Colostrum avoidance practice among primipara mothers in urban Northwest Ethiopia. A cross-sectional study

Tilksew Ayalew1* and Eden Asmare2

Abstract

Background: Breast milk is the ideal and complete form of nutrition for infants. Colostrum contains all the necessary nutrients for infants’ growth and development and antibodies that can protect from many childhood illnesses. Understanding the extent of and barriers to colostrum avoidance in Ethiopia is important for learning how to best improve optimal breastfeeding. No single study has been conducted on primipara mothers in the country. Therefore, this study aimed to assess the rate of colostrum avoidance practice and associated factors among primipara mothers.

Method: A community-based cross-sectional study was conducted from March to April 2016 among (n = 398) randomly selected primipara mothers in Bahir Dar city, northwest Ethiopia. Data were collected using a structured interviewer-administered questionnaire and analyzed using SPSS version 25. Bivariate and multivariate logistic regression analyses were carried out. Odds ratio with 95% confidence interval was used to measure the strength of association. Statistical significance was declared at $P$-value ≤ 0.05.

Results: Out of 398 primipara mothers, 8.8% discarded colostrum. The most common reasons for discarding colostrum were; yellow and creamy (39.2%), bad for infant (35.2%), traditional/cultural reason (17.1%) and infant unable to feed (8.5%). Married mothers (AOR = 4.52, 95%CI: 1.13, 18.16), unemployed mothers (AOR = 3.46, 95%CI: 1.15, 10.51), mothers who underwent normal delivery (AOR = 5.20, 95%CI: 1.87, 20.90) and mothers who initiated breastfeeding within 1 h (AOR = 2.79, 95%CI: 0.96, 8.16) were less likely to discard colostrum.

Conclusion: The current study revealed that colostrum was discarded by 8.8% of primipara mothers. Primipara mothers who were married, unemployed, underwent normal delivery and initiated breastfeeding within 1 h were less likely to discard colostrum. These results suggest that multi-sectoral and multi-disciplinary approaches are needed to decrease colostrum avoidance among primipara mothers in Ethiopia.

Keywords: Breastfeeding, Colostrum avoidance, Primipara, Bahir Dar, Ethiopia

* Correspondence: jonnyayu@gmail.com
1Department of Pediatrics and Child Health Nursing, College of Medicine and Health Sciences, Bahir Dar University, Bahir Dar, Ethiopia
Full list of author information is available at the end of the article

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Background

Breast milk is the ideal and complete form of nutrition for infants. World Health Organization (WHO) and United Nation Fund for Children (UNICEF) recommended early initiation of breast feeding, and exclusive breast feeding for 6 months, and feeding breast milk for 2 years and beyond with appropriate and adequate complementary foods [1, 2].

Breast feeding of new born infants has important implications for immediate and future health especially, in developing nations like Ethiopia where there is high rate of malnutrition, infectious disease and mortality among children [3]. Sub optimal breast feeding practices including colostrum avoidance significantly impair the health, development and survival of children less than 5 years of age [2]. A systematic review and meta-analysis conducted on the effect of optimal breast feeding on child mortality showed that infants who were not exclusively breastfed and given continued breastfeeding had significantly higher risk of all-cause and infection mortality compared to their counter parts [4]. Another evidence from the lancet series on breast feeding revealed that universal breast feeding can prevent the deaths of 823,000 children and 20,000 mothers each year along with $US300 billion economic saving [5].

Colostrum is the first and most immunologically protective secretion of the mammary glands, which is highly nutritious, easily digestible, and act as a natural vaccine various health treats in infants [3, 6]. Evidence from all over the world revealed that neonatal and postnatal deaths were found to be decreased among infants who fed colostrum [7]. However, colostrum avoidance which includes delayed initiation of breast-feeding; pumping and discarding colostrum, and/or wet nursing [3, 6] has been reported across the globe various places such as Indonesia [8], Egypt [6], India [9, 10], Ethiopia [3, 11–16].

Mothers across the world particularly in the developing countries including Ethiopia discard colostrum due to different reasons. Some of the reasons of discarding colostrum are; colostrum is unclean, heavy and hard for digestion, causes abdominal crap and diarrhea, bad lack for family, the traditional belief that colostrum should not be fed until the placenta is passed, viewing it as it is a puse collected in the breast during pregnancy, seeing it having no nutritional value. Some women do not have specific reasons to discard colostrum other than traditional practice [3, 6, 7, 9].

Colostrum avoidance is the common nutritional malpractice in Ethiopia [3]. Studies in different regions of the country revealed that the rate of colostrum avoidance among Ethiopian mothers is (6–76.9%) [3, 11, 16–18].

Evidences showed that primipara mothers; especially teenage primipara mothers are more likely to practice suboptimal breastfeeding than multipara mothers. A study conducted in Indonesia among primigavida mothers revealed 7% of the participants discarded colostrum and most participants (56%) did not have sufficient information about optimal breastfeeding [8]. Another study conducted in Pakistan has reported more than two-third (67%) of primigavida mothers had discarded colostrum and offered prelacteal foods to their new born babies [19]. Gebremeskel et al. have shown in their work that primipara mothers are more likely to practice prelacteal feeding than multipara mothers. They have also revealed that mothers who discarded colostrum were more likely to practice prelacteal feeding compared to mothers who fed colostrum to their new born babies [20].

In Ethiopia, even though few studies are conducted to investigate rate of colostrum avoidance and its associated factors, no researcher tried to investigate the situation in the population primipara mothers. Therefore; the objective of this study was to determine the rate of colostrum avoidance and associated factors among primigavida mothers in northwest, urban Ethiopia.

Methods

Study area and setting

This study was conducted in Bahir Dar city administration from March to April, 2016. Bahir Dar city is located 578 km northwest of Addis Ababa, the capital city of Ethiopia. According to the 2007 Census conducted by the Central Statistical Agency of Ethiopia, Bahir Dar city has a total population of 221,991, of whom 49% are men and 51% are women. From female population, around 66% were reproductive age groups. During the study period, a total of 2500 primi-gavida mothers were living in in Bahir Dar City. The city has nine administrative sub cities. It has one public specialized referral hospital, one public general hospital, two private hospitals, ten health centers which give services for the population of the city [21].

Study design and population

A community-based, cross-sectional study design was used to determine the rate of colostrum avoidance among primigavida mothers living in Bahir Dar city, northwest Ethiopia. Randomly selected primigavida mothers between the age of 15 and 49 years of age, with infants younger than 6 months of age, and who live at list for 6 months in Bahir Dar city were included. Primigavida mothers who lived less than 6 months in Bahir Dar city, who are critically ill or unable to communicate, who were under 16 years old without parents or guardians were excluded.
Sample size and sampling procedure
A total sample of 400 mothers was calculated using Yamane’s formula ($n = N / 1 + N (e^2)$) by considering the following assumptions; $P = 0.5$, a 95% level of confidence, $N = 2500$ (population size) and $e = \pm 5\%$ (level of precision) [22]. First, a total of 2500 mother-infant dyads of primagravida mothers were accessed and listed from Health Information System (HIS) of Bahir Dar city health bureau in collaboration with the local health extension workers of the city administration. Then, mothers were sorted and listed in their respective sub-city. Besides, the total sample size ($n = 400$) was proportionally allocated to size to each sub-city. Finally, the study participants were selected by using simple random sampling method from each sub-city. Data on infants were gained from infants’ mothers and by reviewing birth certificate of infants.

Data collection and data quality assurance
Data were collected using a pre-tested, structured, and interviewer-administered questionnaire which was adopted from previous studies [23–25]. Mothers were interviewed at their households. The English version of the questionnaire was prepared first. Then, language experts translated it to the local language (Amharic) and back to the English to check consistency and accuracy. Three diploma nurses and two Bachelor of Science nurses were recruited as data collectors and supervisors respectively. To ensure data quality, training was given for data collectors and supervisors for two consecutive days on the overall content of the questionnaire, how to approach participants, and the data collection process. Assigned supervisors closely managed the data collection process. A pre-test was done on 10% of the calculated sample size of women out of study area and readjustment was done on the questionnaire.

Measurement
Variables
The dependent variable in this study was colostrum avoidance and the independent variables were socio-demographic characteristics, maternal health care service utilization, breastfeeding-related factors, and other factors.

Operational definitions
Primipara A mother who gave a live birth for the first time [19].

Colostrum avoidance Colostrum avoidance includes: delayed initiation of breast-feeding; pumping and discarding colostrum; and/or wet nursing [3].

Pre-lacteal feeding If an infant during the first 3 days of life took something other than breast milk [26].

Early initiation of breastfeeding If an infant within 1 h of birth is put on the mother’s breast to feed [27].

Exclusive breastfeeding Infant fed on only breast milk (with the exception ordered medicines and vitamins by health professionals 1 day (24 h.) before the survey was conducted [24].

Husband support Husband who supports, encourages, and promotes the mother’s breastfeeding practice [28].

Statistical analysis
The collected data were checked for completeness and consistency and then, coded and entered into EpiData 3.1 and exported to SPSS version 20 for analysis. Bivariate logistic regression was performed to each independent variable with the dependent variables. Then, variables with $p$-value $< 0.25$ were included in multivariate logistics regression analyses. The strength of association was measured using odds ratio and 95% confidence intervals. Statistical significance was declared at $P$-value $\leq 0.05$.

Ethics approval and consent to participate
Ethical approval was obtained from the research review ethical committee of the Addis Ababa University, and permission letter was obtained from Bahir Dar city mayor’s office. Data collectors informed each respondent about the study. Written and verbal consent was obtained from each study participants and confidentiality was assured for all information provided by not exposing to third body. Moreover, personal identifiers were not included in the questionnaire.

Result
Socio demographic profiles of participants
All participants were primipara mothers who were living in Bahir Dar city for 6 months prior the commencement of the study. From 400 eligible mothers, 398 were interviewed in this study making the response rate 99.5%. The mean age of mothers was 26 years with a standard deviation of (SD ± 4). More than half of the mothers (52%) were in the age range of 15–29 years. Out of 398, 73.9% were unemployed, 63.1% were uneducated, and 69.6% mothers belong to Orthodox Christianity while majorities (87.4%) belong to Amhara ethnic group. Majority of participants (86.7%) were married. Almost one out of ten had household income < 1500 Ethiopian Birr (Table 1).

Health care service utilization profile of participants
Regarding to health care service utilization, nine out of ten participants got antenatal care (ANC) follow up. Amongst these, 60.9% of participants attended at health centers, 63.4% had four and more visits while 76.5% got
breastfeeding counseling during ANC visits. Out of 398 participants, 86.4% gave birth at health institutions and majorities (82.2%) were delivered via normal delivery (Table 2).

Colostrum avoidance and breast feeding practices
In the current study, out of 398 primipara mothers, 8.8% discarded colostrum. The most common reasons for discarding colostrum were; yellow and creamy (39.2%), bad for infant (35.2%), traditional/cultural reason (17.1%) and infant unable to feed (8.5%). Regarding breast feeding practices, 65.1% initiated breastfeeding within 1 h, 57.3% practiced exclusive breastfeeding to 6 months and 15.8% gave prelacteal feeding. Among those who gave prelacteal feeding, 47.6% gave butter, 31.8% gave water, and 20.6% gave other foods like cow milk and sugar solution (Table 2).

Factors associated with colostrum avoidance and prelacteal feeding
In bivariate analysis, marital status, mother’s occupational status, mother’s educational status, father’s educational status, number ANC visits, mode of delivery, initiation of breastfeeding within 1 h and house hold income were statistically associated with colostrum avoidance. However, marital status, maternal occupation, mode of delivery and initiation of breastfeeding within 1 h were significantly associated with colostrum avoidance in multivariate analysis.

Marital status was significantly associated with colostrum avoidance. Married mothers were almost four
| Variable                                      | Category (n = 398) | Frequency | Percent (%) |
|----------------------------------------------|--------------------|-----------|-------------|
| Got ANC follow up                            | Yes                | 361       | 90.7        |
|                                              | No                 | 37        | 9.3         |
| Place of ANC (n = 361)                       | Hospital           | 67        | 18.6        |
|                                              | Health Centre      | 220       | 60.9        |
|                                              | Private clinic     | 74        | 20.5        |
| Number of ANC (n = 361)                      | < 3 times          | 132       | 36.6        |
|                                              | ≥ 4 times          | 229       | 63.4        |
| ANC breastfeeding counseling (n = 361)        | Yes                | 276       | 76.5        |
|                                              | No                 | 85        | 23.5        |
| Place of delivery                            | Health institutions| 344       | 86.4        |
|                                              | Home               | 54        | 13.6        |
| Mode of delivery                             | Normal/vaginal     | 327       | 82.2        |
|                                              | C/S                | 71        | 17.8        |
| Early initiation of breast feeding           | < 1 h              | 259       | 65.1        |
|                                              | > 1 h              | 139       | 34.9        |
| Breast fed exclusively                       | Yes                | 228       | 57.3        |
|                                              | No                 | 170       | 42.7        |
| Colostrum avoidance                          | Yes                | 35        | 8.8         |
|                                              | No                 | 363       | 91.2        |
| Reasons to avoid colostrum                   | infant unable to feed| 34  | 8.5         |
|                                              | Bad for infant     | 140       | 35.2        |
|                                              | yellow and creamiest| 156 | 39.2        |
|                                              | Due tradition/culture| 68    | 17.1        |
| Pre-lacteal feeding practice                 | Yes                | 63        | 15.8        |
|                                              | No                 | 335       | 84.2        |
| Prelacteal foods given (n = 63)              | Water              | 20        | 31.8        |
|                                              | Butter             | 30        | 47.6        |
|                                              | Others a*          | 13        | 20.6        |
|                                              |                    |           | 17.1        |
| Who influenced you to give other foods?      | My Own Decision    | 90        | 24.2        |
|                                              | My Husband         | 108       | 29.0        |
|                                              | My Mother          | 76        | 20.4        |
|                                              | My Mother In Law   | 58        | 15.6        |
|                                              | Others b*          | 40        | 10.8        |
| Faced any breast feeding problem?            | Yes                | 264       | 66.3        |
|                                              | No                 | 134       | 33.7        |
| Husband support in breast feeding (n = 397)   | Yes                | 355       | 89.4        |
|                                              | No                 | 42        | 10.6        |
| Cultural support of breast feeding           | Yes                | 52        | 13.1        |
|                                              | No                 | 346       | 86.9        |

a* = cow’s milk, sugar solution, Honey  
b* = Friends, neighbors, members of extended family
times less likely to discard colostrum (AOR = 4.52, 95%CI: 1.13, 18.16) compared with unmarried mothers. Similarly, maternal occupation was significantly associated with colostrum avoidance. Mothers who were unemployed were about three times less likely to discard colostrum (AOR = 3.46, 95%CI: 1.15, 10.51) compared to mothers who were employed. Mode of delivery was also significantly associated with colostrum avoidance. Mothers who were underwent normal delivery were five times less likely to discard colostrum (AOR = 5.20, 95%CI: 1.87, 20.90) compared with mothers who were underwent caesarian delivery. Likewise, initiation of breastfeeding within 1 h was significantly associated with colostrum avoidance. Mothers who initiated breastfeeding within 1 h were almost 3 times less likely to discard colostrum (AOR = 2.79, 95%CI: 0.96, 8.16) compared with mothers who did not initiated breastfeeding within 1 h (Table 3).

**Discussion**

The feeding of infant has important implications for immediate and future health in developing countries like Ethiopia that have high rate of under-five malnutrition, morbidity and mortality. Colostrum is highly nutritious and immunogenic. However, its avoidance has been reported across the globe including Ethiopia. Its avoidance leads to the introduction of prelacteal feeding which is harmful practice for the newborn baby. The extent and associated factors of colostrum avoidance among primiparous mothers is not known in the study area. Identifying the extent and associated factors of colostrum avoidance has important implications to improve infant feeding practices and child health.

In this study, rate of colostrum avoidance and its associated factors were assessed. The current study revealed that colostrum was discarded by 8.8% of primipara mothers. The result is nearly in line with previous

**Table 3** Factors associated with colostrum avoidance among primipara mothers having infants less than 6 months in Bahir Dar City, North west Ethiopia, 2016

| Variable                        | Colostrum Avoidance |   |   |   |   |   |
|---------------------------------|---------------------|---|---|---|---|---|
|                                 | Yes (N & %)         | No (N & %) | COR (95%CI) | AOR (95%CI) | P-value |
| Marital status                  |                      |   |   |   |   |   |
| Married                         | 25 (7.2)            | 320 (92.8) | 1 |   |   |
| Unmarried                       | 10 (18.9)           | 43 (81.1)  | 2.98 (1.34, 6.62) | 4.52 (1.13, 18.16) | 0.033* |
| Maternal occupation            |                      |   |   |   |   |   |
| Unemployed                      | 21 (7.1)            | 273 (92.9) | 1 |   |   |
| Employed                        | 14 (13.5)           | 90 (86.5)  | 2.02 (0.987, 4.4) | 3.46 (1.15, 10.51) | 0.027* |
| Mother’s education              |                      |   |   |   |   |   |
| Unereducated                    | 29 (11.6)           | 222 (88.4) | 3.07 (1.24, 7.58) | 0.28 (0.067, 1.13) | .074   |
| Educated                        | 6 (4.1)             | 141 (95.9) | 1 |   |   |
| Father’s education              |                      |   |   |   |   |   |
| Unereducated                    | 21 (13.6)           | 133 (86.4) | 2.84 (1.30, 6.24) | 0.21 (0.07, 6.7)  | 0.09   |
| Educated                        | 10 (5.3)            | 180 (94.7) | 1 |   |   |
| Number of ANC follow up visits  |                      |   |   |   |   |   |
| < 3 visits                      | 12 (9.1)            | 120 (90.9) | 1.81 (0.788, 4.5) | 0.93 (0.30, 2.85) | 0.894  |
| ≥ 4 visits                      | 12 (5.2)            | 217 (94.8) | 1 |   |   |
| Mode of delivery                |                      |   |   |   |   |   |
| Normal/vaginal                  | 18 (5.5)            | 309 (94.5) | 1 |   |   |
| C/S                             | 17 (23.9)           | 54 (76.1)  | 5.4 (2.62, 11.14) | 5.20 (1.87, 20.90) | 0.003* |
| Early initiation of breast feeding|                   |   |   |   |   |   |
| Yes                             | 14 (5.4)            | 245 (94.6) | 1 |   |   |
| No                              | 21 (15.1)           | 118 (84.9) | 3.11 (1.53, 6.34) | 2.79 (0.96, 8.16) | 0.05*  |
| Household income                |                      |   |   |   |   |   |
| < 1500 birr                     | 15 (42.9)           | 20 (57.1)  | 12.86 (5.74, 28.8) | 0.07 (0.02, 0.35) | 0.10   |
| > 1500 birr                     | 20 (5.5)            | 343 (94.5) | 1 |   |   |

ANC Antenatal Care, C/S Caesarian Section
*p-value ≤ 0.05 (Significant)
Maternal occupation was also found significantly associated with colostrum avoidance. Unemployed mothers were nearly 3 times less likely to discard colostrum. The finding is similar with the previous study done in Kombolcha, Ethiopia [17]. This could be likely due to unemployed could have more time to practice breastfeeding than employed mothers. Tewabe et al. have demonstrated in their work that unemployed mothers practiced breast feeding better than employed mothers [24].

Mode of delivery was also significantly associated with colostrum avoidance. Mothers who were underwent normal vaginal delivery were less likely to discard colostrum than mothers who were underwent cesarean section. The finding is in line with previous studies in Egypt and Vietnam [6, 33]. The possible explanation could be due to that mothers underwent cesarean section could have difficulties to initiate breast feeding due to post-surgical pain and complications. This in turn could delay early initiation of breast feeding and leads to colostrum avoidance. A study from turkey has demonstrated that mothers underwent cesarean section had high rate of delayed initiation of breast feeding [34]. Mukherjee et al. in their review of colostrum feeding practice worldwide also showed that delayed initiation of breastfeeding was observed among mothers underwent cesarean section [7]. This implies that strategies should be designed to prevent unnecessary cesarean section that negatively affects breast feeding practices particularly early initiation of breastfeeding and colostrum feeding. Health care workers who work in maternity units should give special attention to mothers who underwent cesarean section delivery. They should directly assist mothers to initiate breastfeeding and feed colostrum to their babies in addition to managing their post-surgical pain and discomforts.

Early initiation of breast feeding was significantly associated with colostrum avoidance. Mothers who initiated breastfeeding within 1 h were less likely to discard colostrum. The finding is in line with previous studies [15, 31]. The possible explanation might be due to the fact that if the mother delay to start breast feeding, she is likely to carry out infant feeding malpractices including colostrum avoidance. A study in Afar, Ethiopia done on Rural Pastoralist Community has revealed that delayed initiation of breast feeding leads to colostrum avoidance [13]. This implies that primigravida mothers should be counseled on early initiation of breast feeding during their antenatal care follow up. Mothers who missed antenatal care follow up should be informed about the importance of early initiation of breast feeding and feeding colostrum to their new born babies via public media like radio and television.

In this study, colostrum avoidance was statistically associated with marital status, maternal occupation, and mode of delivery and timely initiation of breastfeeding.

Marital status was significantly associated with colostrum avoidance. Married mothers were almost 4 times less likely to discard colostrum compared with unmarried mothers. The finding is similar with the study from North Wolo, Ethiopia [31]. The possible explanation might be due to the fact that married mothers could have get social support from their husband during breast feeding practice. Previous studies have confirmed that husband support has a positive impact on breast feeding practices [24, 32]. In addition, a study conducted in United Kingdom to explore fathers’ experience of breast feeding promotion also revealed that mothers who have strong social support from their husband are more likely to practice early initiation of breastfeeding and colostrum feeding than who do not have support [28].
Limitation
The study has some limitations. First, the study was cross-sectional so that the cause and effect relationship cannot be determined. Second, the study did not assess the qualitative aspect of colostrum avoidance. Third, husbands were not included in the study in spite of their important role in deciding infant feeding practices. Finally, the information obtained from mothers could be subjected to recall bias.

Conclusion
This study revealed that colostrum avoidance practice is common among primipara mothers in the study area. Marital status, maternal occupation, and mode of delivery and timely initiation of breastfeeding were predictors of colostrum avoidance in primipara mothers. Health care workers, who work in maternity unity should give attention to unmarried and employed mothers, should discourage unnecessary cesarean section deliveries and promote early initiation of breast feeding to improve colostrum feeding practice. As this study is the first study done on primipara mothers in the country, it could be used as a base line study for the future researchers. Finally, further interventional and longitudinal studies are needed to improve colostrum feeding practice among primipara mothers.

Abbreviations
ANC: Antenatal Care; C/S: Caesarian Section; AOR: Adjusted Odds Ratio; CL: Confidence Level; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; EDHS: Ethiopian Demographic Health Survey; SD: Standard Deviation; WHO: World Health Organization; UNICEF: United Nation Children’s Fund; SPSS: Statistical Package for the Social Sciences; HIS: Health Information System

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Authors’ contributions
Both authors conceived and designed study. TA analyzed and interpreted data drafted the manuscript for important intellectual content and wrote the paper. Both authors read and approved the manuscript.

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Availability of data and materials
The data of this study can’t be shared publically due to the presence of sensitive (confidential) participants’ information. The data can be obtained from corresponding author up on reasonable request.

Ethics approval and consent to participate
The research review ethical committee of the Addis Ababa University approved this research in accordance with the proclamation No 603/2008 of National Research Ethics Review Guideline (approval no.312/MSC/91/08), and permission letter was obtained from Bahir Dar city mayor’s office (permission letter no.657/90/04). Informed written consent was taken from all participants or the families/guardians when the participants were less than 18 years of age. All the participants’ information was held confidential by locking with keys in the boxes and passwords in computers to avoid access to the third person. Moreover, personal identifiers were not included in the questionnaire.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Author details
1Department of Pediatrics and Child Health Nursing, College of Medicine and Health Sciences, Bahir Dar University, Bahir Dar, Ethiopia. 2Department of Midwifery, College of Medicine and Health Sciences, Bahir Dar University, Bahir Dar, Ethiopia.

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