyoro + Tooro), East central (Busoga), Eastern (Teso + Bugisu + Bukedi), Central 2 (North Buganda), South-west (Ankole + Kigezi), South Buganda (Central 1) and Kampala (Kampala).

Statistical analysis

Analysis was conducted using STATA V.14 (StataCorp, Texas, USA). We utilised the *svyset* command in STATA to adjust for the sampling design used and for non-response, using DHS instructions and variables provided to capture stratification, clustering and individual sampling weights. Descriptive statistics including frequencies and percentages were used to summarise categorical data while

Table 2 Sample size of women according to age group at the time of each survey and recent birth history, by survey

Category	2006	2011	2016
All female respondents (15–49 years)	8531	8674	18506
Adolescents (15–19 years)	1948	2026	4276
Adolescents with a live birth <6 months before the survey	367	376	837
Young women (20–24 years)	1662	1666	3782
Young women with a live birth <6 months before the survey	1291	1225	2831

continuous data (duration of PPA) was expressed in terms of median and IQR. We computed the unweighted numbers of women for the given variable and the weighted percentages and 95% CI. For all denominators using eligible women (with infants below 6 months at the time of the survey), we only included women with infants who were alive at the time of the survey due to breast feeding as a criterion for correct LAM use. In the computation of reported use of LAM at the time of the survey, we assumed that all women who did not report using LAM were indeed not using LAM (missing values were recorded as 0). There was no missing data on other key variables for the study samples included in the analysis.

Patient and public involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

RESULTS

Sociodemographic characteristics of the study samples

A total of 1948 (2006), 2026 (2011) and 4276 (2016) adolescents (15–19 years) and 1662 (2006), 1666 (2011) and 3782 (2016) young women (20–24 years) were included (table 2). Across the decade, primary education was the highest level attained in both adolescents (at an average 65.4%) and young women (≈55.0%) (table 3). Approximately 77.4% of adolescents had never been married as compared with approximately 23.8% in the young women. Table 3 also shows an increasing trend in the proportion of adolescents (17.7% to 24.3%) or young women (22.0% to 29.9%) living in urban areas.

Knowledge of LAM

Knowledge of LAM as a FP method was analysed for two categories of women; all women and eligible women (who had a child <6 months at the time of the survey). Between 2006 and 2016, knowledge of LAM among all and eligible adolescent girls increased. Among all adolescents, knowledge of LAM increased from 3.7% (95% CI: 2.7% to 5.0%) in 2006 to 36.9% (95% CI: 35.0% to 38.9%) in 2016; while among the eligible adolescents, it increased from 6.0% (95% CI: 3.5% to 13.8%) to 56.7% (95%

Table 3 Sociodemographic characteristics of the study samples for UDHS 2006, 2011 and 2016

Survey year		2006		2011		2016							
Attribute	Age group	15–19.9		20–24.9		15–19.9		20–24.9					
		1948	1662	2026	1666	4276	3782						
n		%	95% CI	%	95% CI	%	95% CI	%	95% CI				
Education	None	3.5	2.5 to 4.8	11.5	9.6 to 13.8	2.9	2.1 to 4.2	4.9	3.9 to 6.2	1.8	1.4 to 2.4	3.3	2.7 to 4.1
	Primary	66.7	63.6 to 69.7	59.2	56.0 to 62.4	64.8	61.7 to 67.8	54.7	51.6 to 57.8	64.7	62.4 to 67.0	51.0	48.5 to 53.4
	Secondary	28.5	25.5 to 31.7	23.2	20.5 to 26.2	30.8	28.1 to 33.7	32.4	29.5 to 35.4	31.7	29.5 to 33.9	35.1	32.8 to 37.4
	Higher	1.3	0.9 to 2.0	6.0	4.8 to 7.5	1.5	0.8 to 2.6	8.0	6.5 to 9.8	1.8	1.4 to 2.4	10.7	9.5 to 12.0
Wealth	Poorest	15.3	12.9 to 17.9	18.2	15.6 to 21.0	15.4	13.2 to 18.0	16.4	13.9 to 19.2	17.9	16.2 to 19.8	16.9	15.4 to 18.6
	Poorer	17.5	15.1 to 20.2	20.1	17.7 to 22.7	16.9	14.6 to 19.5	17.8	15.6 to 20.3	19.7	18.0 to 21.5	18.4	16.8 to 20.0
	Middle	17.3	14.9 to 20.0	17.7	15.4 to 20.2	18.0	15.6 to 20.5	20.1	17.1 to 23.3	19.1	17.6 to 20.7	16.1	14.6 to 17.7
	Richer	20.2	17.7 to 22.9	15.4	13.2 to 17.8	23.5	20.6 to 26.6	15.5	13.1 to 18.3	20.0	18.3 to 21.9	19.3	17.6 to 21.2
	Richest	29.8	26.0 to 33.9	28.7	24.8 to 32.9	26.2	22.6 to 30.2	30.3	26.8 to 34.0	23.2	20.8 to 25.9	29.3	26.3 to 32.5
Marital status	Never married	77.6	75.0 to 80.0	21.9	19.4 to 24.6	77.3	74.4 to 79.8	23.9	21.3 to 26.7	77.2	75.5 to 78.8	25.5	23.6 to 27.5
	Married/cohabiting	19.6	17.4 to 22.1	67.1	64.4 to 69.8	20.0	17.5 to 22.7	67.3	64.3 to 70.2	19.9	18.4 to 21.5	64.0	61.9 to 66.0
	Divorced or widowed or separated	2.8	2.1 to 3.7	11.0	9.3 to 13.0	2.8	2.0 to 3.8	8.7	7.1 to 10.6	2.9	2.3 to 3.6	10.6	9.5 to 11.7
Residence	Urban	17.7	14.0 to 22.1	22.0	17.8 to 26.8	19.3	16.3 to 22.8	25.5	22.2 to 29.2	24.3	22.2 to 26.5	29.9	27.4 to 32.6
	Rural	82.3	77.9 to 86.0	78.0	73.2 to 82.2	80.7	77.2 to 83.7	74.5	70.8 to 77.8	75.8	73.5 to 77.9	70.1	67.4 to 72.6
Region	Central 1	11.8	9.5 to 14.5	11.5	9.4 to 14.0	9.3	7.0 to 12.2	13.6	10.8 to 16.9	12.1	10.2 to 14.2	15.0	12.7 to 17.6
	Central 2	9.3	8.0 to 10.9	5.6	4.4 to 7.0	11.2	8.2 to 15.2	10.4	9.0 to 12.0	9.8	8.3 to 11.4	11.2	9.2 to 13.5
	Kampala	8.9	7.2 to 11.1	13.3	10.8 to 16.4	9.7	8.1 to 11.5	10.0	8.0 to 12.4	4.7	3.8 to 5.8	6.8	5.9 to 7.9
	East central	10.3	8.3 to 12.7	8.9	7.2 to 10.9	9.9	8.2 to 11.8	9.5	7.7 to 11.5	9.1	7.5 to 11.0	8.9	7.5 to 10.5
	Eastern	12.2	10.1 to 14.7	14.1	11.6 to 16.9	15.5	13.0 to 18.4	15.5	13.3 to 18.1	20.1	18.5 to 21.9	16.8	15.3 to 18.5
	North	14.0	11.6 to 16.7	14.7	12.0 to 17.9	8.8	7.3 to 10.7	7.4	5.7 to 9.6	11.7	10.6 to 13.0	9.8	8.8 to 11.0
	Karamoja	*	*	*	*	3.2	1.8 to 5.6	3.0	2.0 to 4.4	1.9	1.5 to 2.4	1.7	1.2 to 2.3
	West Nile	5.7	4.6 to 7.0	5.0	3.6 to 6.8	6.2	4.9 to 7.7	5.5	4.6 to 6.7	7.6	5.9 to 9.6	6.2	5.1 to 7.5
% with live birth in <6 months	Western	15.3	13.1 to 17.9	15.2	12.9 to 17.9	14.1	11.1 to 17.6	12.7	10.2 to 15.8	12.8	11.1 to 14.8	13.3	11.9 to 14.9
	South west	12.6	10.5 to 15.0	11.8	9.5 to 14.4	12.2	10.3 to 14.3	12.4	10.6 to 14.4	10.2	8.9 to 11.6	10.3	9.1 to 11.6
		13.4	10.9 to 16.4	27.9	24.3 to 31.7	13.2	10.7 to 16.3	29.7	25.9 to 33.8	14.6	12.7 to 16.9	31.5	28.9 to 34.3

*Not sampled due to insecurity. Karamoja as a region was not included in the 2006 survey. Nonetheless, in the subsequent survey it accounted for 7.6% and 4% of respondents in 2011 and 2016, respectively.

CI: 49.2% to 63.8%), respectively (table 4). Compared with young women, knowledge of LAM among all or eligible women was generally lower among the adolescents. Among eligible young women, knowledge of LAM increased from 9.7% (95% CI: 6.2% to 14.9%) in 2006 to 64.1% (95% CI: 58.7% to 69.2%) in 2016.

Use of LAM

We determined the use of LAM using four broad indicators: current reported use, correct use, passive use of LAM and protection by LAM. The overall use of LAM over the 10 years was low among adolescents, young women and all women of reproductive age. The overall current reported use or correct use of LAM was less than 2% (table 4). The percentage of eligible adolescents or young women correctly using LAM was lower than the percentage who reported using LAM as their FP method. Among eligible women, the current reported use of LAM in adolescents was 1.3% (95% CI: 0.4% to 3.8%) in 2016 as compared with 0.7% (95% CI: 0.2% to 1.9%) in young women; while the correct use of LAM in 2016 was 0.9% (95% CI: 0.2% to 3.5%) in adolescents compared with 0.5% (95% CI: 0.1% to 1.6%) in young women. Table 4 further shows that across the three surveys, the percentage of eligible women passively using LAM was higher compared with those reporting intentional LAM use (>50% of eligible women in all surveys and age groups). Also, the passive use of LAM decreased among all age groups over the review period. Among adolescent girls, passive LAM use decreased from 76.4% (95% CI: 66.5% to 84.0%) in 2006 to 56.3% (95% CI: 48.8% to 63.6%) in 2016, compared with young women among whom it decreased from 84.9% (95% CI: 78.8% to 89.5%) to 56.9% (95% CI: 52.0% to 61.6%), respectively. Between 2006 and 2016, the percentage of eligible women protected by LAM decreased across all age groups. As of 2016 at least 50% of women eligible for LAM were indeed protected by LAM in all three age groups, more so among all women of reproductive age at 62.0% (95% CI: 58.9% to 64.9%). The percentage of eligible adolescents protected by LAM decreased from 76.4% (95% CI: 66.5% to 83.99%) in adolescents in 2006 to 57.2% (95% CI: 49.5% to 64.6%) in 2016, as compared with young women where it decreased from 84.9% (95% CI: 78.8% to 89.5%) in 2006 to 57.3% (95% CI: 52.5% to 62.0%) in 2016 (table 4).

Duration of PPA

Over the 10-year period, the median duration of PPA declined among both adolescents and young women who had had a live birth in the 3 years preceding each survey (figure 1). Among the adolescents, the median duration of PPA decreased from 8.3 months in 2006 to 6.9 months in 2016, while in young women it decreased from 11.2 months to 8.0 months, respectively. Across all age groups, the median duration of PPA was lowest among adolescents. The median duration of PPA in 2016 was 1.1 months shorter among adolescents compared with young women.

DISCUSSION

This study explored the knowledge and use of lactational amenorrhoea as a FP method among adolescents in Uganda. The findings indicate that nearly 60% of eligible adolescents in 2016 had knowledge about LAM, and there was an increase in the percentage of adolescents with knowledge of LAM in the examined period. The reported and correct use of LAM among eligible adolescents was very low, and there was a high but declining prevalence of passive LAM use. The results also show a decrease in the median duration of PPA among adolescents between 2006 and 2016. We compared knowledge and use of LAM among adolescents to levels among young women and all women in reproductive age. On the most recent survey, we found that knowledge of LAM was lower among adolescents compared with the other groups, but reported use was similarly low and passive use comparably high (near universal) across the three age groups.

We found large increases in knowledge of LAM among all and eligible adolescents, especially between 2011 and 2016. Part of this increase may be attributed to changes in the measurement of LAM knowledge in 2016 where a description of LAM was read out to the respondents by survey enumerators, which was not the case in the years before. While some views have previously considered this as a quality concern resulting in misreporting by women, other analyses have supported the inclusion of the LAM description, as higher proportions of self-reported LAM users who correctly practised LAM were observed in surveys with the description.³⁰ Any true increase in levels of knowledge about LAM may be attributed to various efforts that have been implemented over time by the Ugandan government including free primary education, FP initiatives including the use of community health workers and promoting the provision of adolescent and youth-friendly services.^{24 26} The percentage of eligible adolescents who were aware of LAM in this study was higher than what has been reported among women of reproductive age in other SSA countries.^{11 31 32} This may be explained by differences in the methods for determining knowledge of LAM. For example, studies by Abraha *et al*¹¹ and Ekpenyong *et al*³² went beyond the DHS approach and included an assessment of respondents' understanding of the three criteria for LAM practice. Regardless, the observed increase in knowledge may result in better attitudes towards and acceptability of LAM as an effective contraceptive method, which would contribute to increase adoption. But this would be dependent on the appropriateness of the information to which adolescents are exposed and their ability to apply it correctly, among other factors.

Findings from this study show very low percentages of eligible adolescents reporting the use of LAM as their primary FP method, and those that were correctly using it. The low prevalence of reported LAM use may partly be explained by methodological limitations posed by the DHS where if a woman reports use of both LAM and other modern methods, the most effective method

Table 4 Knowledge and use of lactational amenorrhoea and duration of postpartum amenorrhoea, by age group and survey

LAM outcome	Age group	2006			2011			2016		
		n	%	95% CI	n	%	95% CI	n	%	95% CI
1. Knowledge of LAM among all women	15 to 19.9	1948	3.7	2.7 to 5.0	2026	7.3	5.7 to 9.4	4276	36.9	35.0 to 38.9
	20 to 24.9	1662	6.6	5.4 to 8.1	1666	13.4	11.0 to 16.1	3782	65.1	63.3 to 67.0
	15 to 49	8531	6.9	5.8 to 8.1	8674	13.0	11.6 to 14.6	18506	64.0	62.9 to 65.1
2. Knowledge of LAM among eligible women	15 to 19.9	110	6.0	2.5 to 13.8	107	13.5	7.5 to 23.2	220	56.7	49.2 to 63.8
	20 to 24.9	216	9.7	6.2 to 14.9	230	14.5	9.5 to 21.4	461	64.1	58.7 to 69.2
	15 to 49	802	7.6	5.7 to 10.0	783	15.3	12.4 to 18.7	1495	68.9	66.1 to 71.5
3. Current reported use of LAM as FP method among all women	15 to 19.9	1948	*	*	2026	0.0	0.0 to 0.1	4276	0.1	0.0 to 0.3
	20 to 24.9	1662	*	*	1666	0.1	0.0 to 0.4	3782	0.9	0.6 to 1.4
	15 to 49	8531	0.0	0.0 to 0.2	8674	0.1	0.0 to 0.3	18506	0.6	0.5 to 0.8
4. Current reported use of LAM as FP method among eligible women	15 to 19.9	110	*	*	107	*	*	220	1.3	0.4 to 3.8
	20 to 24.9	216	*	*	230	*	*	461	0.7	0.2 to 1.9
	15 to 49	802	*	*	783	0.3	0.0 to 1.1	1495	1.7	1.1 to 2.6
5. Correct use of LAM among eligible women	15 to 19.9	110	*	*	107	*	*	220	0.9	0.2 to 3.5
	20 to 24.9	216	*	*	230	*	*	461	0.5	0.1 to 1.6
	15 to 49	802	*	*	783	0.3	0.0 to 1.1	1495	1.2	0.8 to 2.0
6. Passive use of LAM among eligible women	15 to 19.9	110	76.4	66.5 to 84.0	107	73.5	62.7 to 82.1	220	56.3	48.8 to 63.6
	20 to 24.9	216	84.9	78.8 to 89.5	230	80.3	73.8 to 85.5	461	56.9	52.0 to 61.6
	15 to 49	802	86.4	83.3 to 89.0	783	82.4	79.2 to 85.2	1495	60.7	57.7 to 63.7
7. Protection by LAM among all women	15 to 19.9	1948	4.2	3.3 to 5.3	2026	3.7	2.8 to 5.0	4276	2.9	2.3 to 3.5
	20 to 24.9	1662	10.9	9.4 to 12.7	1666	11.5	9.8 to 13.6	3782	6.9	6.0 to 7.9
	15 to 49	8531	8.0	7.4 to 8.7	8674	7.5	6.8 to 8.3	18506	4.9	4.5 to 5.3
8. Protection by LAM among eligible women	15 to 19.9	110	76.4	66.5 to 84.0	107	73.5	62.7 to 82.1	220	57.2	49.5 to 64.6
	20 to 24.9	216	84.9	78.8 to 89.5	230	80.3	73.8 to 85.5	461	57.3	52.5 to 62.0
	15 to 49	802	86.4	83.3 to 89.0	783	82.7	79.6 to 85.5	1495	62.0	58.9 to 64.9

Values that are bold basically refer to the "primary population" for the study i.e., adolescents (15 to 19 years).

*Percentages not computed due to small sample size.

FP, family planning; LAM, lactational amenorrhoea method.

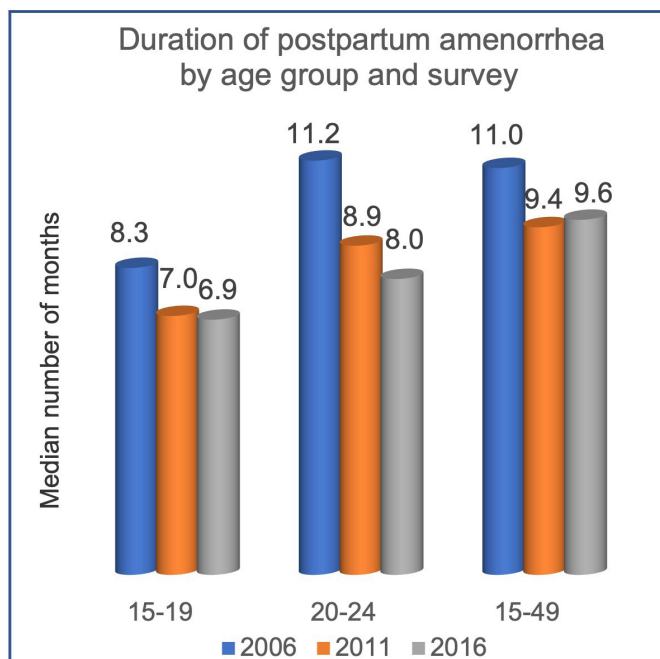


Figure 1 Duration of postpartum amenorrhoea by age group and survey.

is recorded and the woman is not recorded as a LAM user.³⁰ The use of other FP methods besides LAM during the first 6 months after childbirth has been reported.³³ This may explain the observed high proportion of women who were passively using LAM (meet the LAM criteria but do not report LAM use). The study findings relate to previous studies that also show a low prevalence of LAM use among women of reproductive age in general,³⁰ and adolescents in particular.⁵ Low correct use of LAM is a result of not fulfilling one or more of the three criteria, which also influence the effectiveness of LAM as an FP method. This would mean that if new adolescent mothers are not correctly using LAM and they are not using any other FP methods within the first 6 months after childbirth, they would be at higher risk of becoming pregnant again. This would also vary based on factors like sexual activity or access to clinical or social support during this period. In other studies, violation of the exclusive breast feeding and PPA criteria have been reported to be the primary factors affecting the correct use of LAM.^{14 34} This is particularly important in adolescents among whom, early initiation and exclusive breast feeding has been reported to be low, with a higher likelihood of discontinuation.^{19 20}

PPA is one of the key determinants for correct LAM use and its effectiveness. The study findings showed a decrease in the median duration of PPA among adolescents from 8.3 (2006) to 6.9 (2016). The resumption of menses is a commonly used reported determinant of FP use among postpartum women,³⁵ yet variably understood as reported by Cooper *et al*³⁶ who found misconceptions about the return of fecundity in Tanzania.³⁶ The decreasing duration of PPA points to the need to strengthen postpartum FP among adolescents, as the risk

of becoming pregnant may be higher in this subpopulation. The review by Figaroa and colleagues noted wide variation in PPA duration among adolescents in LMICs⁵; while a study in India among women with at least one live birth reported a lower duration of PPA (5.7 months) than what was found in the present study.³⁷ Breastfeeding practices have also been linked to a shorter total duration of PPA.³⁷ According to the authors, the risk of resumption of menses decreases with the increasing duration of breast feeding. This may explain the decreasing duration of PPA among adolescents and why it was lower compared with young women in this study.

Strengths and Limitations

This study benefitted from three rounds of highly comparable nationally representative data collected over 10 years in Uganda to provide an understanding of patterns of LAM use among adolescents. We constructed several indicators of LAM knowledge and use, with sensitivity to the population under consideration (ie, denominators). Nonetheless, this study has limitations. First, it was not possible to investigate factors associated with LAM knowledge or use among adolescents because of the small sample size to allow any meaningful associations. Such information would help inform strategies to improve the use of LAM in this key subpopulation. The findings are also limited by the use of self-reported data on the use of LAM and its criteria especially exclusive breast feeding and return of menses. Correct/accurate reporting on such variables is rather subjective and is affected by the individual's understanding which is often limited. Also, the assessment of knowledge of LAM in the surveys is limited to a single variable and may therefore not provide proper indication of the understanding of LAM among adolescents. The surveys also did not collect information about reasons for non-use of LAM or about follow-on contraceptive methods. Further qualitative studies can help elucidate the understanding and considerations for use of LAM in this important population segment.

CONCLUSIONS

There is increasing awareness about LAM but, the reported and correct use of LAM is low among adolescents with a live baby under 6 months of age in Uganda. There is need to improve uptake of contraceptive methods especially in postpartum adolescents through targeted counselling and educational programmes. This will go a long way in not only reducing their short-interpregnancy intervals but improving their health and well-being including that of their children. Further, additional research is needed to better understand the dynamics of correct LAM use and transition to other FP methods among adolescent mothers.

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Contributors CB and PB share first authorship and contributed equally to this paper. CB and PB conceptualised the study, conducted data analysis and developed the manuscript. LB provided analysis guidance and supported the conceptualisation process and data analysis. CB, PB and LB wrote the first manuscript draft. STW supported data analysis and participated in manuscript review. PW provided technical guidance to the manuscript development process. All authors reviewed the manuscript and approved the final manuscript. CB is acting as the guarantor.

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Ethics approval Data used for the analysis of this paper were obtained with permission from the Demographic and Health Survey (DHS) programme of the US Agency for International Development. The DHS receives government permission, uses informed consent, and assures respondents of confidentiality. The procedures and questionnaires for DHS surveys are reviewed and approved by the ICF International Institutional Review Board (IRB). In addition, ethical approval is obtained from a national ethical review board and local authorities before the surveys are conducted. Before each interview, an informed consent statement providing details on purpose of interview, expected duration, procedures, potential risks and benefits, voluntary participation and confidentiality is read to each respondent and verbal consent is sought. For adolescents, a parent or guardian provides consent prior to their participation in the survey. The data collection procedures are described at length in each survey report, we provide the references to these publicly available materials. We did not require an ethics approval for this study since it involved analysis of only secondary non-identifiable data, which is publicly available to registered users from the online data repositories.

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Data availability statement Data are available in a public, open access repository. Data are available for research purposes on www.dhsprogram.com after registration.

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