

ORIGINAL RESEARCH



Determinants of prelacteal feeding practice in Uganda; a population based cross-sectional study using Uganda demographic and health survey data

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Abstract

Background

Breastfeeding has well-established short-term and long-term health benefits for both the mother and infant. Initiating breastfeeding immediately after birth stimulates breast milk production. Prelacteal feeding (PLF) may result in late initiation of breastfeeding, and thus insufficient production of breast milk. This study aimed to identify the determinants of PLF among children under five years in Uganda.

Methods

This cross-sectional study was conducted using the data from the database of Uganda Demographic and Health Survey 2011. The data of 4,774 children/mothers were evaluated in this study.

Results

The prevalence of PLF was 40.3%. The rate of PLF practice was found to be 2.15 times higher in women with moderate economic status and 2.02 times higher in women with high economic status compared to those who have low economic status. The rate of PLF practice was found to be 1.73 times higher in newborns delivered by an unskilled birth attendant and 4.35 times higher in newborns delivered with no birth attendant compared to those infants delivered by a skilled birth attendant. The ratio of PLF practice was found to be 2.49 times higher in multiple births. Mothers who initiated breastfeeding in the first 24 hours after birth had higher odds of PLF. No relationship was found between PLF practice with some sociodemographic characteristics of mother's (age, marital status, educational status, religion, residential location), maternal factors (number of children, antenatal and postnatal care attendance, place of delivery), and characteristics of the newborn infants (sex, type of delivery, birth order number) in the multivariate logistic regression analysis.

Conclusions

All mothers should be informed about the importance of initiation of breastfeeding immediately after delivery, the risks associated with PLF, the optimal practices for breastfeeding, and the presence of a skilled birth attendant at delivery.

Keywords: prelacteal feeding, newborn, infants, Uganda, breastfeeding, breast milk.

Introduction

Appropriate feeding of infants is important for healthy growth and development. Breast milk contains all the nutritional requirements for infants below six months of age, except vitamin D¹. The World Health Organization (WHO) recommends that breastfeeding should be started within one hour after birth and infants should be exclusively breastfed for the first six months². Exclusive breastfeeding (EBF) means that the infant is fed only breast milk for six months of life; any additional solids or liquids, including water, are not given^{1,2}.

Breastfeeding has well-established short-term and long-term health benefits for both the mother and infant, particularly for the reduction of morbidity and mortality due to infectious diseases such as gastroenteritis or pneumonia in first two years of life and the risk of obesity in childhood^{3,4}. Initiating breastfeeding immediately after birth stimulates breast milk production¹. Thus, exclusive breastfeeding results in abundant milk production².

Providing any food or liquid, including water, other than breast milk to a newborn during the first three days of birth is defined as prelacteal feeding (PLF)⁵. It may result

in late initiation of breastfeeding, insufficient production of breast milk, and a decrease of the immunological benefits of colostrum, which contains a high proportion of antibacterial agents⁶. Since gut is immature in the early days of newborn⁷, prelacteal feeds, which are contaminated easily, may cause infections which may lead to death⁸.

Using data from the most recent Demographic and Health Survey (2000–2013) for 57 countries, Oakley et al. have found that 51% of the infants receive PLF. The prevalence of prelacteal feeding in these countries ranges from 3 to 97%⁹. Overall, 39% of children receive a prelacteal feed in Sub-Saharan Africa⁹. However, PLF rates differ among countries. Only 3% of children receive prelacteal feed in Malawi, while in Ivory Coast the rate of PLF is 67%¹⁰. The determinants of PLF are multifactorial and may differ among countries¹⁰⁻¹³. Sociodemographic characteristics of mothers', characteristics of the infants', antenatal factors, and postnatal factors are significantly associated with the introduction of prelacteal feeds. For example, younger mothers may lack the required experience to practice appropriate infant feeding^{10,12}. High educational level of the mother can make them more aware of recommendations regarding PLF^{10,12,13}.

Table 1: The association between sociodemographic characteristics of mother and prelacteal feeding

Characteristics		Total N (%)*	Prelacteal feeding				p
			Yes		No		
			n	%‡	n	%‡	
Age	15-19	363 (7.6)	168	46.3	195	53.7	0.019
	20-24	1154 (24.2)	465	40.3	689	59.7	
	25-29	1331 (27.9)	509	38.2	822	61.8	
	30-34	847 (17.7)	319	37.7	528	62.3	
	35-39	664 (13.9)	293	44.1	371	55.9	
	40-44	310 (6.5)	122	39.4	188	60.6	
	45-49	105 (2.2)	47	44.8	58	55.2	
Education	Illiterate	837 (17.5)	268	32.0	569	68.0	<0.001
	Primary school	2774 (58.2)	1136	41.0	1638	59.0	
	Secondary/high school	937 (19.6)	429	45.8	508	54.2	
	University	226 (4.7)	90	39.8	136	60.2	
Marital status	Not married	750 (15.7)	338	45.1	412	54.9	0.004
	Married	4023 (84.3)	1585	39.4	2438	60.6	
Residential location	Urban	1143 (23.9)	503	44.0	640	56.0	0.003
	Rural	3631 (76.1)	1420	39.1	2211	60.9	
Economic status	Low	2074 (43.5)	710	34.2	1364	65.8	<0.001
	Middle	816 (17.1)	368	45.1	448	54.9	
	High	1884 (39.4)	845	44.9	1039	55.1	
Mother's religion	Christian	4061 (85.1)	1583	39.0	2478	61.0	<0.001
	Muslim	664 (13.9)	315	47.4	349	52.6	
	Others	49 (1.0)	25	51.0	24	49.0	
Number of children	1-2	1753 (37.0)	736	42.0	1017	58.0	0.038
	3-4	1388 (29.2)	521	37.3	867	62.5	
	≥5	1603 (33.8)	652	40.7	951	59.3	

*column percentages, ‡row percentages

High economic status may provide easy access to other expensive breastfeeding alternatives^{10,12,13}. Mothers' concerns regarding antibiotics that are taken during cesarean and pain that is caused by cesarean may cause a high rate of PLF¹⁰. To reduce PLF practice, culturally sensitive programs should be developed¹⁴. Therefore, the determinants of prelacteal feeding should be defined for each country, separately.

PLF is a widespread practice in Uganda. The Uganda Demographic and Health Survey (UDHS) 2011 showed that the prevalence of PLF among the children born in the last two years (2010-2011) was 41% in Uganda⁵. In the literature search conducted in Pubmed, no study examining

the determinants of PLF was found in Uganda, except for the study by Wamani et al. in 2002¹⁵. In this study that was conducted in a rural area with 720 child/mother couples, few sociodemographic variables were examined and mothers with higher education levels were found to be more likely to give prelacteals¹⁵. Comprehensive analysis of factors influencing PLF is essential to develop an intervention program to promote the early initiation of breastfeeding and EBF in Uganda. Therefore, this study aims to identify the determinants of PLF among children under five years using a dataset from the UDHS 2011.

Methods

Study setting and ethics

Table 2: The association between maternal utilization of healthcare services and prelacteal feeding practice

Characteristics		Total N (%) [*]	Prelacteal feeding				p
			Yes		No		
			n	% [‡]	n	% [‡]	
Antenatal care attendance	Yes	4514 (96.3)	1805	40.0	2709	60.0	0.447
	No	175 (3.7)	75	42.9	100	57.1	
Place of delivery	Health facility	1792 (37.5)	744	41.5	1048	58.5	0.401
	At home	2934 (61.5)	1160	39.5	1774	60.5	
	Other place	48 (1.0)	19	39.6	29	60.4	
Birth assistant at delivery	No birth attendant	290 (6.1)	143	49.3	147	50.7	0.005
	Unskilled birth attendant	1468 (30.7)	582	39.6	886	60.4	
	Skilled birth attendant	3016 (63.2)	1198	39.7	1818	60.3	
Postnatal care attendance	Yes	1001 (35.2)	409	40.9	592	59.1	0.945
	No	1844 (64.8)	751	40.7	1093	59.3	

*column percentages, ‡row percentages

This cross-sectional study was conducted using the data from the database of UDHS 2011. Authorization to use the data was given by The Demographic and Health Surveys Program (Date: 14th Dec. 2015). The UDHS 2011 was the fifth in the series of Demographic and Health Surveys conducted in Uganda⁵. Ethical approval was obtained from the Non-interventional Clinical Research Ethics Committee of Dokuz Eylul University, Izmir, Turkey (Decision No. 2016/33-28).

Study sample

The UDHS 2011 was designed to provide population and health indicator estimates for the country as a whole and for urban and rural areas separately. Estimates were reported for the 10 regions of Uganda. The UDHS 2011 was conducted on a stratified sample. In total, a representative sample of 10,086 households (2,977 in urban areas and 7,109 in rural areas) was selected for the UDHS 2011⁵. Details of sampling technique, selection of households, questionnaire and validation procedure were published in the UDHS 2011 report⁵.

The data of UDHS 2011 were collected between June and December 2011. A total of 9,247 women aged 15-49 years (urban= 2,805 and rural= 6,442 women) were identified as eligible for individual interviews, and 94 percent (8,674 women) were successfully interviewed⁵.

Analysis for our study was restricted among last-born children who were born in the five years preceding the survey. In our study, the total sample size was 7,581. Because their PLF data were not recorded in the database, 2,807 mothers were excluded from our study. Therefore, the data of 4,774

children/mothers were evaluated in this study.

Outcome variable

In the UDHS 2011 women questionnaire, mothers were asked: "In the first three days after delivery, was (NAME) given anything to drink other than breast milk?". "What was (NAME) given to drink? (Options: milk (other than breast milk), plain water, sugar or glucose water, gripe water, sugar-salt-water solution, fruit juice, infant formula, tea/infusions, honey, coffee, and other)"²⁵. In this study, PLF, the dependent variable, was defined as providing any food or liquid other than breast milk to a newborn during the first three days after delivery. The independent variables were chosen based on previous studies^{12,13,16-26} and grouped into four categories: sociodemographic characteristics of mothers', characteristics of the infants', antenatal factors, and postnatal factors.

Statistical analysis

Continuous variables were presented as mean and standard deviation whereas categorical variables were expressed as number and frequency. The association between the categorical independent variables and PLF was analyzed by using a chi-square test. The variables that were found statistically significant in the chi-square test and variables based on previous literature were included in the logistic regression analysis. A p value higher than 0.05 was considered statistically significant. Statistical analyses were performed using the Statistical Package for Social Sciences, Version 20.0 (IBM Corp., Armonk, NY, USA).

Table 3: The association between characteristics of the newborn infants and prelacteal feeding

Characteristics of infant		Total N (%) [*]	Prelacteal feeding				p
			Yes		No		
			n	% [‡]	n	% [‡]	
Sex	Male	2402 (50.3)	986	41.0	1416	59.0	0.276
	Female	2372 (49.7)	937	39.5	1435	60.5	
Weight of infant at birth (gram)	Small (<2500)	247 (9.4)	95	38.5	152	61.5	0.914
	Average-Large (2500-6000)	2373 (90.6)	921	38.8	1452	61.2	
Type of delivery	Caesarean section	318 (6.7)	179	56.3	139	43.7	<0.001
	Normal birth	4456 (93.3)	1744	39.1	2412	60.9	
Type of birth	Multiple births	85 (1.8)	47	55.3	38	44.7	0.004
	Single birth	4689 (98.2)	1876	40.0	2813	60.0	
Birth order number	1 st born	789 (16.5)	362	45.9	427	54.1	0.001
	2 nd born	808 (16.9)	315	39.0	493	61.0	
	3 rd born	652 (13.7)	236	36.2	416	63.8	
	≥4 th born	2525 (52.9)	1010	40.0	1515	60.0	
The timing of breastfeeding initiation	The first 24 hours at any time	262 (7.8)	180	68.7	82	31.3	<0.001
	Within 1 st hour	668 (19.9)	251	37.6	417	62.4	
	Immediately	2432 (72.3)	758	31.2	1674	68.8	

Results

Prevalence of prelacteal feeding according to sociodemographic characteristics of mothers and newborn infants

A total of 4774 mother-child pairs participated in our study. A total of 1923 (40.3%) mothers reported providing prelacteal feeds to their newborn infants. The average age of the mothers was 28.7±7.1 (mean ± SD) years. Results of the chi-square tests to determine the association of factors between sociodemographic characteristics of mothers' and prelacteal feeding are shown in Table 1. In chi-square analysis, the highest rate of PLF was observed among mothers who are between 15-19 years old, who have secondary/high school education, who are not married, who live in urban areas, who have higher economic status, who have religions other than Christianity and Islam, and who have one and/or two children ($p<0.05$), (Table 1). The frequency of infants with prelacteal feeds was also higher among in women with no birth attendant at delivery ($p<0.05$), (Table 2).

In the chi-square analysis, we found that type of delivery (cesarean section), multiple births, birth order number (first birth order), and timing of breastfeeding initiation (first 24 hours) were significantly associated with prelacteal feeding practice ($p<0.05$), (Table 3).

Factors associated with prelacteal feeding

In this study, the variables found to be significant in the chi-square analysis and variables based on previous literature were examined together in the multivariate logistic regression model. The rate of PLF practice was found to be 2.15 times (OR: 2.15, 95% CI=1.38-3.36) higher in women with moderate economic status compared to those who have low economic status. Similarly, the rate of PLF practice was found to be 2.02 times (OR: 2.02, 95% CI=1.44-2.82) higher in women with high economic status compared to those who have low economic status. Another significant factor that influenced PLF was the presence of a birth assistant at delivery. The rate of PLF practice was found to be 1.73 times higher in newborns who delivered by an unskilled birth

Table 4: Multivariate logistic regression analysis prelacteal feeding practice and associated factors

Characteristics		Crude Odds Ratio	95% CI	Adj. Odds Ratio †	95% CI	p
Economic status	Low	1.00 (ref.)		1.00 (ref.)		
	Middle	1.58	1.34-1.86	2.15	1.38-3.36	0.001
	High	1.56	1.37-1.78	2.02	1.44-2.82	<0.001
Birth assistant at delivery	Skilled birth attendant	1.00 (ref.)		1.00 (ref.)		
	Unskilled birth attendant	1.00	0.88-1.13	1.73	1.04-2.88	0.035
	No birth attendant	1.48	1.16-1.88	4.35	1.01-18.67	0.048
Type of birth	Single birth	1.00 (ref.)		1.00 (ref.)		
	Multiple births	1.85	1.21-2.87	2.49	1.04-5.94	0.040
The timing of breastfeeding initiation	Immediately	1.00 (ref.)		1.00 (ref.)		
	Within 1 st hour	1.33	1.11-1.59	1.34	0.96-1.87	0.088
	The first 24 hours at any time	4.85	3.69-6.40	5.08	2.98-8.64	<0.001

†Adjusted according to sociodemographic characteristics of mother (age, marital status, educational status, economic status, religion, residential location), maternal factors (number of children, antenatal and postnatal care attendance, place of delivery, birth assistant history at delivery) and the newborn infants characteristics (sex, type of delivery, type of birth, birth order number, timing of breastfeeding initiation).

attendant, and 4.35 times higher in newborns who delivered with no birth attendant (OR: 1.73, 95% CI=1.04–2.88 and OR: 4.35, 95% CI=1.01–18.67, respectively) compared to those delivered by a skilled birth attendant. The ratio of PLF practice was found to be 2.49 times higher in mothers who had multiple births (OR: 2.49, 95% CI=1.04-5.94) compared to those who gave birth to a single baby. In addition, mothers who initiated breastfeeding in the first 24 hours after birth had higher odds of PLF (OR: 5.08, 95% CI=2.98-8.64) compared to those who initiated breastfeeding immediately after delivery (Table 4).

No relationship was found between prelacteal feeding practice and some sociodemographic characteristics of mother's (age, marital status, educational status, religion, residential location), maternal factors (number of children, antenatal and postnatal care attendance, place of delivery), and characteristics of the newborn infants (sex, type of delivery, birth order number) in the multivariate logistic regression analysis.

Discussion

This study investigated the prevalence of PLF practice in children under five and associated factors in Uganda. In this study, about two-five of mothers reported that they provided prelacteal feeds to their newborn infants. The rate of PLF practice was higher in mothers who have high and moderate economic status, in newborns who delivered by an unskilled

birth attendant, in newborns who delivered without a birth attendant, in multiple births, and in newborns who began breastfeeding in the first 24 hours after delivery.

We found that prevalence of PLF was 40.3% in Uganda. Although it is known that PLF has a negative effect on the growth and development of infants, the prevalence of PLF is higher in Uganda. Our observed prevalence was higher than the overall prevalence of PLF in twenty-two sub-Saharan African (SSA) countries which was reported to be 32.2%¹⁰. The prevalence of PLF in African countries varies from 2.5% to 85.2%^{10,12,16-22}. The prevalence of PLF in Asian countries has been reported as 73.3% in Vietnam²³, 49.8% and 42.7% in India^{24,25}, 26.5% in Nepal¹³, and 12.3% in Timor-Leste²⁶. Using data from the most recent Demographic and Health Survey (2000-2013) for 57 countries, Oakley et al. found that prevalence of PLF was 51%⁹. The differences in the prevalence of PLF among countries may be attributed to differences in culture and local beliefs and availability of an adequate level of maternal and health service. Misconception towards breastfeeding among Vietnamese mothers may cause to high PLF rates²³. Decreased suckling time of an infant and prelacteal feeding can result in decreased breast milk supply. The decrease in breast milk creates a vicious circle by encouraging the mother to PLF. Therefore, breastfeeding practices may explain different rates of PLF between countries. For example, while the PLF rate is 3% in Malawi, where the rate of exclusive breastfeeding is

71%²⁷, the rate of PLF is 73% in Vietnam, where the rate of exclusive breastfeeding is 20%²³.

In the chi-square analysis, we found that PLF practice associated with some sociodemographic characteristics of mother's (age, educational status, marital status, residential location, economic status, religion of mother), maternal factors (birth assistant at delivery, number of children), and characteristics of the newborn infants (type of delivery, multiple births, birth order number, timing of breastfeeding initiation). In this study, the variables found to be significant in the chi-square analysis were examined together in the multivariate logistic regression model. Some variables that were found to be significant in the chi-square analysis were not significant in the logistic regression analysis.

In the logistic regression analysis, we found that economic status, the presence of a birth assistant at delivery, multiple births, and the timing of breastfeeding initiation were significant predictors affecting PLF. Consistent with the results of a recent pooled analysis from Demographic and Health Surveys in twenty-two SSA countries¹⁰, we found that mothers who have high and moderate economic status are more likely to give prelacteal feeds to infant. Our findings are also similar to other studies indicating that lower economic status has a protective effect on PLF^{13,23-26}. A possible explanation is that mothers who have lower economic status may have less access to the expensive prelacteal feeds and therefore exclusive breastfeeding is the only alternative available to them^{10,23,24}. In contrast to our study and previous studies^{13,23-26}, two studies from Nigeria reported that high socioeconomic status has a protective effect on PLF^{12,17}. These contradictory results among countries could be attributed to differences in population characteristics.

Maternal utilization of healthcare services can play an important role on the early breastfeeding practice¹. We found that mothers who had an unskilled birth attendant at delivery were approximately 1.7 times more likely to practice PLF, while women who had no birth attendant at delivery were approximately 4.4 times more likely to practice PLF. However, we could not find a relationship between PLF with the place of delivery, mothers who had antenatal care attendance and postnatal care attendance in the multivariate logistic regression analysis. Oakley et al. reported that the presence of a skilled birth attendant is positively correlated with favorable breastfeeding practices in Middle East/Europe, Latin America, particularly in SSA and Asia. PLF practice was higher among deliveries without skilled birth attendant except Latin America⁹. Similarly, studies have found lower prevalence of PLF in mothers who have an skilled birth attendant at delivery^{10,15,17,19}. When birth occurs without a skilled birth attendant, the most significant source of breastfeeding information comes from family and friends who may advise PLF^{12,19,22,23}. Inconsistent with our study, some studies have demonstrated a strong link between PLF practice and mothers who have antenatal and postnatal care visits^{12,16,17,19}. As a result, the presence of a skilled birth attendant is an important factor in terms of avoiding from PLF. Mothers who have no skilled birth attendant may not receive health information on optimal breastfeeding practices, which could be a likely reason for the high odds of PLF observed in these mothers. Within this scope, breastfeeding counseling should be integrated into routine prenatal and postnatal care in Uganda.

It may be difficult to breastfeed the twin infants at the same

time²⁸. We found that multiple births were significantly associated with higher PLF practice compared to those who gave birth to a single baby in Uganda. This finding is in agreement with another study conducted in Nigeria using the 2013 demographic and health survey data¹⁷. Due to the fact that multiple births are likely to be difficult, it is suggested that breastfeeding after birth may be more problematic. The information and support from health staff are the most critical factors associated with the success of breastfeeding in mothers delivering multiple births²⁸.

The strongest finding of our study was that PLF practice was more common in mothers who initiated breastfeeding in the first 24 hours after birth as compared to those who initiated breastfeeding immediately after birth. This finding is in agreement with other studies conducted in India²⁴ and Ethiopia¹⁸. Moreover, a community based cross-sectional study conducted in the Ethiopia has demonstrated that PLF practice is nine times more likely in mothers who discard colostrum, compared to mothers who give colostrum to their infant¹⁹. In another study, similarly, the presence of PLF has been found to be five times more likely among mothers who discard the colostrum¹⁶. All mothers should be informed and supported about the importance of initiation of EBF practice immediately after delivery¹⁴. An intervention trial conducted in Burkina Faso, Uganda and South Africa has found that PLF practice is lower the women in the intervention group, receiving EBF counselling, than in the control group²⁰.

The main strengths of this study were the collection of data by using a validated questionnaire and the use of an internationally validated study method. In addition, since response rate was high, this study may be considered a study representing the nation. Therefore, the findings are generalizable to the entire country. Moreover, this is the first study conducted in Uganda to describe the predictors associated with PLF. Despite these strengths, the current study has some limitations. First, the data set we used is cross-sectional, which limits the ability to show any causality. Second, since the data of study were collected through a questionnaire, it may be associated with the potential recall bias. Third, other unknown factors such as local beliefs and culture may have played a role as a confounding factor in the study. Fourth, our study was conducted using the data received from the database of UDHS 2011. The data of the article may seem to be outdated, because another report was published in 2016. As we mentioned in the Method section, we got permission to use the database in December 2015. At that date, UDHS 2016 data had not yet been shared. Accordingly, we think that it is important to publish the results of our study, since the last study on this subject in Uganda was conducted in 2002.

Conclusions

In Uganda, the prevalence of PLF was relatively high (40.3%). Economic status of the mother, the presence of a birth assistant at delivery, multiple births, and timing of breastfeeding initiation were found to be associated with PLF. Improving the awareness of mothers on subjects such as the risks associated with PLF, the optimal practices for breastfeeding, and the presence of a skilled birth attendant at delivery is recommended for Uganda. During antenatal and postnatal care visits, all mothers should be informed about the importance of initiation of breastfeeding immediately after delivery. It is recommended to establish baby friendly hospitals for the promotion of mother and baby health in

Uganda.

Acknowledgements

The authors would like to acknowledge Measure DHS for making available the UDHS 2011 data set for this study.

Conflict of interest

All authors declare that they have no competing interests related to this work.

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