BMC Pediatrics

RESEARCH Open Access

Determinants of given anything other than breast milk for neonates in Ethiopia: a multilevel modeling complex sample survey data analysis

Nigusie Selomon Tibebu[1*], Tigabu Desie Emiru[1], Chalie Marew Tiruneh[1], Gebrehiwot Berie Mokonnen[1], Birara Aychew Tilaye[1], Lakachew Yismaw Bazezew[1], Bisrat Dessie Getu[2], Moges Wubneh Abate[3], Adane Birhanu Nigat[3], Getasew Legas[4], Belete Gelaw Walle[5], Mulualem Gete Feleke[6] and Endalk Birrie[7]

Abstract

Background Giving any things other than breast milk during the first 3 days after birth is a prelacteal feeding. Thus, providing anything other than breast milk to newborns has an impact on the prompt initiation and exclusive breastfeeding but a major issue in the developing countries. Therefore, the aimed to assess the determinants both individual and community level factors of given anything other than breast milk for neonates in Ethiopia.

Methods This study was a multilevel population-based cross-sectional conducted with total of weighted sample of 24,252 participants. The Ethiopian Demographic and Health Survey 2019 data were the source of secondary data analysis used in the study. The data was hierarchical; therefore we performed a multilevel analysis. In the multivariable analysis, variables with p-value < 0.05 were deemed substantially correlated with given anything other than breast milk for neonates.

Results In this study, respondents with Catholic religion followers [adjusted odds ratio (AOR) = 0.05; 95%CI: 0.12, 0.28] timely initiation of breast feeding [AOR = 4.44; 95%CI: 2.91, 6.74], Cesarean delivery usage [AOR = 3.94; 95%CI: 2.13, 7.13], and being in communities with pastoralist region [AOR = 6.39; 95%CI: 3.03, 11.62] were significant predictors of given anything other than breast milk for neonates.

Conclusion This study found that giving anything other than breast milk to newborns was associated with both individual and community level characteristics, particularly among members of the Catholic Church, prompt commencement of breastfeeding, use of cesarean section delivery, and contextual region categories. Therefore, improving maternal health and early breastfeeding services should be strengthen. Furthermore, it is preferable to fairly distribute maternal services among regions and to focus on people living in pastoralist regions.

Keywords Breast milk, Ethiopia, Multilevel modeling, Neonates

*Correspondence:
Nigusie Selomon Tibebu
dtu@dtu.edu.et; nigie1221@gmail.com

Full list of author information is available at the end of the article

© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by-nc-nd/4.0/.

Background

Giving any things other than breast milk during the first 3 days after birth is a prelacteal feeding [1].

Despite the World Health Organization's (WHO) recommendation that exclusive breastfeeding (EBF) be practiced for the first six months of life, a significant number of children under the age of five (823,000) were not effectively nursed each year, including by being given anything other than breast milk for newborns [2].

Thus, providing anything other than breast milk to newborns has an impact on the prompt initiation and exclusive breastfeeding, which lowers the immunological benefits of the first maternal breast milk and raises the risk of infections [3, 4].

As mentioned above, infants who are not breastfeed exclusively during the first few months of life are at increased risk of death, particularly from infections. Non-exclusive breastfeeding can more than double an infant's risk of dying from diarrhea and pneumonia between the ages of 0 and 5 months [5].

For instance, worldwide, poor baby nutrition, which includes given anything other than breast milk for neonates, accounts for 18% of acute respiratory fatalities, 30% of diarrheal deaths, and 45% of newborn deaths [6].

The World Health Organization and United Nations Children's Fund (UNICEF) recommend against pre-lacteal feeding for newborns during the first six months of life, unless medically needed, in acknowledgement of the advantages of human breast milk, especially when children are exclusively breastfed [7].

The practice of premature feeding is a major issue in the developing countries. In Africa, breastfeeding is rarely started during the first hour of delivery, which is a lost and important breast feeding opportunity.

In Vietnam and India, the prevalence of given anything other than breast milk was 73.3 and 40.1%, respectively [4, 8]. According to an African study, around 32·2% of mothers in Sub-Saharan Africa [9], 60% of mothers in Egypt [10], and 31.3% of moms in Uganda [11] used pre-lacteal feeding.

According to data from the 2019 Ethiopian Demographic Health Survey (EDHS), 12% of newborns received prelacteal feedings within their first three days of life, from the 8% of children who had them in the past [12]. Nearly three out of ten Ethiopian infants (27%) still consume pre-lacteal meals in the first three days of life, even though 52% of them benefit from breastfeeding within the first hour of delivery.

The studies' shared characteristics included residency, delivery site and type, prenatal care, feeding advice, and initiation of breast feeding [13–18].

However, giving other than breast milk practice for neonates and its determinants in Ethiopia have not yet been thoroughly studied.

Moreover, there is a deficiency of documented data on the individual and community level factors of prelactal feeding practice in Ethiopia. For these reasons, the primary goal of this study was to identify the factors that contribute to prelactal feeding practice in Ethiopia.

Furthermore, the results of this study will aid the health experts in formulating a more thorough and successful intervention program that targets community-level as well as individual-level issues, potentially leading to long-term structural change and successful policymaking.

Methods and materials

Data source and study population

This study was based on secondary data (https://dhsprogram.com/data/dataset/Ethiopia_Interim-DHS_2019), analysis of the 2019 EDHS and data collection took place from March 21, 2019, to June 28, 2019. All census enumeration areas (EAs) established for the 2019 Ethiopia Population and Housing Census (EPHC), which was carried out by the Central Statistical Agency (CSA), served as the sample frame for the 2019 EMDHS.

The 149,093 EAs made for the 2019 EPHC are fully listed in the census frame. A geographic area of 131 households on average is called an EA. The location of the EA, the kind of dwelling (rural or urban), and the approximate number of residential households are all included in the sampling frame.

A weighted sample of 24,252 women who gave birth in the five years before to the survey was employed for our analysis. The EDHS 2019 report contains comprehensive details about the survey's questioner and sampling strategy [12].

Variables of the study

The outcome variable was given anything other than breast milk for neonates, which was a binary outcome variable coded as "0" if it was not breast milk = Yes and "1" if it was breast milk = No. The independent variables in this study were further classified into individual and community level factors.

The individual-level factors used in this study were; age and sex of the respondent, educational status of the participant, marital status, household wealth index, religion, Number of under five children, birth order, sex of child, birth type, ANC visits, timely initiation of breast feeding, place of delivery and usage of cesarean section.

Three community-level variables; residence, contextual region, and community level of women's education were also used as an independent variable in this study.

The community-level factor community level of women's education was created by aggregating individual-level factors since these variables are not directly found from the survey.

Operational definitions

Wealth index

Derived using principal components analysis and it was directly available in the EDHS dataset with the five categories (poorest, poorer, middle, richer, and richest).

It was re-coded as poor (includes the poorest and poor), middle, and rich (includes the rich and the richest categories) for our analysis.

Community level of women education

Using data on respondents' educational attainment, aggregate values were measured by the proportion of women with at least a primary education. These values were then classified using the national median value to values: low (communities where less than 50% of women have at least primary education) and high (communities where more than 50% of women have at least primary education) community level of women education.

Data management and statistical analysis

STATA version 17 was used to further code the data and analyze it. Weighting (with the available sample weight factor (v005)) was done during the study to correct for non-proportional sample selection, non-responses, and to bring the data back to representativeness.

Because the EDHS data is hierarchical in and of itself, we employed the multilevel logistic model. Bivariable multilevel logistic regression analysis was first performed, and for variables with $p < 0.25$ in the bivariable analysis, multivariable multilevel logistic regression analysis was then fitted. Variables with $p < 0.05$ were determined to be substantially linked with providing anything other than breast milk for neonates in the multivariable multilevel logistic regression analysis.

Four models with relevant variables were fitted. Model II assessed the impacts of individual-level factors exclusively, Model III contained just community-level factors, Model IV (complete model) contained both individual and community-level components, and Model I, also known as the null model, fitted without explanatory variables.

To investigate clustering and the degree to which community-level characteristics account for the unexplained variance of the null model, the following metrics were employed: intra-class correlation coefficient (ICC), a proportionate change in variance (PCV), deviance, and median odds ratio (MOR).

The deviance was used to compare and assess the fit of the models, and the model with the lowest deviance was deemed to be the best-fitted model.

Results

Socio-demographic characteristics of the study participants

A total weighted sample of 24,252 women who gave birth within five years preceding the survey was used in our analysis. The mean age of the study participants was 35 years, and the majorities (83.78%) of the head of the household were males.

The majority (67.60%) of the study participants had no formal education and 41.60% were from poor wealth index. Most (91.01%) of the respondents were married. Regarding region, 69.70% were Agrarian. More than half (56.87%) of the study participants were from communities with a lower level of women education (Table 1).

Random effect model and model fitness

According to Table 2, the ICC in the null model was 0.286, meaning that variances between clusters/communities were responsible for approximately 28.6% of the variations in providing newborns with anything other than breast milk.

In a similar vein, the null model's greater MOR value (4.17) suggests that there was a considerable heterogeneity between the clusters. This is understood to mean that, if a person were chosen at random from two distinct clusters, the person from the higher risk cluster would be 4.17 times more likely to give neonates anything other than breast milk than the person from the lower risk cluster.

Furthermore, the final model's higher PCV (41.13%) showed that both individual and community-level factors were responsible for 41% of the variability in the choice to give newborns anything other than breast milk. Table 2 further showed that, with the lowest deviance (1901.566), the final model, or model IV, was the best-fitted model.

Determinants of given anything other than breast milk for neonates

For multivariable multilevel analysis, we consider only variables with $p < 0.25$ in the bivariable analysis. In the multivariable multilevel analysis respondent's religion, timely initiation of breast feeding, cesarean section delivery, contextual region, were significantly associated with given anything other than breast milk for neonates.

The odds of being a catholic religion followers given anything other than breast milk for neonates was 5% [adjusted odds ratio (AOR) = 0.05; 95% CI: 0.12, 0.28] lower as compared to respondents with orthodox religion followers.

Mothers who weren't initiate breast feeding immediately had 4.44 [AOR = 4.44; 95%CI: 2.92, 6.74] times higher odds of having given anything other than breast milk for neonates as compared to their counterparts. Looking at the cesarean section delivery, mothers who

Table 1 Individual and community-level characteristics of respondents, and children mini EDHS 2019

Variables		Frequency (*N*)	Percent (%)
Individual variables			
Age	15–19	269	1.11
	20–24	1,410	5.82
	25–29	4,074	16.80
	30–34	4,682	19.31
	35–39	5,378	22.18
	40–44	4,670	19.26
	45–49	3,767	15.53
Sex	Male	20,319	83.78
	Female	3,933	16.22
Religion	Orthodox	8,293	34.19
	Catholic	111	0.46
	Protestant	7,202	29.70
	Muslim	8,264	34.08
	Other*	381	1.57
Marital status	Single	87	0.36
	married	22,071	91.01
	widowed	874	3.61
	divorced	1,219	5.03
Educational status	Non educated	16,393	67.60
	Educated	7,859	32.40
Wealth index	Poor	10,089	41.60
	Medium	4,999	20.61
	Rich	9,162	37.78
Number of U5 children	No U5 children	7,905	32.60
	1–3	14,463	59.64
	>=3	1,883	7.77
ANC visit	No ANC visit	1,003	25.56
	1–3 visits	1,224	31.19
	>=4 visits	1,698	43.25
Birth order number	1	14,463	59.64
	>=2	9,788	40.36
Sex of child	Male	12,548	51.74
	Female	11,704	48.26
Birth type	Singleton	23,711	97.77
	Multiple	540	2.23
Initiation of breast feeding	Immediately	2,803	75.85
	Not immediately	892	24.15
Place of delivery	Home	2,842	51.42
	Institutional	2,684	48.58
C/S delivery	No	5,226	94.56
	Yes	300	5.44
Community level variables			
Community education	Low	13,791	56.87
	High	10,460	43.13
Residence	Urban	5,728	23.62
	Rural	18,523	76.38
Contextual region	Agrarian	16,903	69.70
	Pastoralist	1,839	7.58
	City	5,509	22.72

*traditional

gave birth through cesarean section had 3.94 [AOR = 3.94; 95%CI: 2.13,7.13] times higher odds of having given anything other than breast milk for neonates as compared to their counterpart.

Regarding contextual region, respondents from Pastoralists had 6.39 [AOR = 6.39; 95%CI: 3.00, 11.62] times higher odds of having given anything other than breast milk for neonates as compared to respondents from Agrarian types of region categories (Table 2).

Discussion

Giving other than breast milk practice for neonates and its determinants in Ethiopia have not yet been thoroughly studied. Moreover, there is a deficiency of documented data on the individual and community level factors of prelacteal feeding practice in Ethiopia. For these reasons, the primary goal of this study was to identify the factors that contribute to prelacteal feeding practice in Ethiopia. This study aimed to identify the individual and community level predictors of given anything other than breast milk for neonates in Ethiopia.

Thus, study found that the factors that determined whether or not a newborn in Ethiopia received something other than breast milk were religion, the timing of the commencement of breastfeeding, the use of cesarean sections, and the contextual region.

The religious aspects of the participants were the determinate factors of practicing and giving other than breast milk for neonates. The outcome was consistent with research carried out in India [19], Pakistan [20]. For instance, in this study the odds of being a catholic religion followers given anything other than breast milk for neonates was 5% [adjusted odds ratio (AOR) = 0.05; 95% CI: 0.12, 0.28] lower as compared to respondents with orthodox religion followers.

Mothers who weren't initiate breast feeding immediately had 4.44 [AOR = 4.44; 95%CI: 2.92, 6.74] times higher odds of having given anything other than breast milk for neonates as compared to their counterparts. The outcome was consistent with research carried out in EDHS 2011, Ethiopia [15] Harari region, Ethiopia [18], Motta, Ethiopia [21], Kobo Ethiopia [22], Debre Markos, Ethiopia [16], Uganda [11], Kuwait [23], Pakistan [20].

The possible justifications could be explained by the fact that there would be more time for infant feeding techniques such as giving other than breast milk when the period between birth and the start of breastfeeding far apart. In fact, prelacteal feeding may be the cause of the delayed start of breastfeeding.

Looking at the cesarean section delivery, mothers who gave birth through cesarean section had 3.94 [AOR = 3.94; 95%CI: 2.13,7.13] times higher odds of having given anything other than breast milk for neonates as compared to their counterpart. The outcome was consistent with

Table 2 Multilevel multivariable analysis of factors associated with given anything other than breast milk for neonates in Ethiopia, EDHS 2019

Variables		Null model	Model II AOR (95% CI)	Model III AOR (95% CI)	Model IV AOR (95% CI)
Individual variables					
Age	15–19		1		1
	20–24		0.69(0.26–1.83)		0.66(0.23–1.84)
	25–29		0.59(0.23–1.49)		0.58(0.22–1.54)
	30–34		0.68(0.25–1.82)		0.70(0.24–2.03)
	35–39		0.67(0.18–2.42)		0.70(0.18–2.75)
	40–44		1.07(0.29–3.85)		1.04(0.27–3.99)
	45–49		0.29(0.07–1.17)		0.27(0.06–1.16)
Sex	Male		1		1
	Female		1.11(0.66–1.86)		0.96(0.56–1.56)
Religion	Orthodox		1		1
	Catholic		0.06(0.01–0.42)**		0.05(0.12–0.28)**
	Protestant		0.53(0.28–1.01)		0.53(0.27–1.08)
	Muslim		1.89(1.14–3.12)*		1.22(0.68–2.18)
	Other		0.54(0.05–5.13)		0.62(0.06–6.32)
Marital status	Single		1		1
	married		2.61(0.42–15.10)		2.29(0.39–13.48)
	widowed		1.06(0.07–15.42)		1.11(0.08–15.43)
	divorced		2.15(0.30-15.07)		2.06(0.30-14.04)
Educational status	Non educated		1		1
	Educated		0.93(0.57–1.49)		0.99(0.60–1.62)
Wealth index	Poor		1		
	Medium		0.89(0.47–1.65)		0.97(0.52–1.80)
	Rich		0.66(0.36–1.20)		0.78(0.40–1.52)
Number of U5 children	No U5 children		1		1
	1–3		1.16(0.45–2.94)		1.17(0.47–2.94)
	>=3		1.67(0.58–4.75)		1.54(0.53–4.43)
ANC visit	No ANC visit		1		1
	1–3 visits		0.57(0.76–1.09)		0.69(0.36–1.32)
	>=4 visits		0.81(0.46–1.43)		1.08(0.58–2.02)
Birth order number	1		1		1
	>=2		0.91(0.76–1.09)		0.92(0.76–1.11)
Sex of child	Male		1		1
	Female		0.87(0.58–1.31)		0.87(0.58–1.30)
Birth type	Singleton		1		1
	Multiple		2.00(0.64–6.22)		2.03(0.67–6.13)
Initiation of breast feeding	Immediately		1		1
	Not immediately		4.74(3.12–7.20)**		4.44(2.92–6.74)**
Place of delivery	Home		1		1
	Institutional		0.54(0.28–1.06)		0.58(0.29–1.14)
C/S delivery	No		1		
	Yes		4.05(2.18–7.54)**		3.94(2.13–7.31)**
Community level variables					
Community education	Low			1	1
	High			1.19(0.71–200)	1.48(0.79–2.78)
Residence	Urban			1	1
	Rural			1.26(0.71–2.23)	1.23(0.59–2.55)
Contextual region	Agrarian			1	1
	Pastoralist			8.79(4.93–15.67)**	6.39(3.0-11.62)**
	City			2.26(1.37–3.72)**	1.56(0.85–2.84)
Constant		0.1375116			
Model criteria					

Table 2 (continued)

Variables	Null model	Model II AOR (95% CI)	Model III AOR (95% CI)	Model IV AOR (95% CI)
ICC	0.2867453			
Log likelihood (LL)	-1081.8845	-964.6777	-1057.0554	-950.78261
Deviance	2163.764	1929.355	2114.110	1901.565[@]
PCV	Reference	22.51%	36.19%	41.13%
MOR	4.165	3.510	3.126	2.981

AOR: Adjusted odds ratio, CI: Confidence Interval, ICC: Intra-Cluster Correlation, MOR: Median Odds Ratio; PCV: Proportionate Change in Variance; 1: reference group; *: p-value 0.05–0.01: **: p-value < 0.01, and [@]Model four is selected based on fitted statistics of deviance

research carried out in EDHS 2011, Ethiopia [15], Egypt [24], Nigeria [25, 26], Kuwait [23], Nagpur, India [27].

Regarding contextual region, respondents from Pastoralists had 6.39 [AOR = 6.39; 95%CI: 3.00, 11.62] times higher odds of having given anything other than breast milk for neonates as compared to respondents from Agrarian types of region categories. This outcome is consistent with the 2011 Ethiopian Demographic and Health Survey secondary data analysis findings [15].

One possible explanation for this is that the majority of pastoralist communities did not have permanent inhabitants. In turn, it can be hard for these communities to obtain an equitable distribution of basic health services, particularly those that pertain to maternal and child health, along with adequate access to information and resources. This may also contribute to a mother's declined understanding of the risks associated with giving other than breast milk her newborn child. Despite these potential explanations, in pastoralist communities, newborns are typically given boiled water, clean water, goat's or cow's milk, honey, and butter on breastfeeding practices that may encourage or allow mothers to practice giving anything other than breast milk.

Strengths and limitations of the study

As a population-based study, bias may have been less common but the findings may not generalize to other child age groups. Hence, the study is cross-sectional, does not demonstrate a cause-and-effect relationship, and only employs one outcome measurement technique. However, the study aimed for local policymakers and responsible bodies.

Conclusion

This study found that giving anything other than breast milk to newborns was associated with both individual and community level characteristics, particularly among members of the Catholic Church, prompt commencement of breastfeeding, use of cesarean section delivery, and contextual region categories. Therefore, improving maternal health and early breastfeeding services should be strengthen.

Furthermore, it is preferable to fairly distribute maternal services among regions and to focus on people living in pastoralist regions.

Abbreviations

ANC	Ante Natal Care
CS	Cesarean Section
DHS	Demographic and Health Surveys
EDHS	Ethiopian Demographic and Health Surveys
EMDHS	Ethiopian Mini Demographic and Health Surveys
U5	Under Five Children

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12887-025-05495-x.

Supplementary Material 1

Acknowledgements

We would especially like to thank the demographic and health survey program for providing us with access to the data set used in this research.

Author contributions

Authors (NTS, BGD, CMT, MWA, EB, and ABN) made substantial contributions to the conception, design, acquisition of data, or analysis and interpretation of data. And (NTS, LYB, GL, TDE, GBM, BAT, MGF, and BGW) took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published, and agree to be accountable for all aspects of the work. All authors have read and approved the final manuscript.

Funding

This research didn't receive any grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data availability

The data underlying the results presented in the study are available from Measure DHS program website at https://www.dhsprogram.com.

Declarations

Ethical approval and consent to participate

All methods were carried out in accordance with relevant guidelines of the Demographic and Health Surveys (DHS) program. Informed consent was waived from the International Review Board of Demographic and Health Surveys (DHS) program data archivists, after the consent paper was submitted to DHS Program, a letter of permission to download the dataset for this study. The dataset was not shared or passed on to other bodies and has maintained its confidentiality.

Consent for publication

Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Pediatrics and Child Health Nursing, College of Health Sciences, Debre Tabor University, Po-Box: 272, Debre Tabor, Ethiopia
[2]Department of Nursing, Debre Tabor Health Sciences College, Debre Tabor, Ethiopia
[3]Department of Adult Health Nursing, College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia
[4]Department of Psychiatry, College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia
[5]Department of Pediatrics and Child Health Nursing, College of Health Science and Medicine, Wolaita- Sodo University, Soddo, Ethiopia
[6]Department of Adult Health Nursing, College of Health Science and Medicine, Wolaita- Sodo University, Soddo, Ethiopia
[7]Department of Pediatrics and Child Health Nursing, College of Medicine and Health Science, Wollo University, Dessie, Ethiopia

Received: 28 February 2024 / Accepted: 6 February 2025
Published online: 09 May 2025

References

1. Organization WH. Infant and young child feeding: model chapter for textbooks for medical students and allied health professionals. World Health Organization. 2009.
2. Jones AD, Ickes SB, Smith LE, Mduduzi MN, Chasekwa B, Heidkamp RA, et al. World Health Organization infant and young child feeding indicators and their associations with child growth: a synthesis of recent findings. Wiley Online Library. 2013.
3. Khanal V, Adhikari M, Sauer K, Zhao Y. Factors associated with the introduction of prelacteal feeds in Nepal: findings from the Nepal demographic and health survey 2011. Int Breastfeed J. 2013;8(1):1–9.
4. Nguyen PH, Keithly SC, Nguyen NT, Nguyen TT, Tran LM, Hajeebhoy N. Prelacteal feeding practices in Vietnam: challenges and associated factors. BMC Public Health. 2013;13(1):1–11.
5. Teshome B, Kogi-Makau W, Getahun Z, Taye G. Magnitude and determinants of stunting in children underfive years of age in food surplus region of Ethiopia: the case of west gojam zone. Ethiop J Health Dev. 2009;23(2).
6. Organization WH. Global health risks: mortality and burden of disease attributable to selected major risks. World Health Organization. 2009.
7. Tiwari S, Bharadva K, Yadav B, Malik S, Gangal P, Banapurmath C, et al. Infant and young child feeding guidelines, 2016. Indian Pediatr. 2016;53:703–13.
8. Roy MP, Mohan U, Singh SK, Singh VK, Srivastava AK. Determinants of prelacteal feeding in rural northern India. Int J Prev Med. 2014;5(5):658.
9. Berde AS, Ozcebe H. Risk factors for prelacteal feeding in sub-saharan Africa: a multilevel analysis of population data from twenty-two countries. Public Health Nutr. 2017;20(11):1953–62.
10. Hossain MM, Radwan MM, Arafa SA, Habib M, DuPont HL. Prelacteal infant feeding practices in rural Egypt. J Trop Pediatr. 1992;38(6):317–22.
11. Ogah A, Ajayi A, Akib S, Okolo S. A cross-sectional study of pre-lacteal feeding practice among women attending Kampala International University teaching hospital maternal and child health clinic, Bushenyi, Western Uganda. Asian J Med Sci. 2012;4(3):79–85.
12. Institute EPH. Federal Ministry of Health and the DHS Program, ICF. Ethiopian Mini Demographic and Health Survey 2019. Addis Ababa, Ethiopia. 2019.
13. Chea N, Asefa A. Prelacteal feeding and associated factors among newborns in rural Sidama, South Ethiopia: a community based cross-sectional survey. Int Breastfeed J. 2018;13:1–8.
14. Bililign N, Kumsa H, Mulugeta M, Sisay Y. Factors associated with prelacteal feeding in north eastern Ethiopia: a community based cross-sectional study. Int Breastfeed J. 2016;11(1):1–7.
15. Belachew AB, Kahsay AB, Abebe YG. Individual and community-level factors associated with introduction of prelacteal feeding in Ethiopia. Archives Public Health. 2016;74(1):1–11.
16. Gualu T, Dilie A, Haile D, Abate A. Determinants of prelacteal feeding practice among postpartum mothers in Debre Markos town, Amhara regional state, Ethiopia, 2016. Nutr Diet Supplements. 2017;9:97–102.
17. Hailemariam TW, Adeba E, Sufa A. Predictors of early breastfeeding initiation among mothers of children under 24 months of age in rural part of West Ethiopia. BMC Public Health. 2015;15:1–6.
18. Bekele Y, Mengistie B, Mesfine F. Prelacteal feeding practice and associated factors among mothers attending immunization clinic in Harari region public health facilities, Eastern Ethiopia. Open Journal of Preventive Medicine. 2014;2014.
19. McKenna KM, Shankar RT. The practice of prelacteal feeding to newborns among hindu and muslim families. J Midwifery Women's Health. 2009;54(1):78–81.
20. Asim M, Ahmed ZH, Hayward MD, Widen EM. Prelacteal feeding practices in Pakistan: a mixed-methods study. Int Breastfeed J. 2020;15:1–11.
21. Tewabe T. Prelacteal feeding practices among mothers in Motta town, Northwest Ethiopia: a cross-sectional study. Ethiop J Health Sci. 2018;28(4).
22. Legesse M, Demena M, Mesfin F, Haile D. Prelacteal feeding practices and associated factors among mothers of children aged less than 24 months in Raya Kobo district, North Eastern Ethiopia: a cross-sectional study. Int Breastfeed J. 2014;9:1–8.
23. Dashti M, Scott JA, Edwards CA, Al-Sughayer M. Determinants of breastfeeding initiation among mothers in Kuwait. Int Breastfeed J. 2010;5:1–9.
24. El Gilany A, AbdelHady DM. Newborn first feed and prelacteal feeds in Mansoura. Egypt BioMed Res Int. 2014;2014(1):258470.
25. Ibadin O, Ofili N, Monday P, Nwajei C. Prelacteal feeding practices among lactating mothers in Benin City, Nigeria. Nigerian J Paediatrics. 2013;40(2):139–44.
26. Agho KE, Ogeleka P, Ogbo FA, Ezeh OK, Eastwood J, Page A. Trends and predictors of prelacteal feeding practices in Nigeria (2003–2013). Nutrients. 2016;8(8):462.
27. Athavale A, Athavale S, Deshpande S, Zodpey S, Sangole S. Initiation of breast-feeding by urban women. Health Popul Perspect Issues. 2004;27(2):117–25.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.