

# Rural Versus Urban Variations on the Factors Associated with Early Initiation of Breastfeeding in Ethiopia.

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## Research

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# Abstract

**Background:** Early initiation of breastfeeding (EIBF) is defined as starting breastfeeding within the first hour of birth. It has clinical importance to reduce neonatal morbidity and mortality. Previously studies have been conducted in Ethiopia to identify factors associated with EIBF. However, those studies hadn't investigated the variation of factors within rural versus urban populations. Therefore, this study is aimed to investigate the differences in factors associated with the early initiation of breastfeeding in rural-urban populations.

**Methods:** This study was used Ethiopian Demographic and Health Survey data, 2016. A total of 3662 children aged less than 24 months were included in the study. Thus, 2897 children were disaggregated into rural and the rest 765 of them were into urban. A multivariable logistic regression model was fitted to identify the determinant of EIBF. Finally, a statistically significant association was declared at a p-value of  $\leq 0.05$ .

**Results:** In rural populations, the study found that the age of mothers 15-24 years (AOR=1.50, 95%CI: 1.13,2.00), mothers not working (AOR=1.38,95%CI: 1.12,1.69), large birth size (AOR=1.44,95%CI:1.12,1.85), and participation of mothers in making health care decisions (AOR=1.43, 95%CI: 1.17,1.75) were positively associated with EIBF. Rural mothers having  $\leq 2$  children (AOR=0.55,95%CI: 0.45,0.67), living in larger to center regions (AOR=0.13,95%CI: 0.06, 0.27), and small peripheral regions (AOR=0.12,95%CI:0.06, 0.24) were negatively associated with EIBF. Irrespective of residence, the odds of EIBF were higher in vaginal delivery (Rural AOR= 4.38,95%CI:1.81,10.59; urban AOR= 3.19,95%CI:1.86, 5.48 ). In the urban population, having frequent ANC follow-ups was associated with a higher odds of EIBF.

**Conclusions:** The study concludes that the age of mothers, working status of mothers, birth sizes, mothers participation in making health care decisions, numbers of children in the households, living in large to center regions and small peripheral regions were determinants of early initiation of breastfeeding, only rural residence. Mode of delivery was associated with EIBF, Irrespective of the residence. In the urban population, having frequent ANC follow-ups was associated with a higher odds of EIBF. Special emphases to mothers living in rural large to center and small peripheral regions should be given. Regardless of the residence, appropriate guidance and supports should be given for babies delivered through cesarean section.

## Background

Globally, about 2.4 million newborns had died in 2019(1). And the world has been working to reduce neonatal deaths to less than 12 per 1,000 total births of countries by 2030(2). To meet these targets, the World health organization (WHO) and United Nations Children's Fund (UNICEF) recommend Optimal breastfeeding practices, includes early initiation breastfeeding, exclusive breastfeeding for the first six months of life, and continue breastfeeding for up to 2 years or beyond with appropriate complementary feeding(3–5). Early initiation of breastfeeding (EIBF) is defined as the starting of breastfeeding within the first 1 hour of birth (4). It is a baseline for the success of exclusive breastfeeding (i.e. feeding children only breast milk for the first six months of life) of infants (6, 7)

Early initiation of breastfeeding assures the mother that the newborns have received colostrum, which is the first milk that contains antibodies mainly immunoglobulin G(8). Thus, early initiation of breastfeeding safeguards the newborn from dying during the riskiest time of life(3). Initiating breast early in the first 1 hour reduces the rate of newborn death by 45 percent and whereas exclusive breastfeeding rises the survival of infants by 14 times in the first six months of life(9). A previous study confirmed that optimal breastfeeding saves the life of 823 000 under-

five children from dying each year(10). EIBF has also health benefits for the mother such as it reduces postpartum hemorrhage, increases mother-to-child bonding(11), and reduces the risk of mothers from cancers such as ovarian(12) and breast cancer(10).

Despite the known advantages of EIBF, Globally, only 48% newborn started breastfeeding within the first 1 hour of birth(13) and only 41% of infant feeds breast exclusively in the first six months(14). A study conducted in 57 low and middle-income countries revealed that only 51.9% of the newborn had been put to breast milk within the first 1 hour (15). In Africa, EIBF ranges from 34 to 64% (13).

The Ethiopian government has recognized the benefits of EIBF to the child and infant feeding practices and endorsed the recommendations of the world health organization in its strategic plan. Such that under the Health Sector Development Program Four (HSDP-IV) of Ethiopia, In 2010, the minister of health has planned to increase the proportion of EIBF to 92 percent by the end of 2015(16). In Ethiopia, Despite the improvement of EIBF from 48.8% in 2000 to 75.7% in 2016(17), the rate of EIBF is still below the expected targets of Health Sector Development Program Four (HSDP-IV) of Ethiopia.

Previously studies had conducted in Ethiopia to identify the factors of early initiation of breastfeeding. Accordingly, maternal educational status(18–21), mode of delivery(18, 19, 22–24), parity(19, 22), place of delivery(17, 19, 23, 25, 26), residence(19–21, 27), income(19, 28), visiting ANC service(17, 19, 24), family size (17), working status of mothers(21), sex of infants(21), number of children in the household(20), birth attendance(24), fathers education status(28) and knowledge of Infant and Young Child Feeding(28) were associated with early initiation of breastfeeding. However, these studies had been conducted in specific areas of Ethiopia and were not nationally representative. Even though one study has been done nationally(29), it reports the pooled result or national average of EIBF and is not segregated by rural versus urban populations. In other ways, the study has not assessed the variation of determinants between rural versus urban populations. And the previous study confirmed that there was a variation of EIBF in Ethiopia across a residence (25). Such that, using the pooled finding may cover the variation of determinants between rural and urban populations. Thus, a gap exists on how the determinants of early initiation of breastfeeding vary between rural versus urban populations of Ethiopia. Further more, the world health organization has recommended for further studies along with a regions, a countries and a population groups (such as by income levels, educational levels, cultural ,residence and ethnic backgrounds) to adequately and sensitively protect,promote and support breastfeeding of infants(4). Therefore, this study is aimed to identify factors associated with EIBF across Rural Versus urban population of Ethiopia by using nationally representative data .

## Methods

### Study setting and data source

Ethiopian Demographic and Health Survey (EDHS 2016) data were used, which was the fourth survey conducted nationally from January 18 to June 27, 2016. The population-based cross-sectional study design was used to collect the data. The EDHS,2016 were selected by using a two-stage stratified sampling technique. In the first stage, 645 enumeration areas (202 in urban areas and 443 in rural areas) were selected. Then in the second stage, 28 households per cluster have been selected. The detailed sampling technique was summarized in the full EDHS 2016 reports(30). For this study, from the births data set, a total of 10,641 mothers who gives birth in the preceding five years were used as a target population. To reduce the recall bias, this study was only included women who have a child aged < 24 months, and children who are not lived with their mothers were excluded. A total of 3662 children

were included in the study. Thus, 2897 children were disaggregated into rural and the rest 765 of them were into urban (Fig. 1).

## Variables

The dependent variable was early initiation of breastfeeding which is defined by WHO as introducing breastfeeding to the newborn within one hour after delivery (4). Participants were asked when did they put their newborn on breast following delivery and their response was then categorized as early initiated (if within one hour, coded as "1") and late initiated (if after one hour, coded as "0").

The independent variables included maternal age (years), maternal education status, current working status of mother, Partner education status, sex of household, family size, number of under-five children, wealth index, exposed to media, region, covered by health insurance, age at first birth, place of delivery, parity, women participating in making health care decisions, antenatal care visits, mode of delivery, sex of the child, birth type, skin to skin care, birth size and birth order. The regions were recoded into three categories; small peripheral regions (Afar, Somali, Benishangul, and Gambela), Large central regions (Tigray, Amhara, Oromia, and Southern Nations Nationalities and Peoples Region (SNNP)), and Metropolitans (Harari, Dire Dawa, and Addis Ababa), based on their geopolitical features similar to other study conducted in Ethiopia (17). For the media exposure the composite variable is created from three variables; frequency of watching TV, reading a newspaper, and listening to the radio, and coded as "yes" if an individual was exposed to all or either of the three and "No" if an individual was not exposed to at least one of these. The women's health care decision-making autonomy was assessed as the person who usually decides to obtain healthcare. Which was categorized as women participating in making health care decisions and didn't participate in making health care decisions (decides by their husband/partner).

## Statistical analysis

Descriptive statistics were presented as frequencies and percentages to summarize the distribution of background characteristics of respondents. At bivariate analysis, a Chi-Square test was performed to identify the unadjusted association of each explanatory variable with the outcome variable (EIBF) at a P-value < 0.25. Those variables which show an association with EIBF in the bivariate analysis at the aforementioned p-value were a candidate for multivariable logistic regression analysis. In multivariable logistic regression analysis, variables with a p-value < 0.05 were declared as significantly associated with EIBF. Adjusted odds ratios in the final model together with their 95% CI and p-values were reported for each explanatory variable. The final model fitness was also tested by Hosmer-Lemeshow goodness of fit (P-value > 0.05). All the above analyses were carried out separately for data disaggregated by rural-urban residence.

## Results

### Rates of EIBF in rural versus urban residence

The rate of EIBF in rural-urban residence respective to the study characteristics were indicated in Table 1. A total of 3662 study participants were included in the study. Among this 2897 study participants were disaggregated into rural and 765 into the urban residences. There was no statistically significant difference in the rate of EIBF with maternal working status in urban residences. However, in rural residence, mothers who are currently working were

associated with a higher rate of EIBF(77%) as compared to mothers who are not currently working (23%,  $p < 0.001$ ). In rural populations, being a male household head was associated with a higher rate of EIBF (82.7%) as compared to their counterparts(17.3%,  $p < 0.001$ ). But in the urban area, there was no statistically significant difference in the rate of EIBF between male (69.9%) and female heads (30.1%,  $P = 0.57$ ). In urban areas, there were no significant differences in the rate of EIBF across the family size of the household. But in the rural population, the rate of EIBF was higher (72.6%) among households who have  $>4$  family size as compared to households who have  $\leq 4$  family sizes (27.4%,  $P = 0.01$ ). The households who have  $>2$  children were associated with a higher rate of EIBF as compared to households who have  $\leq 2$  children, irrespective of the residences. In urban areas, female infants(51.1%) had higher rate of EIBF as compared male infants(48.9%,  $P = 0.03$ ).

Table 1

Sample characteristics and rates of early initiation of breastfeeding by rural-urban residence in Ethiopia, 2016

Variables	Categories	Rural			Urban		
		Number (%)	Rate of EIBF N (%)	P value	Number (%)	Rate of EIBF N (%)	P value
Maternal age (years)	15-24	882 (30.4)	704 (31)	0.07	196(25.6)	165(25.3)	0.80
	25-34	1388 (47.9)	1096 (48.3)		455(59.5)	391(60.0)	
	≥35	627 (21.6)	471 (20.7)		114(14.9)	96(14.7)	
Maternal education status	No formal education	1936(66.8)	1519(66.9)	0.72	189(24.7)	167(25.6)	0.17
	Primary	801(27.6)	623(27.4)		249(32.5)	215(33.0)	
	Secondary and above	160(5.5)	129(5.7)		327(42.7)	270(41.4)	
Mother Currently working	No	2187(75.5)	1748(77)	<0.001	463(60.5)	406(62.3)	0.26
	Yes	710(24.5)	523(23)		302(39.5)	246(37.7)	
Partner education status	No formal education	1416(51.5)	1109(51.2)	0.55	101(14.6)	90(15.1)	0.60
	Primary	986(35.8)	787(36.3)		211(30.4)	180(30.2)	
	Secondary and above	350(12.7)	271(12.5)		382(55.0)	326(54.7)	
Sex of house hold	Male	2359(81.4)	1878(82.7)	<0.001	532(69.5)	456(69.9)	0.57
	Female	538(18.6)	393(17.3)		233(30.5)	196(30.1)	
Family size	≤4	828(28.6)	623(27.4)	0.01	360(47.1)	299(45.9)	0.25
	>4	2069(71.4)	1648(72.6)		405(52.9)	353(54.1)	
Number of under five children	≤2	1062(36.7)	761(33.5)	<0.001	444(58.0)	364(55.8)	0.003
	>2	1835(63.3)	1510(66.5)		321(42.0)	288(44.2)	
Wealth index	Poor	1368(60.2)	1770(61.1)	0.19	50(6.5)	42(6.4)	0.47
	Medium	417(18.4)	521(18.0)		11(1.4)	8(1.2)	
	Rich	486(21.4)	606(20.9)		704(92.0)	602(92.3)	
Exposed to media	No	2185(75.4)	1717(75.6)	0.66	158(20.7)	134(20.6)	0.87
	Yes	712(24.6)	554(24.4)		607(79.3)	518(79.4)	
Region	Large to center	1574(54.3)	1229(54.1)	<0.001	184(24.1)	149(22.9)	0.46
	small peripheral	1076(37.1)	803(35.4)		195(25.5)	176(27.0)	
	Metropolitan	247(8.5)	239(10.5)		386(50.5)	327(50.2)	

Covered by health insurance	Yes	88(3.0)	70(3.1)	0.789	40(5.2)	33(5.1)	0.62
	No	2809(97.0)	2201(96.9)		725(94.8)	619(94.9)	

Table 1  
Sample characteristics and rates of early initiation of breastfeeding by rural-urban residence in Ethiopia, 2016  
(Continued).

Variables	Categories	Rural			Urban		
		Number (%)	Rate of EIBF N (%)	P value	Number (%)	Rate of EIBF N (%)	P value
Age at first birth	< 18years	1774(61.2)	1391(61.3)	0.98	165(21.6)	146(22.4)	0.18
	≥18 years	1123(38.8)	880(38.7)		600(78.4)	506(77.6)	
Place of delivery	Health facility	932(32.2)	748(32.9)	0.09	670(87.6)	573(87.9)	0.54
	Home	1965(67.8)	1523(67.1)		95(12.4)	79(12.1)	
Parity	1-3	1362(47.0)	1066(46.9)	0.69	580(75.8)	484(74.2)	0.47
	4-5	685(23.6)	531(23.4)		121(15.8)	110(16.9)	
	≥6	850(29.3)	674(29.7)		64(8.4)	58(8.9)	
Women participating in making health care decisions	Yes	2154(74.4)	1735(76.4)	<0.001	644(84.2)	552(84.7)	0.38
	No	743(25.6)	536(23.6)		121(15.8)	100(15.3)	
Antenatal care visits	Not all	1111(38.4)	879(38.7)	0.67	46(6.0)	35(5.4)	0.08
	1-3 visits	912(31.5)	715(31.5)		196(25.6)	174(26.7)	
	≥4 visits	874(30.2)	677(29.8)		523(68.4)	443(67.9)	
Mode of delivery	C/S	24(0.8)	12(0.5)	<0.001	82(10.7)	54(8.3)	<0.001
	vaginal	2873(99.2)	2259(99.5)		683(89.3)	598(91.7)	
Sex of child	Male	1430(49.4)	1103(48.6)	0.10	387(50.6)	319(48.9)	0.03
	Female	1467(50.6)	1168(51.4)		378(49.4)	333(51.1)	
Birth type	Single	2868(99.0)	2250(99.1)	.432	757(99.0)	645(98.9)	0.85
	Multiple	29(1.0)	21(0.9)		8(1.0)	7(1.1)	
Skin to skin care	No	2132(73.6)	1659(73.1)	0.21	258(33.7)	208(31.9)	0.01
	Yes	765(26.4)	612(26.9)		507(66.3)	444(68.1)	
Birth size	Large	791(27.3)	650(28.6)	0.01	247(32.3)	215(33.0)	0.49
	Average	1280(44.2)	996(43.9)		368(48.1)	308(47.2)	
	Small	826(28.5)	625(27.5)		150(19.6)	129(19.8)	
Birth Order	1	500(17.3)	390(17.2)	0.97	251(32.8)	201(30.8)	0.01
	2-3	862(29.8)	676(29.8)		329(43.0)	283(43.4)	
	≥4	1535(53.0)	1205(53.1)		185(24.2)	168(25.8)	

The rate of EIBF was higher among women who have participation in making health care decisions(76.4%) as compared to mothers who have no participation in making health care decisions(23.6%,  $p < 0.001$ ). Regardless of living area, the rate of EIBF was higher among newborns delivered vaginally as compared to newborns delivered through cesarean section. There were no statically significant differences in the rate of EIBF across the weight newborns in urban population. However, in rural populations, there was a significant difference in the rate of EIBF across the birth weight of newborns. In urban population, the rate of EIBF was higher among newborns who have skin-to-skin care (68.1%) as compared to those who have no skin-to-skin care(31.9%,  $p=0.01$ ).

## **Factors associated with EIBF in Rural-urban Ethiopia**

Table 2 shows the results of the multivariable logistics regression analyses for factors associated with EIBF. In rural residence, variables such as Maternal age (years), current working status of mothers, numbers of under-five children in the households, regions, mode of delivery, and Women participation in making health care decisions were significantly associated with EIBF. Based on this, the odds of EIBF was 50% (AOR=1.50,95%CI:1.13,2.00) higher among mothers whose ages are between 15-24 years as compared to mothers whose ages are  $\geq 35$ years. The Odds of EIBF were higher by 38%(AOR=1.38,95%CI: 1.12,1.69) among mothers who are not working as compared to their counterparts. The odds of EIBF were reduced by 45% (AOR=0.55,95%CI: 0 .45, 0.67) among mothers who have  $\leq 2$  children as compared to mothers who have  $>2$  children in the households. The odds of EIBF were 43% (AOR=1.43, 95%CI:1.17,1.75)higher among mothers who are participated in making health care decisions as compared to their counterparts. The odds of EIBF were increased by 44%(AOR:1.44,95%CI:1.12,1.85) among newborns who have large birth sizes as compared to small birth sizes. Mothers who are living in larger to center regions (AOR=0.13,95%CI: 0.06, 0.27), and small peripheral regions (AOR=0.12,95%CI:0.06, 0.24) were less likely to initiate breastfeeding early in the first hour.

Table 2

shows the multivariable analysis of factors associated with early initiation of breastfeeding by rural-urban residence, Ethiopia, 2016(Continued).

Variables	Category	Rural Residence			Urban Residence		
		AOR	AOR 95% CI	P-value	AOR	AOR 95% CI	P-value
Maternal age (years)	15-24	1.50	1.13,2.00	0.01	-	-	-
	25-34	1.19	0.94,1.49	0.15	-	-	-
	≥35	1	Reference		-	-	-
Maternal education status	No formal education	-	-	-	1	Reference	
	Primary	-	-	-	0.98	0.56,1.86	0.97
	Secondary and above	-	-	-	0.88	0.47,1.65	0.69
Mother Currently working	No	1.38	1.12,1.69	0.002	-	-	-
	Yes	1	Reference		-	-	-
Sex of house hold	Male	1.12	0.89,1.42		-	-	-
	Female	1	Reference		-	-	-
Wealth index	Poor	1	Reference		-	-	-
	Medium	1.11	0.85,1.42	0.45	-	-	-
	Rich	1.11	0.86,1.43	0.42	-	-	-
Family size	≤4	0.84	0.66, 1.06	0.14	0.95	0.59, 1.54	0.85
	>4	1	Reference		1	Reference	
Number of under five children	≤2	0.55	0.45, 0.67	<0.001	0.70	0.41,1.19	0.19
	>2	1	Reference		1	Reference	
Region	Large to center	0.13	0.06, 0.27	<0.001	-	-	-
	small peripheral	0.12	0.06, 0.24	<0.001	-	-	-
	Metropolitan	1	Reference		-	-	-
Age at first birth	<18 years	-	-	-	1	Reference	
	≥18 years	-	-	-	1.09	0.68, 1.95.	0.77
Place of delivery	Health facility	1.17	0.91,1.51	0.21	-	-	-
	Home	1	Reference		-	-	-
Mode of delivery	C/S	1	Reference		1	Reference	

1: Reference, OR: Adjusted Odds Ratio, CI: Confidence Interval.

	Vaginal	4.38	1.81,10.59	<0.001	3.19	1.86, 5.48	<0.001
Sex of child	Male	1.18	0.98,1.42	0.08	0.68	0.45, 1.05	0.08
	Female	1	Reference		1	Reference	
1: Reference, OR: Adjusted Odds Ratio, CI: Confidence Interval.							

Table 2: shows the multivariable analysis of factors associated with early initiation of breastfeeding by rural-urban residence, Ethiopia, 2016(Continued).

Variables	Category	Rural Residence			Urban Residence		
		AOR	AOR 95% CI	P – value	AOR	AOR 95% CI	P – value
Women participating in making health care decisions	Yes	1.43	1.17,1.75	<0.001	-	-	-
	No	1	Reference		-	-	-
Antenatal care visits	Not all	-	-	-	1	Reference	
	1-3 visits	-	-	-	3.05	1.29, 7.20	0.01
	≥4 visits	-	-	-	2.32	1.05,5.15	0.03
Birth size	Large	1.44	1.12,1.85	0.01	-	-	-
	Average	1.167	0.94,1.45	0.16	-	-	-
	Small	1	Reference		-	-	-
Birth Order	1	-	-	-	0.56	0.25 ,1.28	0.17
	2-3	-	-	-	0.69	0.35, 1.38	0.30
	≥4	-	-	-	1	Reference	
Skin to skincare	No	1	Reference		1	Reference	
	Yes	1.04	0.80,1.35	0.77	1.52	0.97, 2.37	0.06

1: Reference, OR: Adjusted Odds Ratio, CI: Confidence Interval.

Irrespective of the residence, the odds of EIBF were higher among newborns delivered vaginally (RuralAOR=4.38,95%CI:1.81,10.59; urban AOR=3.19,95%CI:1.86, 5.48 ) as compared to newborns delivered through cesarean section. In urban populations, the odds of EIBF were higher among mothers who have 1-3 antenatal visits(AOR=3.05,95%:1.29, 7.20) and ≥4 visits (AOR=2.32, 95%1.05,5.15) as compared to mothers who have no antenatal visits.

## Discussion

This study disclosed the rural-urban difference in the factors associated with EIBF. A previous study in Ethiopia(29) has focused on the whole nation using the pooled data. On the contrary, this study has analyzed by disaggregating the dataset into Rural versus urban to identify the factors of EIBF respective the residence. Based on this, maternal

age, current working status of mothers, numbers of under-five children, regions, women participation in making health care decisions, birth sizes, and mode of delivery were determinants of EIBF in rural populations. Whereas in the urban population, only antenatal care visits and mode of delivery were found to be determinants of early initiation of breastfeeding of infants.

In agreement with studies (31, 32), in rural populations, the odds of EIBF were higher among younger mothers as compared to older mothers. The possible justification might be due to the improvement of health education regarding optimal breastfeeding practice, girl education, and women's empowerment in making health care decisions (33).

In rural residency, the odds of EIBF were higher among mothers who are not working as compared to their counterparts. The finding is supported by a study conducted in Nigeria (34). The possible explanation might be that the mothers who had works are more likely have financial access which enables them to purchase a meal for newborns which in turn leads to formula feeding and that contributes to the late initiation of breastfeeding. In addition, mothers who had work may afford to pay the requested fee for cesarean section and they may choose cesarean section as the mode of delivery, which is the known contributing factor for the late initiation of breastfeeding of newborns(22). Furthermore, mothers who have no works more likely to stay at home and may only focus on the care of their baby, including optimal breastfeeding.

Irrespective of the residence, in both Rural and Urban populations, the rate of EIBF was higher among newborns who are delivered vaginally as compared to newborns delivered by cesarean section. Similar results have been reported from studies (17–20, 22–24, 29, 34–38). The possible explanation might be due that the newborn may be exhausted and stressed during surgical extraction from the maternal abdomen and the newborn may be depressed due to the effect of anesthesia, and later on, it contributes to the late initiation of breastfeeding. In addition, in cesarean section, the time gap for repairing the surgical incision and responsiveness of mothers following the procedure may delay breastfeeding initiation.

In the rural population, mothers who have autonomy in making health care decisions were associated with higher odds of EIBF as compared to their counterparts. The result is contrary to a study conducted in Niger(39). The possible explanation might be that those mothers may know the importance of EIBF to their babies. In addition, those mothers may be empowered to reject any cultural constraint or practice regarding the prelacteal feeding of the newborn(33).

In the urban population, mothers who have antenatal care were associated with higher odds of EIBF as compared to mothers who didn't have antenatal care. The finding is supported by studies(19, 24, 31, 32, 38). The possible explanation might be that having antenatal visits was an opportunity for health professionals for giving health education regarding optimal breastfeeding and the importance of EIBF for the newborn.

The other finding of this study was that in rural populations, babies reported as large birth sizes were associated with a higher odds of EIBF as compared to babies reported as small-sized. The finding is supported by studies conducted in Nigeria and Nepal (34, 40). The possible justification might be the mothers and health professionals perceived that the large-sized babies are healthy, therefore, they may put the baby to breast milk early in the first hours. In addition, the small-sized babies may they are preterm and immature which needs special care immediately after birth to adapt to the extrauterine environment. Thus, the time gaps may contribute to the late initiation of breastfeeding.

On the contrary to the previous study(20), In rural population, the numbers of children in the households were positively associated with EIBF, such that, the mothers who have  $\leq 2$  children in the household were less likely practiced EIBF as compared to mothers who have  $>2$  children. The possible justification might be due that the mothers may have previous experience regarding optimal breastfeeding or may the mothers have information regarding the importance of EIBF during the previous births.

Similar to the previous study (17), this study revealed that rural mothers who are living in large to center and small to peripheral regions were less likely to practice EIBF as compared to mothers who are living in Metropolitan. The possible justification might be differences in sociocultural practices/beliefs or it may be differences in awareness regarding the importance of EIBF to newborns.

The clinical and public health implication of this study is to take prompt intervention on the determinate factors and respond to increasing the proportion of EIBF of newborns. Therefore, In rural residences, considering and taking special attention to older mothers, small-sized newborns, women empowerment, to mothers living in large to center regions and small peripheral could increase the rate of EIBF. In urban residences, strengthening maternal and child health services utilization. Irrespective of residence, giving special attention to newborns delivered through cesarean section could increase the rate of EIBF.

## Strengths And Limitations

The study has used nationality representative data of 2016 EDHS. The study was used rural-urban data disaggregation method and it is the first study to investigate rural-urban differences in factors associated with EIBF using nationally representative data. However, the study shares the limitation of a cross-sectional study that was impossible to establish the cause and effect relationship. Also, data were self-reported and so prone to recall biases despite an attempt was taken to minimize the recall bias.

## Conclusions

The study concludes that the age of mothers, working status of mothers, birth size, mothers participation in making health care decisions, numbers of children in the households, living in large to center regions, small peripheral regions were determinants of early initiation of breastfeeding, only rural residence. Mode of delivery was associated with EIBF, irrespective of the residence. In the urban population, having frequent ANC follow-ups was associated with a higher odds of EIBF. Special emphases regarding socio-cultural practices that may negatively impact EIBF should be given to mothers living in rural large to center and small peripheral regions. In rural residences, breastfeeding initiation support for older mothers, and empowerment of women in making health care decisions should be emphasized. In urban residences, strengthening maternal and child health services utilization should be emphasized. Regardless of the residence, appropriate guidance and supports should be given for babies delivered through cesarean section.

## Abbreviations

AOR

Adjusted odds ratio

CI

Confidence interval

DHS  
Demographic health survey  
EDHS  
Ethiopian demographic and health survey  
EIBF  
Early initiation of breastfeeding  
HSDP  
Health sector development program  
UNICEF  
United Nations international children's fund  
WHO  
World health organization

## **Declarations**

### **Ethics approval and consent to participate**

Since we have used a secondary data analysis that was publically available from the MEASURE DHS program, ethical approval and participant consent were not necessary. We had requested DHS Program and permission was allowed to download to use the data from <https://www.dhsprogram.com/> there are no names of household addresses or individuals in the data.

### **Consent for publication**

Not applicable

### **Availability of data and materials**

The data is available at the corresponding Author and may be provided upon request

### **Competing interests**

The authors declare that they have no competing interests.

### **Funding**

The authors did not receive funding for this study

### **Authors' contributions**

DG and ZA drafted the proposal, did the analysis, wrote the results, and organized the manuscript. ZA Contributed on editing, analysis, and write up of the result, and DG critically revised the manuscript for its scientific content. All authors read and approved the final manuscript.

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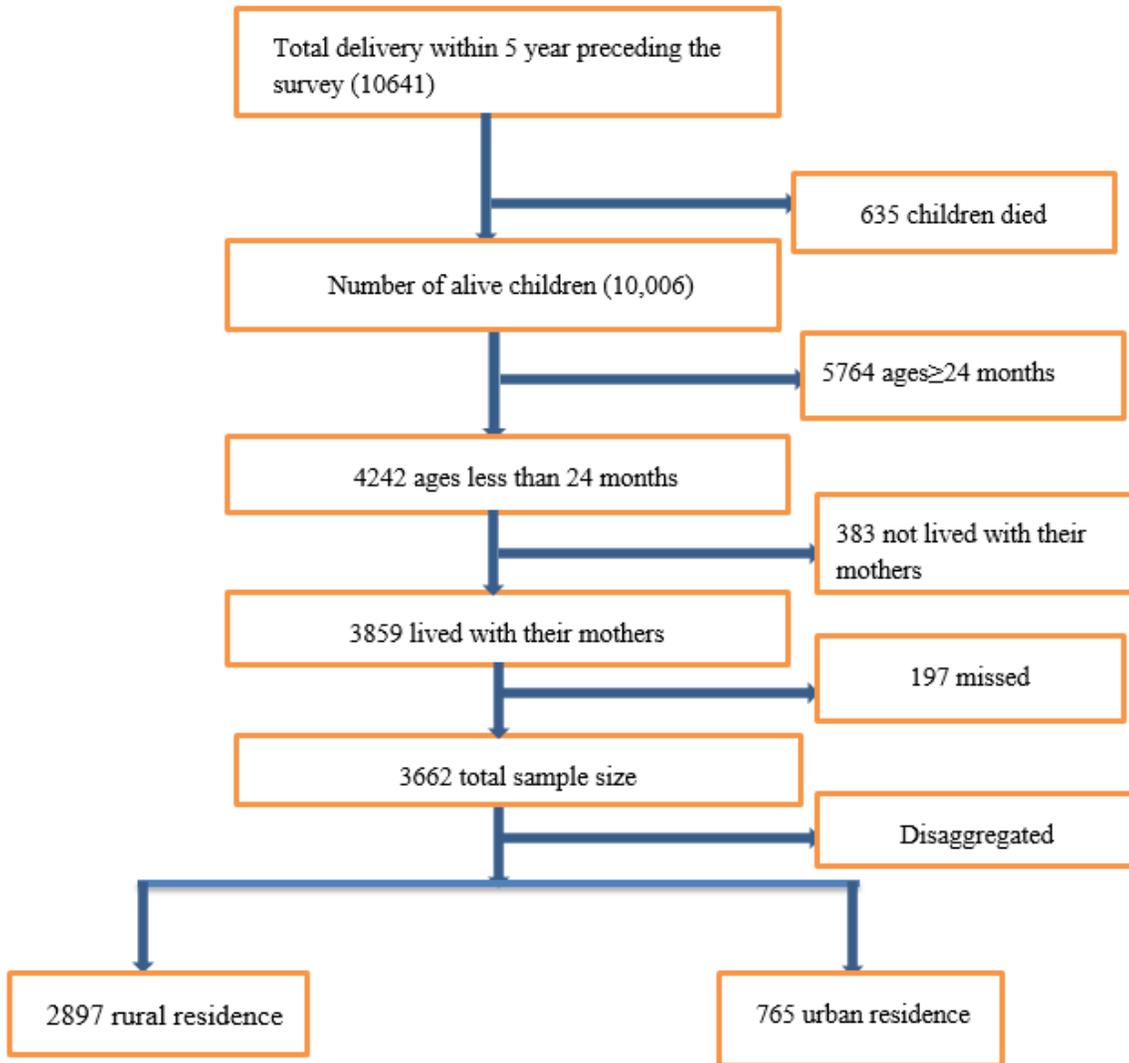
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## Figures



**Figure 1**

schematic presentation of study populations.