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Predictors of exclusive breastfeeding and maternal access to mobile phones in urban settings in Hawassa City, Sidama Region, Ethiopia

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Abstract

Introduction: *exclusive breastfeeding (EBF) rates in Ethiopia remain below national targets. In urban areas, the prevalence of EBF is comparatively low, and the underlying determinants influencing breastfeeding practices in these settings have not been sufficiently explored. This study aimed to assess the prevalence and predictors of exclusive breastfeeding practice and maternal access to mobile phones.* ***Methods:*** *community-based cross-sectional study was conducted with a sample of 772 mothers and their infants aged 0-5 months. Trained data collectors administered a pre-tested and validated questionnaire developed by the Food and Agriculture Organization of the United Nations (FAO). Data were analyzed using a multiple logistic regression model to identify predictors of exclusive breastfeeding practice.* ***Results:*** *the prevalence of exclusive breastfeeding was 54.4% (95% CI 50.8, 58.0). Regarding maternal knowledge, 96% (95% CI 94.7, 97.4) of women have adequate knowledge, and 59.6% (95% CI 55.9, 63.1) have a favorable attitude towards exclusive breastfeeding. Access to mobile phones among women was 100%, and 84.1% of women were willing to receive breastfeeding SMS text messages. Mothers with adequate knowledge were 3.27 times more likely to practice exclusive breastfeeding (AOR = 3.27; 95% CI: 1.38, 7.75). Women with vocational education were 2.62 times and secondary education were 3.20 times more likely to practice exclusive breastfeeding (AOR = 2.62; 95% CI: 1.37, 5.00), and (AOR = 3.20; 95% CI: 1.53, 6.67) respectively than no education and university graduates. Exclusive breastfeeding was 2.11 times more common among women with supportive husbands than those without (AOR = 2.11; 95% CI: 1.41, 3.16).* ***Conclusion:*** *more than half of the women practiced exclusive breastfeeding, and the majority demonstrated good knowledge and a positive attitude toward it. However, the overall prevalence of exclusive breastfeeding remains inadequate. Maternal knowledge, age, educational level, occupation, and husband's support were key predictors of exclusive breastfeeding. A significant proportion of lactating mothers own mobile phones and are familiar with sending, receiving, and reading SMS messages. Therefore, a more extensive and comprehensive approach to exclusive breastfeeding counseling should be implemented to improve rates among urban populations.*

Introduction

The act of feeding a baby only breast milk, either from their mothers, a wet nurse, or expressed breast milk, is known as exclusive breastfeeding. Except for some exclusions like oral rehydration solution drops or syrups containing vitamins, minerals, supplements, or medications authorized by a health practitioner from birth to six months of age, the infant is not given any other alternatives during the first six months of life, including liquids, solids, or even water [1]. It is well documented that breastfeeding provides many important health benefits to children and mothers and is considered the gold standard in infant feeding [2]. The benefits of breastfeeding include increased child survival, health, and development; it also lowers some health risks for women; it serves as a natural form of birth control; and it boosts both personal and societal economic growth [3].

Suboptimal breastfeeding practices, especially non-exclusive breastfeeding in the first six months of life, are contributing to the burden of childhood morbidity and mortality and are responsible for 45%, 30%, and 18% of deaths associated with infectious diseases, diarrhea, and acute respiratory diseases, respectively [4,5]. Over the last ten years, more than half of the world's population has transitioned to urban living, with 54% now residing in urban areas and expected to increase to 66% by 2050 [6]. With rapid urbanization in many low- and middle-income countries (LMIC), there are rapid changes in social behavior and health [7,8], which may contribute to the rapid decline in breastfeeding practice in many urban areas [9,10]. The Sustainable Development Goal (SDG) 2: zero hunger acknowledges that breastfeeding is the primary method for feeding infants and young

children [11]. To strengthen the effort in reducing child mortality, the Ethiopian Ministry of Health (EMoH) had targeted an increase in the proportion of EBF for less than 6 months from 48% to 70% in 2015 [12].

They fell short of the target level set by the Sustainable Development Goals (SDGs) in low- and middle-income countries, especially in Africa. In 2017, only 37% of African newborns under six months of age received exclusive breast milk, and the prevalence of EBF varies by population and country [13]. The 2019 Ethiopian Demographic and Health Survey, 59% of infants 0-5 months and 7.5% of those at 6 months old were exclusively breastfed [14]. Proper breastfeeding habits depend on mothers' knowledge and their attitude [15]. In East Africa, 84.4% of women were aware of exclusive breastfeeding, and 96.2% of mothers had heard of it [16].

A study conducted in Lagos State, Nigeria, found that 89.2% of breastfeeding mothers demonstrated good breastfeeding knowledge [17]. In Rwanda, 78.9% of mothers had a positive attitude toward exclusive breastfeeding, and 85.6% of adolescent mothers understood it [18]. According to different studies conducted in Ethiopian cities, women in Jimma town (73.94%), Mizan Aman town (93.6%), and Bedele town (91.8%) have good knowledge of exclusive breastfeeding [19-21]. Therefore, most of the women had good knowledge of exclusive breastfeeding. The study in Hawassa city revealed that the age-specific prevalence of exclusive breastfeeding was 42.9%, 39.1%, and 18% at 1-1.9 months, 2-3.9 months, and 4-5.9 months, respectively. The 2019 Ethiopian health demography survey also shows similar results. This indicates that as the infant's age increases, the practice of exclusive breastfeeding declines [14,22]. A postnatal care visit is one of the ways to promote exclusive breastfeeding. However, a study in Northwest Ethiopia revealed that only 13.3% of women attended postnatal care visits. Other studies also indicated a low prevalence of postnatal care visits [23-26].

The study results in Ethiopia showed that 73% of moms without jobs and 54.8% of mothers with jobs exclusively breastfed. In the Somali region, women without jobs are more likely to breastfeed exclusively. Maternal employment with maternity leave was linked to exclusive breastfeeding [27-30]. Findings from routine monitoring and usability assessment showed that the mHealth application facilitated real-time information exchange in the primary health care system, as well as timely identification and registration of pregnant women, thereby increasing uptake of maternal health services across the continuum of pregnancy, childbirth, and postnatal care [31].

Therefore, exclusive breastfeeding practice was low and unsatisfactory due to maternal workload and insufficient maternity leave. Low coverage of postnatal care and traditional methods of exclusive breastfeeding promotion. Inadequate use of technology for real-time breastfeeding promotion. Urbanization is linked with the encouragement of formula feeding and a gap between knowledge and practical application. Therefore, this study intends to assess the current predictors of exclusive breastfeeding practice and maternal access to mobile phones and use for planning a short text message intervention in the study area. The findings inform policy decisions and best practices for national multi-sectoral food and nutrition interventions.

Methods

Study design: a community-based cross-sectional study employing quantitative methods was carried out in Hawassa city from October to December 2024.

Study setting: Hawassa city is the capital of Sidama Regional State, located approximately 275 kilometers south of Addis Ababa, the capital city of Ethiopia. Hawassa is among the fastest-growing cities in Ethiopia. It is the region's main administrative, commercial, and industrial city. The city administration is divided into 8 sub-cities, 32

Kebeles (the lowest administrative structure), 1 (20 urban and 12 rural). It has an annual population growth rate of 4% [32]. The Ethiopian Central Statistical Agency estimates the population of Hawassa at 351,469 in 2018. In 2022, the Regional Health Bureau reported 26,602 people in the reproductive age group; 13,779 were males and 12,823 were females. The total estimated number of pregnant and lactating women in 2022 was 13,634, and the number of surviving infants was 12,853.

Study population: the study participants were selected mothers who had infants aged 0 to 6 months residing in the study area during the study period in Hawassa city.

Inclusion and exclusion criteria: all mothers who had infants aged 0-6 months and had been residents of the study area for more than six months, and who were able to provide consent during the study, were included. And those women's children with evidence of chronic health problems, who were unable to communicate, or who had chronic illnesses, were excluded.

Variables: the practice of exclusive breastfeeding was the outcome variable, while demographic characteristics, maternal and child health-related factors, knowledge, and attitudes served as independent variables.

Sample size determination: EPi- Info version 7.2.5.0 was used for sample size estimation. The sample size (n) was determined based on the single population proportion. The prevalence of mothers with a positive attitude towards exclusive breastfeeding, 37.6% was used from previous studies [33]. The level of confidence (α) was taken to be 0.05 (Z α/2 1.96) and a marginal error of 5%. The estimated sample size based on these assumptions was 360. A design effect of 2 was used to minimize the effect of cluster sampling, and a non-response rate of 10%, the total sample size required for the study was 772.

Sampling procedure: four sub-cities (50%) out of the eight sub-cities were randomly selected to make the sample more representative. The sample size was divided based on the proportion of the total number of lactating women found in each sub-city. The list of all lactating women was obtained from the health extension family folder. Mothers who lived in the area for at least six months and those who gave consent to participate in the study were eligible. The study participants were selected using simple random sampling by using a lottery method.

Data collection tools and techniques: the questionnaire was developed on paper and then uploaded to the Kobo Toolbox online tool. Once the questions were uploaded to the Kobo Toolbox, it was shared with the assessment team for review, testing, and finalization. Six data collectors and two supervisors were trained to participate in the data collection process. This study used a field-tested and validated questionnaire from the Food and Agriculture Organization of the United Nations (FAO), the Ethiopian Demographic Health Survey (EDHS) tool, and other literature [34]. The questionnaire was pretested on 5% of the total sample size in the adjacent kebele. Then it was checked for its clarity, consistency, and completeness, and the necessary corrections were made accordingly. The questionnaire includes socio-demographic, household characteristics, obstetric, and child health-related characteristics, knowledge, attitude, EBF practice, and mobile phone-related questions. The questionnaire was originally prepared in English and translated into Amharic by a language expert and back into English to ensure its consistency. The questionnaires were administered by interviewers to breastfeeding mothers selected from the source population.

Data analysis procedure: the data was downloaded into Excel and exported to SPSS for further statistical analysis. The first section included socio-demographic characteristics such as maternal age, religion, marital status, educational status, and occupation, followed by a descriptive analysis. Descriptive statistics, including frequencies,

percentages, and cross-tabulation, were performed to describe sociodemographic, maternal, and child health characteristics and mobile phone use of the study participants. The knowledge section assessed maternal intellectual ability regarding exclusive breastfeeding practices. Ten knowledge questions were posed to determine the maternal knowledge level. One point was assigned for a correct answer, while zero was given for an incorrect answer, resulting in a minimum and a maximum score of zero and ten, respectively. Women who correctly answered all ten questions received ten points and were categorized as having good knowledge, while those scoring below ten were classified as having poor knowledge [34]. The third section assessed maternal attitudes towards EBF. A total of six questions were asked, and three responses were expected: favorable, neutral, or undecided, and unfavorable. Women's answers containing a favorable response were given three points, a neutral response two points, and an unfavorable response one point. The fourth section focused on maternal practices regarding exclusive breastfeeding. A total of four major points were considered, and women who correctly answered all four questions were considered as exclusively breastfeeding their infant until six months.

The first descriptive analysis was carried out to examine the distribution of each variable. Bivariate analysis was carried out to describe the association between the two variables. Finally, factors which was significant in the bivariate association were observed with a p-value of 0.25 and retained for subsequent multivariate analyses using multiple logistic regression to control for possible confounders. The adjusted odds ratio was used to measure the strength of the association between dependent and independent variables. A 95% CI was used to determine the significance of the associations with a p-value of less than 0.05. Hosmer and Lemeshow´s goodness-of-fit test checked the goodness of model fit, and logistic regression was run.

Ethical consideration: ethical approval was obtained from the Hawassa University Ethical Review Board, with reference number IRB/106/14. An official letter was issued from Hawassa University College of Agriculture, School of Human Nutrition and Food Science Technology, to the Hawassa City Health Department. In response, the health department sent an official letter to the public health center to obtain permission and support. The study's purpose was explained to participants, and oral consent was obtained to confirm their willingness to participate. Confidentiality of responses was maintained throughout the research process. All incomplete questionnaires were treated as non-responses.

Results

Sociodemographic and economic characteristics of study participants: all study subjects, 772 mothers, participated in the study with a response rate of 100%. Out of 772 mothers, 757 (98.1%) were married. Concerning maternal age, 244 (31.6%) of the women were <25 years, and 291 (37.7%) women had an age range between 25 and 29 years, with a mean age of 27.7 (SD= ±4.2). Only 14 (1.8%) women led a household. The majority, 195 (47.4%) of the women, have an average monthly income of between 4,500 and 7,500 birr, followed by 169 (38.5%) of women who reported that their monthly income was between 1,500 and 4,500 birr. Educational status: 283 (36.7%) of women achieved secondary education, 226 (29.3%) attended primary school, 156 (20.2%) attended vocational training, and the rest were university graduates, and a few others had never attended. All the households have electric light sources and toilets. Maternal employment, majority, 315 (40.8%) of the women were housewives, 216 (28%) were private employees, 150 (19.4%) were government employees, and 91 (11.8%) of the women were students (Table 1).

Maternity and infant-related characteristics: the marital age of the women, 439 (56.9%), was ≥ 20, and 333 (43.1%) were ≤ 20 years. All (100%) women had antenatal care visits, and among them, 545 (70.6%) had four or more visits. Regarding methods

of delivery, 531 (68.8%) gave birth by spontaneous vaginal delivery, and 241 (31.2%) by cesarean section. A greater part, 771 (99.9%), of women delivered their babies at a health facility. Postnatal care utilization was 197 (25.5%) of women had four or more visits, 256 (33.2%) of women had three visits, 287 (37.2%) of women had two visits, and the others had only one visit. Of the number of deliveries, 496 (64.2%) gave birth more than once, and 266 (34.5%) gave birth only once. Infant sex, 436 (56.5%) were females and 336 (43.5%) were males. The age group of the infant 364 (47.2%) was 2-4 months, 278 (36.0%) was 4-6 months, and 130 (16.8%) was 0-2 months. The mean age of the infants was 3.8 (SD=±1.2) months (Table 2).

Knowledge of exclusive breastfeeding among women: the study revealed that 741 (96.0%) of participants had adequate knowledge about breastfeeding, with a mean (±SD) score of 8.02 (±.1.34), and 767 (99.4%) had heard about breastfeeding. Seven hundred and twenty-eight (94.9%) reported that they knew about exclusive breastfeeding. Six hundred and forty-six (83.7%) and 704 (91.2%) of the respondents said that breast milk alone was the first food for the newborn and adequate for the first six months of age, respectively. About 614 (79.5%) of the women reported that breast milk was given eight or more times daily. Most respondents, 747 (96.8%), reported that exclusive breastfeeding is given for the first six months, and 416 (53.9%) of the moms know different ways of increasing breast milk supply. More than half, 523 (67.7%), 553 (69.0%), and 558 (72.3%) of women reported that breast milk offers benefits for the child, mother, and the country, respectively. About 416 (53.9%) of mothers knew about maintaining breastmilk supply.

Maternal attitude towards exclusive breastfeeding practice: about 460 (59.6%) of women have a favorable attitude towards exclusive breastfeeding. About 756 (97.9%) of women felt positive, and 656 (86%) of the women reported no difficulties in exclusively breastfeeding for six months. A high proportion, 748 (96.9%), of moms felt good about giving breast milk to their infants on demand. More than half, 510 (66.1%) of women, felt confident in expressing and storing breast milk.

Infant breastfeeding practice based on the 24-hour recall: the prevalence of exclusive breastfeeding was 54.4% (95% CI: 50.8, 58.0). The age-specific prevalence of EBF was 15.7% for 0-2 months, 32.4% for 2-4 months, and 6.3% for 4-6 months (Figure 1). The sex-specific prevalence was 24.0% for males and 30.4% for females (Figure 2). Most women, 676 (87.6%), started breastfeeding immediately after birth. Additionally, 742 (96.1%) women gave their infants their first milk (colostrum).

Ownership of mobile phone health (mHealth) and related characteristics: in this study, 772 (100%) mothers reported owning mobile phones. About 569 (73.3%) have experience in sending and 587 (76%.0) receiving SMS text messages using their mobile phones. Among respondents, 649 (84.1%) were willing to receive SMS text messages, and 494 (64.0%) of the women preferred receiving an SMS text message at any time. In this study, only 49 (8.3%) women received health-related SMS using mobile phones. About 656 (85.0%) of respondents preferred the Amharic language (Table 3).

Predictors of exclusive breastfeeding practice: logistic regression analysis was used to identify the variables affecting exclusive breastfeeding practice and to control the influence of confounding variables. Bivariate and multivariate analyses were performed, with PV<0.05 and 95% CI used as criteria. Maternal knowledge, age, level of education, monthly income, marital age, number of ANC visits, type of delivery, number of PNC visits, and husband's support were associated with exclusive breastfeeding practice in the bivariate analysis. Multivariable logistic regression was then performed to control the effect of confounding variables. logistic regression analysis was used to identify the variables affecting exclusive breastfeeding practice and to control the influence of confounding variables. Bivariate and multivariate analyses were performed, with PV<

0.05 and 95% CI used as criteria. Maternal knowledge, age, level of education, monthly income, marital age, number of ANC visits, type of delivery, number of PNC visits, and husband's support were associated with exclusive breastfeeding practice in the bivariate analysis. Multivariable logistic regression was then performed to control the effect of confounding variables. Women´s knowledge, age, postnatal care, maternal employment, maternal level of education, and husband support become strongly associated factors after being adjusted for potential confounding variables. Compared to breastfeeding women with inadequate knowledge, those with good knowledge were 3.50 times more likely to practice exclusive breastfeeding (AOR =3.5, 95% CI: 1.48, 8.29). The odds of exclusive breastfeeding practices among mothers aged 25-29 and 30-34 years old were 61% and 70% less likely to practice EBF compared to mothers 35 years and above, respectively. Compared to women with a university degree, women with vocational training and secondary school education were 2.62 times (AOR =2.62, 95% CI: 1.37, 5.00) and 3.20 times (AOR =3.20, 95% CI: 1.53, 6.67) more likely to practice EBF, respectively. Compared to student mothers, exclusive breastfeeding was linked with 2.77 times higher odds in government-employed women (AOR = 2.77, 95% CI: 1.35, 5.67), and 2.51 times higher odds in private-employed women (AOR = 2.51, 95% CI: 1.42, 4.44). Women with husband support were 2.11 times more likely to breastfeed than those with no support (AOR =2.11, 95% CI: 1.41, 3.16) (Table 4).

Discussion

This study indicated that 54.4% (95% CI: 50.8, 58.0) of mothers exclusively breastfed their infants in the first six months. A similar study conducted at Bahirdar city revealed that 57.3% (95%CI: 52.3%-62%) of women were exclusively breastfed until six months [35]. This study was also higher than the study conducted in Harar town, 45.8% of women practiced exclusive breastfeeding [36]. And also lower than the Ethiopian mini-demographic health survey (59%), because this survey included the rural areas' research findings [14]. A study conducted in some rural areas of Ethiopia the prevalence was relatively higher than in the urban areas. Offa district of Wolayta Zone, 78.0%, Goba district of Oromia region, 71.3%, in Debre Tabor town of Amhara region, 70.8%, and Azezo district, Northwest Ethiopia, 79% [37-40]. However, this result was less than that of a 2017 study conducted in one of Hawassa's rural sub-cities (60.9%, 95% CI: 56.6, 65.1) [41]. This indicates that the rate of exclusive breastfeeding varied between urban and rural areas; as a result, alternative promotional approaches to exclusive breastfeeding should be used to raise the rate in urban areas.

This study indicated that 96.0% (95% CI: 94.7, 97.4) of mothers have good knowledge of exclusive breastfeeding. This finding was higher than the findings of a study in North West Ethiopia, 92.1% (95% CI: (89.5-94.6), and South West Tanzania, 77.7 % [42,43]. Similarly, the study conducted in Lagos State, Nigeria, showed that 94% had good knowledge of exclusive breastfeeding [17,43]. Despite good knowledge, low postnatal care follow-up for counseling, lack of continuous family support, and weak and inadequate reminder strategies remain reasons for the low rates of exclusive breastfeeding in urban areas [23,24,44-46].

Women's attitudes regarding exclusive breastfeeding were also evaluated. More than half, 59.6% (95% CI: 56.2, 62.8) of women had a positive attitude about it. A study on breastfeeding women in Jimma was 63.99%, and in Lagos State, Nigeria, it was 90%. In Rwanda, it was found that 78.9% had a positive attitude towards breastfeeding, which was higher than in the current study [17-19]. Despite a positive attitude, women have limited practice towards exclusive breastfeeding.

Regarding women's access to cell phones, 48.5% and 51.4% had a smart and standard phone, respectively. Among the participants women 84.1% of women were willing to receive SMS texts. Amharic was the language that 85% of them

preferred. The survey in Northwest Ethiopia found that 37.6% of people had a smartphone, and 76.7% of people owned a mobile phone, which is lower than the current study [47]. A survey conducted in Gulu, Uganda, most of the women consistently stated that they would be amenable to receiving health messages on their mobile phones [48].

In this result, a large proportion of women who own a mobile phone have experience reading, receiving, and sending SMS messages. Their willingness to receive text messages is very high, which will create an opportunity for researchers and healthcare providers to offer real-time breastfeeding information and counseling. The multivariate regression statistics showed that there was a significant relationship between knowledge and exclusive breastfeeding; those women who have good knowledge are 3.50 times more likely to practice exclusive breastfeeding than those who have poor knowledge (AOR = 3.50, 95% CI = (1.48, 8.29). Maternal knowledge played a key role in exclusive breastfeeding practices. The current result was consistent with the cross-sectional study conducted in Gambia, Banjul, where 60.2% of breastfeeding women had good knowledge, but only 38.6% of women breastfed their infants [49]. Similar studies conducted in Abuja, Nigeria [50]; Southwest Tanzania [43]; Italy [51]; Northwest Ethiopia [42]; and Tigray Mekele [52] have shown that good knowledge becomes a predictor of exclusive breastfeeding practice.

Compared to women with no education and university degrees, breastfeeding women with vocational training were 2.62 times more likely to perform EBF (AOR = 95% CI = (1.37, 5.00) and those with secondary school education were 3.20 times more likely to do so (AOR = 95% CI = (1.53, 6.67). A similar study done in Indonesia, breastfeeding women with elementary, junior, and high school grades were 1.167 times, 1.203 times, and 1.177 times more likely to exclusively breastfeed, respectively, than mothers without such records [53]. Additionally, compared to breastfeeding women without education, mothers in sub-Saharan Africa who completed elementary school were 1.37 (95% CI AOR: 1.27 to 1.48) times more likely to exclusively breastfeed. In terms of EBF practices, women with a secondary education did not differ substantially from mothers without education [54].

Women who have their husbands' support are also 2.11 (AOR=2.11, CI: 1.41, 3.16) times more likely to exclusively breastfeed than those who do not (OR = 95% CI: 1.41, 3.16). This study was comparable to those carried out in Mekele, Tigray, Ethiopia, Bahir Dar town, northwest Ethiopia (AOR = 4.15, 95% CI: 2.13, 6.28), and Boyolali, Indonesia (p = < 0.001, 95% CI: 1.669-5.383). Different studies also indicated that fathers' support has a positive impact on exclusive breastfeeding practices [35,55].

Limitations of the study: since the study was conducted in an urban community, the findings may not apply to the entire community. The study was not based on direct observation or practical intervention but on women´s answers to a questionnaire.

Conclusion

According to the study, the rate of exclusively breastfed (EBF) infants under six months of age was lower than the national recommendation. Nonetheless, there is a positive attitude and good knowledge regarding exclusive breastfeeding. Maternal knowledge, age, level of education, occupation, and husband support were predictors of exclusive breastfeeding. A significant number of urban lactating mothers have access to a mobile phone and know how to send, receive, and read SMS messages. This will allow researchers and health care providers to provide breastfeeding information and counseling in real time. Improving the rate of exclusive breastfeeding is necessary to meet the national target and the Sustainable Development Goal (SDG). Therefore, a more extensive and comprehensive counseling approach, along with real-time information, would

be a key strategy to improve exclusive breastfeeding rates among the urban population.

What is known about this topic

- *Different studies and reports showed that exclusive breastfeeding was an important public health strategy for improving children??s and mothers' health by reducing child morbidity and mortality and helping control healthcare costs in society;*
- *Globally, with the increased availability of mobile phones, the use of mobile technology for health-related interventions (mHealth) has greatly increased.*

What this study adds

- *The rate of exclusively breastfed infants under six months of age was lower than the national goal. Nonetheless, there was sufficient understanding regarding exclusive breastfeeding;*
- *A significant number of urban lactating mothers have access to a mobile phone and know how to send, receive, and read SMS messages. This will allow us to provide breastfeeding information and counseling in real time.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Sisay Tesfaye served as the principal investigator and contributed to idea generation, proposal development, data collection, analysis, writing the original manuscript, selecting the journal, and submitting the paper. Dejene Hailu and Samson Gebremedhin provided technical support in proposal development, research methodology, data analysis techniques, and offered helpful comments on manuscript writing and final approval.

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Tables and figures

Table 1: socio-demographic characteristics of lactating women at Hawassa city, Sidama region, Ethiopia, December 2024

Table 2: maternal and child health-related characteristics of lactating women at Hawassa city, Sidama region, Ethiopia, December 2024

Table 3: maternal access to mobile phone and related characteristics of lactating women at Hawassa city, Sidama region, Ethiopia, December 2024

Table 4: factors associated with exclusive breastfeeding practice among lactating women at Hawassa city, Sidama region, Ethiopia, December 2024

Figure 1: infant breastfeeding practice by the sex of the infant at Hawassa city, Sidama region, Ethiopia, December 2024

Figure 2: infant breastfeeding practice by the age group of the infant at Hawassa city, Sidama region, Ethiopia, December 2024

References

1. World Health Organization. Infant and young child feeding: Model chapter for textbooks for medical students and allied health professionals. 2009. Accessed on May 14, 2025.

2. Hernández Luengo M, Álvarez-Bueno C, Pozuelo-Carrascosa DP, Berlanga-Macías C, Martínez-Vizcaíno V, Notario-Pacheco B. Relationship between breastfeeding and motor development in children: protocol for a systematic review and meta-analysis. BMJ Open. 2019 Sep 17;9(9): e029063. **PubMed**| **Google Scholar**
3. Rollins NC, Bhandari N, Hajeebhoy N, Horton S, Lutter CK, Martines JC *et al*. Why invest, and what it will take to improve breastfeeding practices? Lancet Lond Engl. 2016 Jan 30;387(10017): 491-504. **PubMed**| **Google Scholar**
4. World Health Organization. Global health risks: mortality and burden of disease attributable to selected major risks. 2009. Accessed on Aug 10, 2025.
5. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, Mathers C *et al*. Maternal and child undernutrition: global and regional exposures and health consequences. Lancet. 2008 Jan 19;371(9608): 243-60. **PubMed**| **Google Scholar**
6. UN DESA | United Nations Department of Economic and Social Affairs. World´s population increasingly urban with more than half living in urban areas. Accessed on Aug 10, 2025.
7. City BL, Assessment E, Tool R. Urbanization and health. Bull World Health Organ. 2010;88(4): 245-6. **Google Scholar**
8. Elsey H, Agyepong I, Huque R, Quayyem Z, Baral S, Ebenso B *et al*. Rethinking health systems in the context of urbanisation: challenges from four rapidly urbanising low-income and middle-income countries. BMJ Glob Health. 2019 Jun 16;4(3): e001501. **PubMed**| **Google Scholar**
9. Oakley L, Baker CP, Addanki S, Gupta V, Walia GK, Aggarwal A *et al*. Is increasing urbanicity associated with changes in breastfeeding duration in rural India? An analysis of cross-sectional household data from the Andhra Pradesh children and parents study. BMJ Open. 2017 Sep 21;7(9): e016331. **PubMed**| **Google Scholar**
10. Liu J, Shi Z, Spatz D, Loh R, Sun G, Grisso J. Social and demographic determinants for breastfeeding in a rural, suburban and city area of South East China. Contemp Nurse. 2013 Oct;45(2): 234-43. **PubMed**| **Google Scholar**
11. World Health Organization. Global Nutrition Monitoring Framework: operational guidance for tracking progress in meeting targets for 2025. InGlobal Nutrition Monitoring Framework: operational guidance for tracking progress in meeting targets for 2025 2017. **Google Scholar**
12. Medbox. Health Sector Development Programme IV 2010/11 - 2014/15. Accessed on Aug 11, 2025.
13. Bhattacharjee NV, Schaeffer LE, Marczak LB, Ross JM, Swartz SJ, Albright J *et al*. Mapping exclusive breastfeeding in Africa between 2000 and 2017. Nat Med. 2019 Aug;25(8): 1205-12. **PubMed**| **Google Scholar**
14. DHS program. Ethiopia Mini Demographic and Health Survey 2019. 2021. Accessed on Jul 26, 2023.
15. Manjapallikkunnel SR, Nair ANK, Sujatha C. Knowledge, Attitude and Practices Among Mothers of Infants Regarding Breastfeeding. J Family Reprod Health. 2023 Sep;17(3): 136-141. **PubMed**| **Google Scholar**
16. Dukuzumuremyi JPC, Acheampong K, Abesig J, Luo J. Knowledge, attitude, and practice of exclusive breastfeeding among mothers in East Africa: a systematic review. Int Breastfeed J. 2020 Aug 14;15(1): 70. **PubMed**| **Google Scholar**
17. Osibogun OO, Olufunlayo TF, Oyibo SO. Knowledge, attitude and support for exclusive breastfeeding among bankers in Mainland Local Government in Lagos State, Nigeria. Int Breastfeed J. 2018 Aug 22: 13: 38. **PubMed**| **Google Scholar**

18. Mugabo J, Nishimwe C, Marete O. Knowledge, Attitude, and Practice Towards Exclusive Breastfeeding and Associated Factors Among Adolescent Mothers in Nyagatare District, Rwanda. Int J Community Med Public Health [Internet]. 2025;11;12(2): 683-93. **Google Scholar**
19. Gebresenbet H. Knowledge, attitude, and practice towards exclusive breast feeding among inhabitants of ginjo guduru kebele, jimma town, Oromia region, Ethiopia, ARC J. Nutr. Growth. 2020 Nov 16;6(2): 2455-550. **Google Scholar**
20. Tadele N, Habta F, Akmel D, Deges E. Knowledge, attitude and practice towards exclusive breastfeeding among lactating mothers in Mizan Aman town, Southwestern Ethiopia: descriptive cross-sectional study. Int Breastfeed J. 2016 Feb 27: 11: 3. **PubMed**| **Google Scholar**
21. Wolde T, Diriba G, Wakjira A, Misganu G, Negesse G, Debela H *et al*. Knowledge, attitude and practice of exclusive breastfeeding among lactating mothers in Bedelle town, Southwestern Ethiopia: Descriptive cross sectional study. Researcher. 2014;6(11): 91-7. **Google Scholar**
22. Adugna B, Tadele H, Reta F, Berhan Y. Determinants of exclusive breastfeeding in infants less than six months of age in Hawassa, an urban setting, Ethiopia. Int Breastfeed J. 2017 Nov 2: 12: 45. **PubMed**| **Google Scholar**
23. Yimer TS, Ferede WY, Sisay FA. Utilization of early postnatal care services and associated factors among mothers who gave birth in the last 12 months in South Gondar Zone District, Amhara Regional State, Ethiopia. J Health Popul Nutr. 2024 Feb 15;43(1): 26. **PubMed**| **Google Scholar**
24. Tsegaye B, Amare B, Reda M. Prevalence and Factors Associated with Immediate Postnatal Care Utilization in Ethiopia: Analysis of Ethiopian Demographic Health Survey 2016. Int J Womens Health. 2021 Feb 24: 13: 257-266. **PubMed**| **Google Scholar**
25. Worku S, Dheresa M, Ali T, Lodebo M. Early Postnatal Care Utilization and Associated Factors Among Women Who Give Birth in the Last Six Weeks in Hosanna Town, Southern Ethiopia, 2022. J Pregnancy. 2024;2024(1): 1474213. **PubMed**| **Google Scholar**
26. Hailemariam T, Atnafu A, Gezie LD, Kaasbøll JJ, Klein J, Tilahun B. Postnatal care utilization within 48 h after birth and its determinants in northwest Ethiopia: a multilevel logistic regression analysis. Sci Rep. 2024 Nov 5;14(1): 26809. **PubMed**| **Google Scholar**
27. Adugnaw E, Gizaw G, Girma M, Arage G, Libanos M, Emrie WA *et al*. The median time to stopover exclusive breastfeeding among employed and unemployed mothers of infants aged 6-12 months in Ethiopia, 2019. Sci Rep. 2023 Apr 17;13(1): 6259. **PubMed**| **Google Scholar**
28. Tadesse F, Alemayehu Y, Shine S, Asresahegn H, Tadesse T. Exclusive breastfeeding and maternal employment among mothers of infants from three to five months old in the Fafan zone, Somali regional state of Ethiopia: a comparative cross-sectional study. BMC Public Health. 2019 Jul 29;19(1): 1015. **PubMed**| **Google Scholar**
29. Zewdie A, Taye T, Kasahun AW, Oumer A. Effect of maternal employment on exclusive breastfeeding practice among mothers of infants 6-12 months old in Wolkite town, Ethiopia: a comparative cross-sectional study. BMC Womens Health. 2022 Jun 11;22(1): 222. **PubMed**| **Google Scholar**
30. Navarro-Rosenblatt D, Garmendia ML. Maternity leave and its impact on breastfeeding: a review of the literature. Breastfeeding medicine. 2018 Nov 1;13(9): 589-97. **PubMed**| **Google Scholar**
31. Nigussie ZY, Zemicheal NF, Tiruneh GT, Bayou YT, Teklu GA, Kibret ES *et al*. Using mHealth to Improve Timeliness and Quality of Maternal and Newborn Health in the Primary Health Care System in Ethiopia. Glob Health Sci Pract. 2021 Sep 30;9(3): 668-81. **PubMed**| **Google Scholar**

32. Studocu. SFD Promotion Initiative Final Report - Hawassa, Ethiopia (2016). Accessed on Jun 6, 2025.
33. Ermancho B, Lette A, Tamirat A, Ermeko T. Determinants of exclusive breastfeeding practice in Southern Ethiopia. J Food Nutr Popul Health. 2021;5(4): 50. **Google Scholar**
34. FAO. Guidelines for assessing nutrition-related knowledge, attitudes and practices. Accessed on May 15,2025.
35. Ayalew T. Exclusive breastfeeding practice and associated factors among first-time mothers in Bahir Dar city, North West Ethiopia, removed: A community based cross sectional study. Heliyon. 2020 Sep 3;6(9): e04732. **PubMed**| **Google Scholar**
36. Dibisa TM, Sintayehu Y. Exclusive Breast Feeding and Its Associated Factors Among Mothers of <12 Months Old Child in Harar Town, Eastern Ethiopia: A Cross-Sectional Study. Pediatric Health Med Ther. 2020 May 12: 11: 145-152. **PubMed**| **Google Scholar**
37. Lenja A, Demissie T, Yohannes B, Yohannis M. Determinants of exclusive breastfeeding practice to infants aged less than six months in Offa district, Southern Ethiopia: a cross-sectional study. Int Breastfeed J. 2016 Dec 9: 11: 32. **PubMed**| **Google Scholar**
38. Setegn T, Belachew T, Gerbaba M, Deribe K, Deribew A, Biadgilign S. Factors associated with exclusive breastfeeding practices among mothers in Goba district, south east Ethiopia: a cross-sectional study. International breastfeeding journal. 2012 Nov 27;7(1): 17. **PubMed**| **Google Scholar**
39. Arage G, Gedamu H. Exclusive breastfeeding practice and its associated factors among mothers of infants less than six months of age in Debre Tabor town, Northwest Ethiopia: a cross?sectional study. Advances in Public Health. 2016;2016(1): 3426249. **Google Scholar**
40. Asemahagn MA. Determinants of exclusive breastfeeding practices among mothers in azezo district, northwest Ethiopia. International breastfeeding journal. 2016 Aug 2: 11: 22. **PubMed**| **Google Scholar**
41. Adugna B, Tadele H, Reta F, Berhan Y. Determinants of exclusive breastfeeding in infants less than six months of age in Hawassa, an urban setting, Ethiopia. Int Breastfeed J. 2017 Nov 2;12(1): 45. **PubMed**| **Google Scholar**
42. Mazengia AL, Demissie H. Knowledge and practice of employed mothers towards exclusive breastfeeding and its associated factors in Mecha District, Northwest Ethiopia. Journal of Nutrition and Metabolism. 2020;2020(1): 4820582. **Google Scholar**
43. Kelvin AM, Mweya CN. Assessing exclusive breastfeeding knowledge and practice among women in Mbeya, Southwest Tanzania: A cross-sectional study. International Journal of Africa Nursing Sciences. 2024 Jan 1;20: 100733. **Google Scholar**
44. Zegeye AF, Gebrehana DA, Bezabih SA, Mengistu SA, Adane KC, Lakew AM. Poor access to breastfeeding counseling services and associated factors among lactating mothers who had optimal antenatal care follow-up in Sub-saharan Africa: A multilevel analysis of the recent demographic and health survey. BMC Health Services Research. 2024 Dec 18;24(1): 1577. **PubMed**| **Google Scholar**
45. Mudau AG, Mabunda JT, Mushaphi LF. Challenges and strategies to implement exclusive breastfeeding in the selected Districts of Limpopo Province, South Africa: professional nurses' perspectives. Pan Afr Med J. 2023 Nov 2: 46: 75. **PubMed**| **Google Scholar**
46. Mambo AB, Garba MC, Landis FC. Exclusive Breast Feeding Practices, Knowledge and Challenges amongst Mothers with Children 0-6 Months in the Bamenda II Municipality of the Northwest Region of Cameroon. Journal of Advances in Medicine and Medical Research. 2024 Dec 10;36(12): 170-81. **Google Scholar**

47. Endehabtu B, Weldeab A, Were M, Lester R, Worku A, Tilahun B. Mobile phone access and willingness among mothers to receive a text-based mhealth intervention to improve prenatal care in Northwest Ethiopia: cross-sectional study. JMIR pediatrics and parenting. 2018 Oct 17;1(2): e9618. **PubMed**| **Google Scholar**
48. Walter YO, Atim P, Amone D, Peter AS, Tabo GO. Attitudes of female market vendors of reproductive age towards use of mobile phones and access to family planning self-care interventions in Northern Uganda: a cross-sectional study. BMC Med Inform Decis Mak. 2024 Jun 12;24(1): 164. **PubMed**| **Google Scholar**
49. Senghore T, Omotosho TA, Ceesay O, Williams DC. Predictors of exclusive breastfeeding knowledge and intention to or practice of exclusive breastfeeding among antenatal and postnatal women receiving routine care: a cross-sectional study. International breastfeeding journal. 2018 Mar 2;13(1): 9. **PubMed**| **Google Scholar**
50. Okoroiwu GI, Ubosi NI, Aliyu SM, Eya CP. Knowledge, attitude and practice of exclusive breastfeeding amongst mothers of infants in Gwagwalada area council, FCT, Abuja, Nigeria. Journal of Applied Sciences and Environmental Management. 2021 Mar 31;25(1): 127-32. **Google Scholar**
51. Cascone D, Tomassoni D, Napolitano F, Di Giuseppe G. Evaluation of knowledge, attitudes, and practices about exclusive breastfeeding among women in Italy. International journal of environmental research and public health. 2019 Jun;16(12): 2118. **PubMed**| **Google Scholar**
52. Gebretsadik GG, Tadesse Z, Mamo L, Adhanu AK, Mulugeta A. Knowledge, attitude, and determinants of exclusive breastfeeding during COVID-19 pandemic among lactating mothers in Mekelle, Tigrai: a cross sectional study. BMC pregnancy and childbirth. 2022 Nov 18;22(1): 850. **PubMed**| **Google Scholar**
53. Laksono AD, Wulandari RD, Ibad M, Kusrini I. The effects of mother´s education on achieving exclusive breastfeeding in Indonesia. BMC Public Health. 2021 Jan 6;21(1): 14. **PubMed**| **Google Scholar**
54. Wako WG, Wayessa Z, Fikrie A. Effects of maternal education on early initiation and exclusive breastfeeding practices in sub-saharan Africa: a secondary analysis of demographic and health surveys from 2015 to 2019. BMJ open. 2022 Mar 1;12(3): e054302. **PubMed**| **Google Scholar**
55. Zeng J, Zheng QX, Wang QS, Liu GH, Liu XW, Lin HM *et al*. Father support breastfeeding self-efficacy positively affects exclusive breastfeeding at 6 weeks postpartum and its influencing factors in Southeast China: a multi-centre, cross-sectional study. BMC Public Health. 2024 Oct 3;24(1): 2698. **PubMed**| **Google Scholar**

Table 1: socio-demographic characteristics of lactating women at Hawassa city, Sidama region, Ethiopia, December 2024			
Variables	**Category**	**Frequency**	**Percentage**
Maternal age	<25	244	31.6
	25-29	291	37.7
	30-34	171	22.2
	>35	66	8.5
Marital status	Married	757	98.1
	Divorce	6	0.8
	Widowed	9	1.2
Educational status	Never attended	29	3.8
	Primary school	`	29.3
	Secondary school	283	36.7
	Vocational training	156	20.2
	University/graduate	78	10.1
Ethnic group	Sidama	304	39.4
	Wolayta	261	33.8
	Oromo	79	10.2
	Amhara	56	7.3
	Gurage	72	9.3
Maternal religion	Protestant	461	59.8
	Orthodox	194	25.2
	Muslim	91	11.8
	Catholic	25	3.2
Maternal current occupation	Housewife	315	40.8
	Government employ	150	19.4
	Private employee	216	28
	Student	91	11.8
Maternal monthly income	<1500	2	0.5
	1500-4500	160	38.9
	4500-7500	195	47.4
	>7500	54	13.1

Table 2: maternal and child health-related characteristics of lactating women at Hawassa city, Sidama region, Ethiopia, December 2024

Variables	Category	Frequency	Percentage
Marital age	< 20 Year	333	43.1
	> 20Year	439	56.9
ANC visit	Four and more	545	70.6
	Three times	227	29.4
Parity	Primiparous woman	266	34.5
	Multiparous woman	496	64.2
	Grand multipara	10	1.3
Place of delivery	Health institution	771	99.9
	Home delivery	1	0.1
Type of current delivery	C/S	241	31.2
	SVD/normal	531	68.8
Postnatal care	Four or more times	197	25.5
	Three times	256	33.2
	Two times	287	37.2
	Only once	32	4.1
When you go back to work	After 3 months	147	19.0
	After four months	335	43.4
	I will stay at home all the time	290	37.7
Infant sex	Female	436	56.5
	Male	336	43.5
Infant age	0-2	130	16.8
	2-4	364	47.2
	4-6	278	36.0

ANC: antenatal clinic, C/S: caesarean section, SVD: spontaneous vaginal delivery

Table 3: maternal access to mobile phone and related characteristics of lactating women at Hawassa city, Sidama region, Ethiopia, December 2024			
Variables	**Category**	**Frequency**	**Percentage**
Availability of a mobile phone	Yes	772	100
	No	0	0
Type of mobile phone	Smart phone	375	48.6
	Standard phone	397	51.4
Sending SMS text (n=686)	Yes	569	73.3
	No	203	26.3
Receiving SMS text	Yes	587	76.0
	No	185	24.0
Type of information received	From ethio-telecom	274	46.7
	Health-related	49	8.3
	Individual text	264	45
Willingness to receive BF-related SMS	Yes	649	84.1
	No	123	15.9
Preferred time to receive SMS (n=656)	Afternoon	101	13.1
	Night	149	19.3
	Morning	28	3.6
	Any time	494	64
Preferred language to receive SMS (n=656)	Amharic	656	85
	English	8	1,0
	Sidamigna	65	8.4
	Oromigna	27	3.5
	Other	16	2.1

Table 4: factors associated with exclusive breastfeeding practice among lactating women at Hawassa city, Sidama region, Ethiopia, December 2024				
Variables	**Exclusive breastfeeding practice N=772**		**Crude Odds ratio (95% CI)**	**Adjusted Odds Ratio (95% CI)**
	Yes	**No**		
Knowledge score				
Good	410	331	2.60(1.208,5.60)*	3.50(1.48,8.29)**
Poor	10	21	1	1.00
Maternal age				
<25	155	89	1	0.53(0.27,1.04)
25-29	149	142	0.60(0.42,0.85)**	0.39(0.21,0.72)**
30-34	69	102	0.38(0.26,0.58)**	0.30(0.16,0.58)**
>35	47	19	1.42(0.78,2.57)*	1
Maternal level of education				
Never attended	7	22	0.45(0.17,1.19)	1.76(0.55,5.66)
Primary school	121	105	1.65(0.98,2.79)*	3.24(1.49,7.02)**
Secondary school	166	117	2.04(1.22,3.39)**	3.20(1.53,6.67)**
Vocational training	94	62	2.17(1.25,3.79)**	2.62(1.37,5.00)**
University/graduate	32	46	1	1
Maternal occupation				
Housewife	147	168	0.93(0.58,1.49)	1.38(0.79,2.41)
Government employ	84	66	1.36(0.80,2.29)	2.77(1.35,5.67)**
Private employ	145	71	2.18 (1.32,3.59)**	2.51(1.42,4.44)**
Student	44	47	1	1
Postnatal care (PNC)				
Four or more times	140	57	3.15(1.47,6.77)**	1.20(0.73,1.97)
Three times	121	135	1.15(0.55,2.41)	0.75(0.34,1.65)
Twice	145	142	1.31(0.62,2.74	0.68(0.46,0.99)*
Only once	14	18	1	1
Husband support??				
Yes	345	223	2.66(1.91,3.70)***	2.11(1.41,3.16)**
No	75	129	1	1
N.B. P-value < 0.05*, P-value < 0.025**, **COR**: crude odds ratio; **AOR**: adjusted odds ratio; CI: confidence interval				

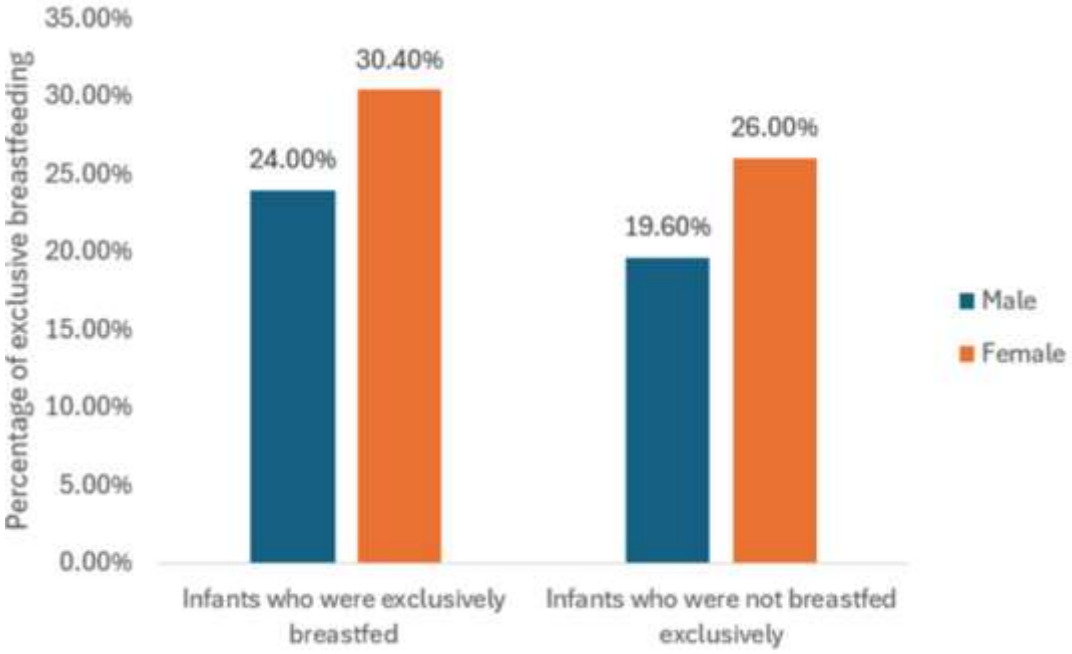

Figure 1: infant breastfeeding practice by the sex of the infant at Hawassa city, Sidama region, Ethiopia, December 2024

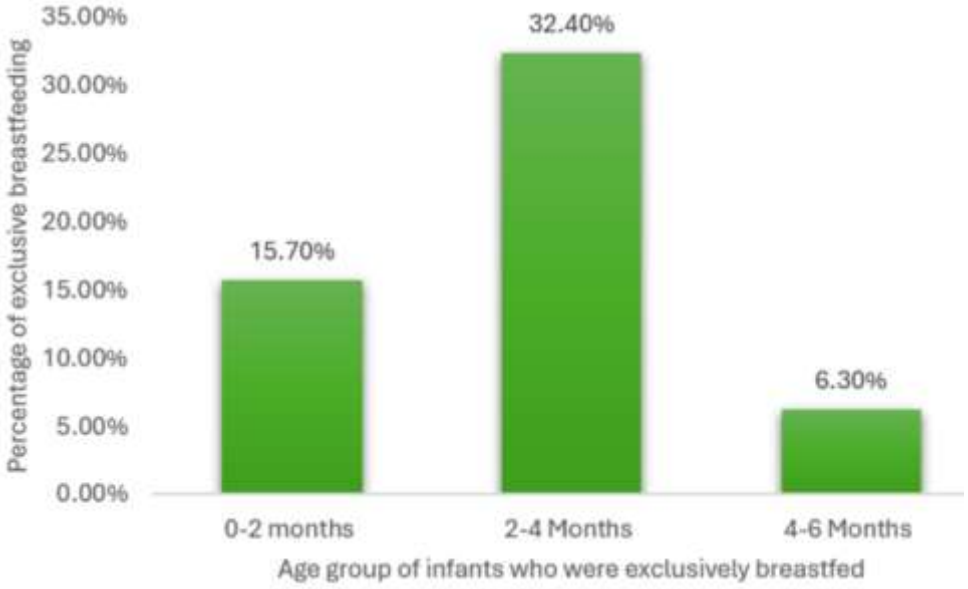

Figure 2: infant breastfeeding practice by the age group of the infant at Hawassa city, Sidama region, Ethiopia, December 2024