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# Colostrum Feeding Practices and Associated Factors Among Mothers Having Children Less Than 12 Months of Age in Wolaita Sodo City, Wolaita, Ethiopia 2019

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**Abstract:** Back ground: Colostrum is the principal milk produced in the first few days after delivery. It is a normative ordinary for the newborns concerning the comprehensive form of nutrition which is well thought –out as the “golden milk” is highly nutritious and contains anti-infective substances. It is very rich in vitamin A, protein and recommended as the newborns’ absolute nourishment by UNICEF and WHO that should begin soon after delivery. The main purpose of this study was to assess colostrum feeding practices and associated factors among mothers having children less than 12 months age in Wolaita Sodo City, Wolaita, Ethiopia. Methods: A community-based cross-sectional study was employed from May 31 to Sep 31 2019 in Wolaita Sodo City. The data collected by using interview-based structured questionnaires among 396 eligible mothers through a systematic sampling technique. Data was analyzed by using SPSS version 25. Both binary and multiple Variable logistic regressions (“odds ratio”) analyses with a p-value < 0.0 5 with 95% confidence interval were identified as statistically significant. Result: Three hundred fifty seven, 87.4% (95%, CI: 11: 00- 14:00) of mothers practiced colostrum feeding after delivery. In multivariate logistic regression analysis at P-value of < 0.05, Counseling on timely initiation of breastfeeding during antenatal care (AOR=7.798, 95% CI: 2.64-23.01), place of delivery (AOR=4.010, 95% CI: 1.260-12.760) and birth attendant of the current birth (AOR=3.119, 95% CI: 1.263-7.706) had the significant association with colostrum feeding practice. Conclusion: Counseling provided on early initiation of breastfeeding during antenatal care, giving birth at health care facilities and attending delivery by health care professionals were predictors of colostrum feeding among mothers having infants less than 12 months of age. Strengthening education on timely initiation of breastfeeding during antenatal care, promoting to give birth at health care institutions and accessing delivery attendance by health care workers are essential for colostrum feeding. Sustaining awareness creation strategies and approaches were suggested for the advancement of the nutritional value of colostrum and its health welfares for new born babies.

**Keywords:** Colostrum, Feeding Practice, Infants, Wolaita Sodo City, Wolaita, Ethiopia

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## 1. Introduction

Child death is high internationally when equated to other age categories and greater than 75% happens in unindustrialized nations. Colostrum is the first liquid that is produced in the first few hours after delivery. Timely feeding of it to the newborn babies is continued as significant to challenge child nutrition and also the existence of newborn as revealed by scientific evidence [1-3]. Colostrum contain less amounts of lipid and potassium

than usual milk [4, 5] It is helpful for bodily growth and intellectual development and has also laxative effect which encourages passage of baby’s first stool which helps to prevent jaundice by clearing excess bilirubin that is created in large quantities at birth [1]. It contains various maternal immunoglobulins and is thick, sticky and clear to yellowish in color. It has proteins, vitamin A and maternal antibodies important to the newborn’s nutrition until lactation is fully

established and it has also high amounts of sodium, potassium, chloride, and cholesterol and various cytokine and growth factors which combination is supposed to encourage peak development of the infant's heart, brain, and central nervous system [1-4]. In a word it acts as a natural vaccine and ultimately reduces the leading causes of death like diarrhea and acute respiratory Infections (ARI) in developing nations of the World [1, 2]. Colostrum has a positive consequence in the prevention of juvenile malnutrition [1] and also delivers natural immunity (baby's first immunization) against many bacterial and viral infections through establishing important bacteria in the baby's gut [2-4]. Despite colostrum having these merits, it is rejected in some communities because it is taken as heavy, thick, dirty, toxic [1] and dangerous to children's health [1-4]. Inappropriately, colostrum feeding is not initiated to newborn soon after delivery for different communal mythologies and misunderstanding. These artificial problems distress directly and indirectly the health of newborn infants and results in malnutrition and high mortality rate in infants [1]. Suboptimal breastfeeding is accountable for 45% of newborn communicable mortality, 30% of diarrheal deaths and 18% of severe respiratory deaths among children less than five years of age [1, 2]. In Ethiopia, about 18% of the infant deaths have been credited to deprived feeding practices [1-3]. Although colostrum feeding provides newborns with immunity to infection, any practice that reduces a frequency or volume of breastfeeding during this time could reduce an infant's long-term health and immunological defense [1, 2].

Even though the world health organization (WHO) recommended initiating colostrum feeding within the first hour of birth [1], a higher number of mothers avoided their colostrum before giving milk to their infant [1-5]. Mothers living in under developed countries avoid colostrum due to outdated views [1-3]. Prolonged labor, cesarean delivery, lack of knowledge regarding the benefits of colostrum and neonatal illness are the factors of colostrum's feeding [1-3]. Even though Ethiopia has developed the National Infant and Young Child Feeding guideline which recommends colostrum feeding [1, 2]. There is wide variability towards colostrum feeding practice and discordant findings in different regions of Ethiopia [1-5] but no study was done on the feeding practices of colostrum and factors related to it in Wolaita Sodo City. Hence, this study aimed to investigate colostrum feeding practices and factors associated among mothers having children aged <12 months in Wolaita Sodo City, Wolaita, Ethiopia

## 2. Methods

### 2.1. Study Area and Setting

The study was carried out in Wolaita Sodo city. The city has a total population of 250521. From this, about 4752 mothers have infants less than 12 months of age. The city has three sub cities and 24 kebeles. Wolaita Sodo City has three

health centers, one teaching and referral hospital owned by MOH and one private general hospital. The Wolaita Sodo city is located from 327 km from Addis Ababa, the capital of Ethiopia (11).

#### 2.1.1. Study Design and Period

A community-based cross-sectional study was employed from May 31 to Sep 31 2019 in Wolaita Sodo City, Wolaita, Ethiopia

#### 2.1.2. Source Population

All mothers having children less than 12 months of age in Wolaita Sodo city

#### 2.1.3. Study Population

Selected mothers who have a child less than 12 months of age at the time of data collection in Wolaita Sodo City

#### 2.1.4. Inclusion Criteria

Mothers who have a child less 12 months of age, resided in study area for at least six months and provided informed consent during the period of data collection

#### 2.1.5. Exclusion Criteria

Mothers who were seriously ill and not volunteer to participate in the study

### 2.2. Sample Size Determination

Sample size was calculated with Epi info statistical software version 3.03 using single population proportion statistical formulas and considering colostrum feeding practice in Aksum town from the previous study as 86.5  $n=Z(1.96)^2 P(1-P)/d^2$  where

$n$ =the sample size [

$z$ =the level of confidence (1.96)<sup>2</sup> with 95% CI

$p$ =the proportion of colostrum feeding practices of mothers having children less than 12 months age in Raya Kobo District 86.5% (12)

$d$ =margin of error

Sample size calculation:

Colostrum feeding practice=86.5

$n=(z \alpha /2)^2 \cdot P(1-P)=(1.96)^2 \cdot 0.865(1-0.865) \div (0.05)^2=180$

Taking the design effect as 2 and considering 10% non-respondent rate with confidence levels of 95% and 5% margin of error.

$nf$ =final sample size was 396

### 2.3. Sampling Procedure

The multi stage sampling technique was used to select study population at the community level. First 8 kebeles were selected from the total of 24 kebeles. A sample size of 396 mothers who have a child with the age less than 12 months old from each kebele were selected based on proportional allocation to the sample size was done. Systematic sampling technique ( $k=12$ ) was used to choose the household for an interview and the starting mother was selected using a lottery method. In the households with

more than one child less than 12 months, the youngest child was selected randomly. The actual age of the infants was determined by asking the mothers and reviewing the birth date from vital certificate.

## **2.4. Variable of Study**

### **2.4.1. Dependent Variable**

Colostrum feeding practice.

### **2.4.2. Independent (Exposure) Variables Related to**

#### **Maternal Socio-demographic and Economic Factors**

Age of the mother, sex of the child, monthly income, family type, occupation of the mother, educational status of mother, educational status of father.

### **2.4.3. Independent Variables Related to the Maternal Health Service Utilizations**

ANC follow up, counseling during ANC, birth order of the child, mode of delivery, place of delivery, birth attendants, and timely initiation of breastfeeding.

### **2.4.4. Operational Definitions**

Colostrum: it is the yellowish breast milk created with in the first few days after delivery.

## **2.5. Data Collection Instrument**

Structured, pre-tested and interviewer administered questionnaires were used. Questions on the questionnaire include the socio demographic characteristics, health service utilization, obstetrics and breast feeding related issues. The questionnaires were from the World Health Organization indicators for assessing infant and young child feeding practices and by adapting to the Ethiopian context.

## **2.6. Data Collection Procedure**

Data were collected through face-to-face interview maintaining the predetermined sampling intervals by 5 professional nurses and 5 Health Officers. The principal investigator supervised data collectors. The data collectors informed the respondents all details of the research purpose and procedures and what was expected of them, potential risk and benefit in order to encourage accurate and honest response. When the mother was not available on the first visit, data collectors arranged alternative visits. If a woman was still not available on second visits or declined to participate in the study, the household was jumped and the immediate next household in the sampling frame was considered.

## **2.7. Data Quality Management**

Before data collection, the questionnaire was first prepared in English and translated into Amharic and back to English to keep the consistency of questionnaire. Three days training was given to data collectors and supervisors by the principal

investigator before the actual data collection.

A pretest was conducted in Bodit town on 5% of total sample size was tested. Based on the pretest, questionnaires were revised, edited and the necessary corrections made accordingly. The collected data were reviewed and checked for completeness and consistency by the supervisor and principal investigator on a daily basis.

## **2.8. Data Processing and Analysis Procedures**

The data were coded, cleaned, entered and edited was done by using EPiData version 3.1 and exported to SPSS version 25 for analysis. Binary logistic regression analysis was employed to scan the statistical association between the outcome variable and every single independent variable. Variables which revealed statistical significance during bivariate analysis at  $\leq 20\%$  ( $p\text{-value} \leq 0.2$ ) were arrived into multivariate logistic regression to quarantine an independent effect of the predictors by using the backward removal method. The Hosmer–Lemeshow test was used to check the appropriateness of the model for analysis. Results were presented using tables and texts. Adjusted odds ratios (AOR) with 95% CI, were estimated to assess the strength of associations and statistical significance was stated at a  $p\text{-value} < 0.05$ .

## **2.9. Ethical Issues**

Ethical clearance was obtained from Wolaita Sodo University Institutional Review Board (IRB). Written consent was gotten from Wolaita Sodo city health department. During data collection all respondents were asked their authorization and informed consent was signed from each study participants.

## **3. Results**

Socio-demographic and economic characteristics of the respondents

All eligible mothers of this study were agreed and participated in this study making the response rate of (100.00%). The mean age of mothers participated in this study was 25.97. A big majority 339 (85.6%) of respondents were Wolaita in their ethnic group. About 275 (69.4) of respondents were protestant Christian in their religious affiliation. 151 (38.1%) of mothers completed primary school and 298 (75.3%) of them were housewives. Around 202 (51%) of infants were males in their sex. From 396 mothers, 361 (91.2%) of mothers were living with their nuclear family. The big majority of families 381 (96.21%) families have less than three under-five children. About 350 (91.4%) the study participants have exposure to mass media and majority of respondents 215 (54.2%) of the families earn greater than or equal to 2500 hundred Ethiopian birr as monthly income (Table 1)

**Table 1.** Socio-demographic and economic characteristics of the respondents having infants of age less than 12 in Wolaita Sodo City, Wolaita, Ethiopia, 2019 GC.

variables	Category (n=396)	Frequency (%)
Age of the mother	<19	27 (6.8)
	20-24	188 (47.5)
	25-29	111 (28)
	30-34	46 (11.6)
	35 and above	24 (6.1)
Ethnicity	Wolaita	339 (85.6)
	Amhara	23 (5.8)
	Gurage	21 (5.3)
	others	13 (3.3)
Marital status of mother	single	2 (.5)
	Married	369 (93.2)
	Divorced	16 (4)
	Widowed	9 (2.3)
Religious affiliation	Protestant	275 (69.4)
	Orthodox	97 (24.5)
	Muslim	22 (5.6)
	others	2 (.5)
Maternal educational level	No formal education	21 (5.1)
	Completed primary	151 (38.1)
	Completed secondary	138 (34.8)
	College and above	87 (22)
Occupational status of mother	House wife	298 (75.3)
	employed	98 (24.7)
Husbands educational status	No formal education	17 (4.3)
	Primary school	98 (24.7)
	Secondary school	133 (33.6)
	College and above	123 (31.1)
Sex of infant	Male	202 (51)
	female	194 (49)
Age of infant	Birth to 6 months	196 (49.5)
	7 to 11 months	200 (50.5)
Family type	Nuclear	361 (91.2)
	Extended	35 (8.8)
Number of under-five children	Less than 3	381 (96.2)
	4 and above	15 (3.78%)
Exposure to mass media	Exposed	350 (91.4)
	Not exposed	46 (8.6)
	Less than 1000	50 (12.62)
Monthly income	1000 to 1499	46 (11.61)
	1500 to 1999	35 (8.83)
	2000 to 2500	65 (16.41)
	Greater than or equal to 2500	215 (54.29)

The respondents' obstetric and health care service utilization

The highest majority 379 (95.7) of respondents have received antenatal care. About 333 (86.9%) of participants started their antenatal care before fifth month of gestation. Most of mothers 206 (54.3%) have received antenatal visit of four times. 249 (65%) of the study participants have had got

counseling on breast feeding. 226 (57.1%) were receiving counseling on timely initiation of breastfeeding. 315 (79.5%) respondents delivered at health institutions and 345 (87.1%) of them assisted by health care professionals. From the total of 396 mothers, 347 (87.6%) of mothers had spontaneous vaginal delivery. About 182 (46%) of infants were first in their birth order (Table 2).

**Table 2.** Obstetric and health care service utilization among mothers' having infants less than 12 months of age in Wolaita Sodo City, Wolaita, Ethiopia 2019.

variables	Categories or responses	Frequency (%)
Antenatal visits	Yes	379 (95.7)
	No	17 (4.3)
Gestational age at first antenatal visits (n=379)	Before 5 <sup>th</sup> month	333 (86.9)
	After 5 <sup>th</sup> month	46 (13.1)
Number of antenatal visits (379)	once	21 (5.8)
	twice	42 (11.5)
	three times	110 (28.9)
	four times	206 (54.3)

variables	Categories or responses	Frequency (%)
Counseling on breast feeding during antenatal care (n=379)	Yes	249 (65)
	No	130 (35)
Counseling on timely initiation of breastfeeding during antenatal care (n=379)	Yes	226 (57.1)
	No	173 (42.9)
Place of delivery (n=396)	Health institution	315 (79.5)
	Home	81 (20.5)
	Health care workers	345 (87.1)
Birth attendants (n=396)	Family	32 (8.1)
	Traditional attendants	19 (4.8)
	Spontaneous vaginal delivery	347 (87.6)
Mode of delivery (n=396)	Caesarean section	49 (12.4)
	First	182 (46)
Infants birth order (396)	Second	121 (30.6)
	Third and above	93 (23.5)

### Knowledge of mothers on colostrum feeding after delivery

From the total of 396 mothers involved in the study, 338 (83.1) heard about timely initiation of breastfeeding and 339 (85.6) thought that feeding breast milk is important for their infants. 300 (75.5) stated colostrum as the first vaccine for their children, 231 (58.3) reported that breastfeeding prevents uterine bleeding, 314 (82.4) told that it can reduce neonatal mortality and 326 (78.3) declared that maternal breastfeeding increases the attachment between the mother and their baby (Table 3).

**Table 3.** Knowledge of mothers on colostrum feeding having children less than 12 months of age in Wolaita Sodo City, Wolaita, Ethiopia 2019 GC.

Variables (n=396)	responses	Frequency (%)
Colostrum is first vaccine	Yes	300 (75.75)
	No	96 (24.5)
Think colostrum feeding important)	Yes	339 (85.6)
	No	57 (14.4)
Heard timely initiation of breastfeeding	Yes	338 (83.1)
	No	58 (14.6)
Early initiation of breast milk prevents uterine bleeding	Yes	231 (58.3)
	No	165 (41.7)
Timely initiation of breastfeeding reduces neonatal mortality	Yes	314 (82.4)
	No	67 (17.6)
Timely initiation of breast milk increases attachment	Yes	326 (78.3)
	No	70 (21.7)

### Colostrum feeding practice and related characteristics of mothers

From the 396 mothers who participated in the study, 312 (78.8%) initiated feeding their infants within one hour of delivery. About 346 (87.4%) of mothers provided colostrum for their infants, 356 (87.3%) were feeding their infants based on demand of the child (Table 4).

**Table 4.** Colostrum feeding practice of mothers having children less than 12

**Table 5.** Factors associated with colostrum feeding practices among mothers having children less than 12 months of age in Wolaita Sodo City, Wolaita, Ethiopia, 2019 (Yes=Fed colostrum, No=Not fed colostrum).

Colostrum feeding practice				
Variables	Yes	No	COR (95% CI)	AOR (95% CI)
Family type				
Nuclear	321	40	3 (1.437-7.170) *	0.142 (0.034-0.601)

months of age in Wolaita Sodo City, Wolaita, Ethiopia 2020 GC.

variables	responses	Frequency (%)
Fed colostrum for current child	Yes	346 (87.4)
	No	50 (12.6)
Breast feeding current child	Yes	382 (96.5)
	No	14 (3.5)
Breastfed with in 1 hour of delivery	Yes	312 (78.8)
	No	84 (21.2)
Feeding based on demand of infant	Yes	347 (87.6)
	No	52 (12.4)

### Factors associated with colostrum feeding practices

In the binary logistic regression at a p-value of  $\leq 0.25$ , family type, family income, exposure to mass media, ANC follow up, number of ANC follow up, counseling on timely initiation of breastfeeding during ANC visit, Early initiation of breastfeeding after delivery, place of delivery, birth order and birth attendant were statistically associated with colostrum feeding practice.

In multiple logistic regression by using backward elimination technique, mothers who have counseling on timely initiation of breastfeeding during antenatal care were 7.798 times higher to practice colostrum feeding than those mothers who have not counseled on timely initiation of breastfeeding (AOR=7.798, 95% CI: 2.64-23.01), mothers delivered at health care facilities were 4.010 times more to practice colostrum feeding than their counterparts. (AOR=4.010, 95% CI: 1.260-12.760) and mothers attended by health care professionals have 3.119 times more likely to provide colostrum for their infants than those mothers assisted by non-health care workers (AOR=3.119, 95% CI: 1.263-7.706) had the significant association with colostrum feeding practice (Table 5).

Colostrum feeding practice				
Variables	Yes	No	COR (95% CI)	AOR (95% CI)
Extended ANC follow up	25	10	1	1
Yes	327	42	7 (2.611-19.483) *	0.00 (0.001-0.056)
No	9	8	1	1
Exposure to mass media				
Yes	321	41	2.819 (1.231-6.453)*	0.254 (0.052-1.250)
No	25	9	1	1
Counseled on EXBF				
Yes	230	17	9.840 (3.494-27.711)*	0.529 (0.102-2.741)
No	11	8	1	1
Counseled on TIBF				
Yes	212	14	5.744 (2.383-13.846)*	7.798 (2.64-23.01) **
No	29	11	1	1
Breastfed with in 1 hour Of delivery				
Yes	288	24	5.37 (2.87-10.024)	0.039 (0.086-0.066)
No	58	26	1	1
Place of birth				
Health institution	291	24	0.174 (0.093-0.326)*	4.010 (1.260-12.760)**
Home	55	26	1	1
Birth attendant				
Health care professional	318	27	3.472 (2.353-5.122)	3.119 (1.263-7.706)**
Non health care professional	28	23	1	1

NB: \* P-value=0.2, \*\*P-value=0.001.

## 4. Discussion

The main reason of this particular study was to assess colostrum feeding practice and its associated factors amongst mothers having infants less than 12 months age in Wolaita Sodo City. This study has shown that the magnitude of colostrum feeding practice was 87.4% which is consistent with the finding reported from Raya Kobo district, Kombolcha town and North Wollo Zone respectively [20, 25, 27]. The result of this study is lower than similar study done at Aksum town which was found to be 94.7% [26]. The finding from the current study is almost similar to the report from North Wollo zone which was 88% [25]. The finding of recent study was greater than similar studies done at Debre Tabor town [28] and Northern part of Ethiopia [13]. The differences among these current and previous studies may be due to period of the study, socio-demographic and economic disparities, socio-cultural variability among the study participants, differences in the study design and sample size.

The finding from current study is higher than the similar studies done in different developing countries which was 79% in Assam, India [19], 63% in Bangladesh [29], 69% in Nepal and 83% in South Africa [29, 30]. The result from the recent study is lower than similar study in Burkina Faso which showed colostrum feeding 92% and 97% in Uganda respectively [30]. The differences may be due to cross-cultural, educational, infant feeding styles and residential dissimilarities.

Counseling given for prenatal mothers on timely initiation of breastfeeding during antenatal follow up heightens the

feeding practice of colostrum. The mothers who got counseling on early initiation of breastfeeding practiced colostrum feeding 7.798 times higher than their counterparts. The finding is similar to studies in the Northern part of Ethiopia [25, 26]. This may be due to creation of awareness towards advantage of colostrum to their infants during promotion of timely breastfeeding initiation. Recommending timely breastfeeding during pregnancy may also keep the place for mothers to discuss the essentials of colostrum for their newborn critically.

The odds of colostrum feeding practice among mothers who delivered at health care facilities were 4.010 times higher than those who gave their current birth at home. This is in line with the study done at North Wollo Zone [25]. The lower odds of colostrum feeding at home delivery could be due to the pressure from family members, friends or significant others. The higher odds of mothers who delivered at health institutions can be because of information from the birth attendants, counseling on colostrum advantages during immediate postnatal period or delayed breastfeeding initiation after delivery.

## 5. Conclusion

Counseling provided on early initiation of breastfeeding during antenatal care for antenatal care mothers, place of delivery and birth attendants were predictors of colostrum feeding practice among mothers having infants less than 12 months of age. Strengthening education on timely initiation of breastfeeding during antenatal care, promoting to give birth at health care institutions and accessing delivery attendance by

health care workers are essential for colostrum feeding. Sustaining awareness creation strategies and approaches were suggested for the advancement of the nutritional value of colostrum and its health welfare for new born babies.

Based on the finding from current study, it is better to provide culturally tailored health education for pregnant mothers by health extension workers focusing on the essentials of colostrum feeding for the betterment of their babies.

## Strength of the Study

The study tried to address mothers recall bias by limiting the infants age to less than 12 months. Rather than facility based study, community centered study was used to reduce the social desirability bias. The protective relationship between colostrum feeding practices and risk was demonstrated after controlling for factors that are known to be associated with colostrum feeding experiences. This particular study also tried to limit sample related issues. Another strength may be, this is the first study on colostrum feeding at the study area in particular to address issues related early breastfeeding problem

## Limitations

The evidence obtained from mothers might be exposed to memory bias since the data were gathered grounded on self-report of the mothers of infants aged less than 12 months age. Lack of support with qualitative data may be another short back. The study also shares some constraints of cross-sectional study design.

## Abbreviations

UNICEF: united Nations children's fund  
 WHO: world health organization  
 SPSS: statistical software for social sciences  
 P-value: probability value  
 CI: confidence interval  
 AOR: adjusted odds ratio  
 ARI: acute respiratory infections  
 IYCF: infants and young child feeding  
 MOH: minister of health  
 ANC: antenatal care  
 Epi info: epidemiological information  
 IRB: institutional review board

## Declarations

### *Ethical Approval and Consent to Participate*

The ethical clearance for this study was proven by the Wolaita Sodo University institutional review board and a supportive letter was obtained from the Wolaita Sodo City health department office. The study participants have fully informed on the purpose of the study and information was

collected after obtaining written informed consent from each participant. Information was documented secretly and confidentiality was guaranteed during the study period.

### *Data availability and Materials*

The datasets used during the current study are available from the corresponding author on reasonable request.

### *Conflicts of Interest*

The author declare that there is no conflict of interest.

### *Funding Source*

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