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Breastfeeding Rates Decrease by About Half between 12 and 23 Months in Sub-Saharan Africa: Evidence from 21 Countries

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Abstract

Introduction: Continued breastfeeding is associated with a reduced risk of child morbidity and mortality. There is no evidence on the prevalence and determinants of continued breastfeeding conducted using the most recent indicators for assessing infant and young child feeding practices in 2021. Therefore, the findings of this study could help nutrition policymakers prioritize and implement specific interventions for breastfeeding continuation. **Methods:** Data from the demographic and health surveys of 21 countries, was used. The study comprised a sample of 44,423 children between the ages of 12 and 23 months. Utilizing multilevel logistic regression, the factors associated with the outcome variable were identified. Statistical significance was attained by variables having a p-value <0.05. **Results:** The prevalence of continued breastfeeding among children aged 12 to 23 months was 64.59%. Maternal age, educational level, marital status, working status, parity, ANC visits, twin status, age of the child, and preceding birth interval were significantly associated with continued breastfeeding. **Conclusion:** Nearly two-thirds of children aged 12 to 23 months continued breastfeeding. Therefore, women's empowerment, improving maternal healthcare services, and giving special attention to unmarried and younger women, primiparous women, women with multiple births, mothers with female children, and mothers from rural areas are recommended.

Keywords: continued breastfeeding, children, DHS, sub-Saharan Africa, multilevel analysis

Introduction

Breastfeeding is one of the most significant life-saving actions for young children, as it is the child's primary immunization (Bhutta et al., 2013). Breastmilk comprises antibodies that protect common childhood illnesses and provides all, half or more, and up to one-third of the child's nutritional needs during the first months, the second half of the first year, and the second year of life, respectively (WHO, 2023). Despite the proven health benefits of breastfeeding, less than half of babies are breastfed globally, according to World Health Organization (WHO) recommendations ("Breastfeeding 2023," February 7, 2023). Not breastfeeding is associated with both health- and social-related consequences (THAN, 2022). Due to its health-related consequences, it causes more than half a million child deaths annually, secondary to increased vulnerability to disease. It also costs the world's economy up to US$1 billion a day (health system costs, cognitive losses, and household formula costs).

Continued breastfeeding (CBF) beyond the first year of life provides vital nutrients to the growing infant, delays maternal fertility postpartum, reduces the child's risk of morbidity and mortality, and prevents dehydration in children recovering from infections (WHO, 9 August 2023). According to the WHO global strategy for infant and young child feeding, it is recommended that children continue breastfeeding for two years or beyond (Organization & UNICEF., 2003). Children who continue

breastfeeding after one year of age can meet a significant portion of their energy requirements with the breast milk in their diet and have a low risk of dehydration and fast recovery during illness as their appetite for solid food decreases (Brown, Stallings, de Kanashiro, Lopez de Romana, & Black, 1990).

Half of all deaths caused by infectious diseases between 6 and 23 months of age could be prevented by CBF (Sankar et al., 2015). Continued breastfeeding is associated with higher performance in intelligence tests among children and adolescents (Victora et al., 2015) and a reduced risk of a child being overweight or obese (Victora et al., 2016). It is also important for mothers to reduce their risk of breast cancer, ovarian cancer, and type 2 diabetes mellitus (Chowdhury et al., 2015). Breastfeeding during the first 23 months of life is also an important intervention for reducing pneumonia-related morbidity and mortality (Lamberti et al., 2013). Evidence supports CBF up to 2 years of age, as recommended by the WHO for reducing mortality in children aged <2 years in sub-Saharan Africa (SSA) (Zhao et al., 2020). Breastfeeding is also important to protect against diarrhea-specific morbidity and mortality throughout the first two years of life (Lamberti, Fischer Walker, Noiman, Victora, & Black, 2011).

Studies conducted elsewhere showed that the prevalence of CBF was 45.4% in Qatar (Al-Kohji, Said, & Selim, 2012), 78% in Timor-Leste (Senarath, Dibley, & Agho, 2007), 20.9% in Vietnam (Doma et al., 2021), 55.9% in Turkey (Yalçın, Yalçın, & Kurtuluş-Yiğit, 2014), 75.2% in Tigray, northern Ethiopia (Mulugeta et al.), and 79.5% in Oromia region, Ethiopia (Mekonnen et al., 2021). Factors like residence, household wealth status, maternal educational status, age of the child, place of delivery, maternal occupation, maternal age, child sex, current marital status of the mother, birth order, preceding birth interval, mode of delivery, parity, husband's occupation, antenatal care follow-up, and media exposure were significantly associated with CBF (Cohen et al., 2018; Cozma-Petruţ et al., 2021; Doma et al., 2021; Mekonnen et al., 2021; Mulugeta et al.; Santana, Giugliani, Vieira, & Vieira, 2018; Senarath et al., 2007; Yalçın et al., 2014).

Appropriate breastfeeding practices are recommended to decrease the burden of under-five mortality and its related costs in SSA (Pretorius, Asare, Genuneit, Kruger, & Ricci, 2020). A previous study conducted in SSA to determine the status of infant and young child feeding reported that CBF at 1 year and 2 years was 89.5% and 53.7%, respectively (Gebremedhin, 2019). However, there is no evidence on the pooled prevalence and determinants of CBF in the region conducted using the most recent indicators for assessing infant and young child feeding (IYCF) practices, 2021, introduced to widen the age window to reflect any breastfeeding in the second year of life. The 2008 IYCF indicator was designed to assess CBF at one year (12–15 months), while the 2021 IYCF indicator considers children aged 12–23 months. The main reason for the revision was to increase the sample size, as it tends to be small for children aged 12–15 months, and the age window did not accurately reflect "at 1 year" (Organization, 2021). Therefore, this study is intended to determine the pooled prevalence and determinants of CBF among children aged 12 to 23 months in SSA countries using the most recent demographic and health survey (DHS) data and breastfeeding indicators.

Methods and Materials

Data Sources, Study Design, and Sampling

Using the most recent DHS from 21 SSA countries, which was conducted between 2015 and 2022, a cross-sectional pooled dataset was used. Angola (2015–16), Benin (2017–18), Burundi (2016–17), Cameroon (2022), Ethiopia (2016), Gabon (2019–21), Gambia (2019–20), Guinea (2018), Kenya (2022), Liberia (2019–20), Mali (2018), Malawi (2015–16), Nigeria (2018), Rwanda (2019–20), Sierra Leone (2019), Senegal (2019), Tanzania (2022), Uganda (2016), South Africa (2016), Zambia (2018), and Zimbabwe (2015) were among the 21 SSA countries whose DHSs were utilized. In order to determine the pooled prevalence of CBF and the factors that are associated with it in the SSA countries, the data were appended. Each country's survey has different datasets, such as those for males, females, children, births, and households. The kid's record (KR) file was employed in this investigation. The DHS is a national survey that is often conducted in low- and middle-income nations every five years. Each country's survey has different datasets, such as those for males, females, children, births, and households. The kid's record (KR) file was employed in this investigation. The DHS is a national survey that is often conducted in low- and middle-income nations every five years. By using common methods

for sampling, questionnaires, data collection, cleaning, coding, and analysis, it enables cross-national comparison (Corsi DJ, 2012).

The study comprised a weighted sample of 44,423 children between the ages of 12 and 23 months. The DHS uses a two-stage, stratified sampling method (Aliaga A, 2006). The first step is creating a sample frame, which is a list of enumeration areas (EAs) or primary sampling units (PSUs) that encompass the entire nation. This list is typically created using the most recent national census that is available. The systematic sampling of the homes included in each cluster, or EA, is the second step. More details on survey sample techniques are available in the DHS guidelines (Croft T, 2020).

Variables of the Study

Outcome variable: the outcome variable was continued breastfeeding, and it is the percentage of children 12–23 months of age who were fed breast milk during the previous day (Organization, 2021). It was measured based on the maternal report and coded as 1 "if the child fed breast milk during the previous day" and 0 "otherwise."

Explanatory variables: both individual and community-level variables were considered in this study. Individual-level factors: maternal age, maternal education, paternal education, maternal working status, marital status, household wealth status, media exposure, parity, pregnancy intention, ANC visit, place of delivery, mode of delivery, twin status of the child, age of the child, preceding birth interval, and sex of the child. Community-level factors: place of residence, community-level media exposure, community-level education, community poverty level, community level of ANC utilization, community level of delivery at a health facility, and sub-region. These factors were created by aggregating individual-level factors, as these factors were not directly accessible from DHS data (Table 2).

Data Management and Analysis

STATA/SE version 14.0 statistical software was used to clean, recode, and analyze data that was taken from the most recent DHS data sets. To control for non-responses and sampling errors, a sample weight was used. After categorizing continuous variables, categorical variables underwent additional reclassification. The results were presented in frequencies and percentages using descriptive analysis. Descriptive statistical methods were used to portray the variables at the individual and community levels. The variables in the DHS data were arranged into clusters; homes were nested within 1692 clusters, and 44,423 children are nested within households. In order to use the conventional logistic regression model, the presumptions of independent observations and equal variance across clusters were broken. This suggests that accounting for between-cluster effects requires the use of a complex model. To ascertain the factors associated with CBF, multilevel mixed-effects logistic regression was employed. The null model (outcome variable only), model I (only individual-level variables), model II (only community-level variables), and model III (both individual and community-level variables) are the four models that multilevel mixed effect logistic regression uses. The null model, which is the model devoid of independent variables, was employed to examine the CBF variability throughout the cluster. Evaluations were conducted on the relationships between the outcome variable and the factors at the individual (Model I) and community levels (Model II). The link between the community-level and individual-level factors was fitted alongside the outcome variable (CBF) in the final model, or Model III.

Through the use of the intra-class correlation coefficient (ICC) and proportionate change in variance (PCV), the magnitude of the clustering effect and the extent to which community-level factors explain the unexplained variance of the null model were assessed. The best-fitting model was determined to be the one with the lowest deviation. Ultimately, factors were deemed statistically significant when they had a p-value of less than 0.05 and an adjusted odds ratio (AOR) with a 95% confidence interval (CI) associated with CBF. A variance inflation factor (VIF) lying within acceptable bounds of 1–10 was used to test for multi-collinearity amongst covariates, demonstrating the lack of significant collinearity among independent variables.

Random-Effect Results

The methods of estimating random effects or measures of variation of the outcome variable were the PCV, ICC, and median odds ratio (MOR). The ICC and PCV were used to measure the variation

between clusters. Using clusters as a random variable, the ICC reveals that the variation of CBF between clusters is computed as ICC = VC/(VC+3.29) ×100%. When two clusters are randomly chosen using clusters as a random variable, the MOR is the median value of the odds ratio between the area of the highest risk and the area of the lowest risk for CBF; MOR = $e^{0.95\sqrt{VC}}$. Furthermore, the PCV illustrates the variation in the CBF prevalence that may be attributed to variables. It is calculated using the following formula: PCV = (Vnull-VC)/Vnull×100%, where Vnull represents the null model variance and VC stands for cluster-level variance (Sommet N, 2017). The relationship between the probability of CBF and independent variables at the individual and community levels was estimated using fixed effects.

Results

Individual- and Community-Level Characteristics of Study Subjects

A total of 44,423 children aged 12 to 23 months were included in this study. The mean age of mothers was 28.31± 0.03 years, and 71.72% of them fall in the age range of 20–34 years. More than one-third (34.56%) of the mothers had no formal education, and 45.98% of the parents completed secondary or higher education. The majority (83.92%) of the mothers were currently married, and 68.48% of them had jobs. Nearly 64% of mothers had media exposure, and 47.84% of them had poor socioeconomic status. Nearly half (49.51%) of mothers in SSA were multiparous, and 70.30% of them reported their current pregnancy was wanted. Home delivery was reported by 27.41% of mothers in SSA countries, and 62.02% of them attended 4+ ANC visits during pregnancy. The majority (93.81%) and (96.98%) of mothers reported vaginal delivery and single birth, respectively. The mean age of children was 17.24± 0.02 months, and 36% of them fall in the age range of 12-15 months. More than half (50.74%) of the children were male, and the preceding birth interval was >24 months for the majority (84.41%) of children aged 12-23 months. Only 32.02% of the study subjects were from urban areas, and 52.76% of them were from a community with low media exposure. More than half (56.22%) and 52.80% of mothers of children aged 12 to 23 months had low community-level education and high community poverty, respectively. High community health facility delivery and ANC utilization were reported by 55.71% and 49.92% of mothers, respectively. Regarding the sub-region, 47.65% of mothers of children aged 12 to 23 months were from eastern African countries (Table 3).

Pooled Prevalence of Continued Breastfeeding

In the present study, the proportion of continued breastfeeding among children aged 12 to 23 months in SSA countries was 64.59% (95% CI: 64.15%, 65.04%) (Fig 1). This study revealed that the proportion of continued breastfeeding decreases as the child gets older, with a proportion of 82.70%, 66.27%, and 41.42% for children aged 12–15, 16–19, and 20–23 months, respectively (Fig 2). The highest proportion (70.95%) of continued breastfeeding was reported in eastern African countries and the lowest (32.39%) in southern African countries (Fig 3).

Measures of Variation and Model Fitness

To find out if the data supported the choice to evaluate randomness at the community level, a null model was employed. The results of the null model, which had a variance of 0.046 and a P value of <0.001, demonstrated that there were notable variations in CBF between communities. The variance within clusters contributed 85.83% of the variation in CBF, while the variance across clusters was responsible for 14.17% of the variation. The probabilities of CBF varied by a factor of 1.23 in the null model between the higher- and lower-risk clusters. The differences between communities are explained by 12.06% of the variation in CBF, according to Model I's intra-class correlation value. Next, Model II was created using community-level variables and the null model. The ICC result from Model II indicated that 11.38% of the fluctuations in CBF were caused by cluster variations. The likelihood of CBF varied by 1.20 times between low and high CBF in the final model (model III), which ascribed both individual and community-level variables to approximately 11.84% of the variation in the likelihood of CBF (Table 4).

Individual and Community-Level Factors Associated with Continued Breastfeeding

The final fitted model of multivariable multilevel logistic regression showed that the following factors were significantly associated with continued breastfeeding among children aged 12–23 months: maternal age, maternal educational level, paternal educational level, current marital status of the mother,

maternal working status, wealth index, parity, place of delivery, ANC visits attended during pregnancy, mode of delivery, twin status, residence, preceding birth interval, child's sex, community level education, and sub-region.

The odds of continued breastfeeding were 1.22 times higher among mothers aged 34+ years compared with mothers aged <20 years [AOR = 1.22; 95% CI (1.09, 1.38)]. Children of mothers who had no formal education were 16% and 49% times less likely to continue breastfeeding than children of mothers with primary and secondary or higher education, respectively [AOR = 0.84; 95% CI (0.79, 0.90)] and [AOR = 0.51; 95% CI (0.47, 0.55)]. Children of fathers who had no formal education were 21% less likely to continue breastfeeding than children of fathers with secondary or higher education [AOR = 0.79; 95% CI (0.73, 0.85)]. The odds of continued breastfeeding were 1.13 times higher among currently married women compared with their counterparts [AOR = 1.13; 95% CI (1.05, 1.22)]. Mothers who work were 1.32 times more likely to continue breastfeeding their child than those who hadn't [AOR = 1.32; 95% CI (1.25, 1.39)].

Children from poor families were 18% less likely to continue breastfeeding than those from rich families [AOR = 0.82; 95% CI (0.77, 0.88)]. Grand multiparous women were 1.09 times more likely to continue breastfeeding their children than primiparous women [AOR = 1.09; 95% CI (1.00, 1.19)]. Mothers who gave birth at a health facility were 8% less likely to continue breastfeeding their children than those who gave birth at home [AOR = 0.92; 95% CI (0.87, 0.98)]. Children of mothers who attended 1 to 3 ANC visits were 1.27 times more likely to continue breastfeeding than children of mothers who had no ANC visit during pregnancy [AOR = 1.27; 95% CI (1.15, 1.39)]. Mothers with cesarean section delivery were 19% less likely to continue breastfeeding their children than mothers with vaginal delivery [AOR = 0.81; 95% CI (0.73, 0.89)]. Single delivery increases the odds of continued breastfeeding by 4.65 times [AOR = 4.65; 95% CI (4.07, 5.31)].

Children aged 12–15 months and 16–19 months were 9.59 and 3.40 times more likely to continue breastfeeding than children aged 20–23 months, respectively [AOR = 9.59; 95% CI (9.03, 10.2)] and [AOR = 3.40; 95% CI (3.22, 3.58)]. Female children were 5% less likely to continue breastfeeding compared with males [AOR = 0.95; 95% CI (0.91, 0.99)]. The odds of continued breastfeeding were 1.28 times higher among children with a preceding birth interval of >24 months compared with their counterparts [AOR = 1.28; 95% CI (1.20, 1.37)]. Children of mothers from rural areas were 26% less likely to continue breastfeeding than those from urban areas [AOR = 0.74; 95% CI (0.70, 0.79)]. Mothers from a community with a low level of education were 10% less likely to continue breastfeeding their children compared with mothers from high community education [AOR = 0.90; 95% CI (0.85, 0.96)]. Children of mothers from the eastern Africa sub-region were 1.57 times more likely to continue breastfeeding compared with children of mothers from western Africa [AOR = 1.57; 95% CI (1.48, 1.66)] (Table 5).

Discussion

This study was conducted to determine the pooled prevalence of continued breastfeeding and its associated factors among children aged 12 to 23 months in SSA countries using recent DHS data. In the current study, the proportion of continued breastfeeding among children aged 12 to 23 months in SSA countries was 64.59% (95% CI: 64.15%, 65.04%). This finding was higher than studies conducted in Turkey (55.9%) (Yalçın et al., 2014), Qatar (45.4%) (Al-Kohji et al., 2012), and Vietnam (20.9%) (Doma et al., 2021). On the other hand, it was lower than studies conducted in Timor-Leste (78%) (Senarath et al., 2007), Tigray, Ethiopia (75.2%) (Mulugeta et al.), and Oromia region, Ethiopia (79.5%) (Mekonnen et al., 2021). The possible justification for this discrepancy might be differences in sample size, study settings, study period, nature of the data, and study participants. Some of the previous studies incorporated children aged less than 24 months, while the current study considered children aged 12 to 23 months as per the newly introduced guidelines for breastfeeding indicators. In addition, the previous studies were conducted in a single country or study area with a small sample size, whereas the current study uses pooled data from 21 countries with a large nationally representative sample. The difference might also be due to socio-cultural differences among the study participants included in each study.

This study also identified individual and community-level factors associated with continued breastfeeding. Accordingly, women who were 34 years old or older were more likely to continue to

breastfeed their children than women who were younger than 20 years. This finding was consistent with studies conducted in Vietnam (Doma et al., 2021), Turkey (Yalçın et al., 2014), and Brazil (Santana et al., 2018). This might be attributed to the better emotional strength and familiarity acquired with previous children among older women than younger ones (Queiros, Batista de Oliveira, & Martins, 2009). Younger mothers have a higher intake of breastmilk substitutes, and they are more influenced by the breastmilk substitute industry, which leads to a decline in breastfeeding (Baker et al., 2016). Older women might have a better decision in breastfeeding practices, a stronger attachment to habits of infant feeding like continued breastfeeding, and less insight about baby formula promotion and marketing than younger mothers (Kent, 1981). Mothers and fathers with higher educational levels were more likely to continue breastfeeding their children. Studies conducted in Tigray, Ethiopia (Mulugeta et al.), the Oromia region, Ethiopia (Mekonnen et al., 2021), Brazil (Santana et al., 2018), and California (Cohen et al., 2018) reported similar findings. This might be attributed to literate families grasping nutrition instruction better than those with no formal education. Educated mothers are also more likely to read magazines and be exposed to nutrition training regarding the importance of CBF through mass media. Furthermore, the capability of educated families to recognize the benefits of appropriate child feeding practices, implement positive breastfeeding practices, have advanced decision-making abilities on issues related to breastfeeding, and easily understand and convert theory into practice can contribute to higher odds of CBF.

The odds of continued breastfeeding were 1.13 times higher among currently married women compared with their counterparts. This finding was consistent with studies conducted in Tigray, Ethiopia (Mulugeta et al.), and Brazil (Santana et al., 2018). This might be explained by mothers' outstanding sources of breastfeeding support from their partner and family. Married women breastfeed longer compared with unmarried mothers, as the presence of the partner is more likely to provide better support for the mother (Tarrant, Younger, Sheridan-Pereira, & Kearney, 2011). Mothers who work were more likely to continue breastfeeding their children than non-working mothers. A study conducted in Timor-Leste (Senarath et al., 2007) reported a similar finding. This might be attributed to the fact that non-working mothers may terminate breastfeeding and choose breastmilk replacements as they spend more time away from home searching for work. Working mothers may have more access to highly skilled employment and can continue breastfeeding for a longer duration. Children from poor families were less likely to continue breastfeeding than those from wealthy households. This finding was consistent with a study conducted in India (Ghosh, Rohatgi, & Bose, 2022). This might be due to the fact that mothers from rich households have easy access to nutrition education and maternal health care services like ANC services that enforce appropriate breastfeeding practices. Women with better financial access are also able to get basic maternal health care services during their pregnancy and pay for the services they obtain at the health institution and on transportation. Grand-multiparous women were more likely to continue breastfeeding their children than primiparous women. This finding was in agreement with a study conducted in Brazil (Santana et al., 2018). This might be due to the fact that mothers with more birth experience are more likely to breastfeed the next baby for a long duration, as their continuous pregnancies and deliveries expose them to information regarding breastfeeding continuation and maintenance.

Mothers who gave birth at a health facility were less likely to continue breastfeeding their children than those who gave birth at home. This finding was consistent with a study conducted in Timor-Leste (Senarath et al., 2007). The lower odds of CBF in women who delivered in health facilities are contradictory to the expectation, which highlights the need for continued breastfeeding promotion to address all groups in the population and incorporate health-care professionals. Children of mothers who attended ANC visits were more likely to continue breastfeeding than those who had no ANC visit during pregnancy. This finding was in line with a study conducted in the Oromia region of Ethiopia (Mekonnen et al., 2021). This might be due to the fact that mothers who have had ANC visits may receive health-related information from health care professionals. Hence, improving community involvement to increase ANC service utilization can increase appropriate breastfeeding practices, including continued breastfeeding. Mode of delivery was another significant factor in which mothers with cesarean section delivery were less likely to continue breastfeeding their children than mothers with vaginal delivery. This finding was in agreement with studies conducted in China (Chen et al., 2018; Rawat & Tirkey,

2021). This might be due to the narcotism and pain of cesarean delivery, which block the mother-infant interaction and inhibit appropriate breastfeeding practice (Righard & Alade, 1990). Mothers who espouse cesarean delivery are more likely to have a maternal illness and/or fetal problems, which could lead to unsuccessful breastfeeding (Liston, Allen, O'Connell, & Jangaard, 2008). Similarly, a single birth increases the odds of continued breastfeeding by 4.65 times. This might be due to the fact that the physical and mental demands associated with the birth of twin babies compared to a singleton birth result in several hindrances to continued breastfeeding.

The child's age was also associated with continued breastfeeding. Younger children were more likely to continue breastfeeding than older children. This finding was in agreement with a study conducted in Tigray, Ethiopia (Mulugeta et al.). This might be due to the fact that, as the child gets older, mothers might cease breastfeeding and shift to other foods. Many women are also returning to work with the increase in child ages. Female children were less likely to continue breastfeeding compared with males. This finding was consistent with a study conducted in Vietnam (Doma et al., 2021). This could be related to the stronger preference of sons over daughters. Mothers with girls may have an increased chance of having another child with the expectation of the child being male (Jayachandran & Kuziemko, 2011). Tradition might have its own impact as sons hold a principal position in the family, and the process of family structure is often prearranged around the necessity for sons. If mothers have a girl, they may feel worried about having a son and stop breastfeeding their daughter earlier in order to try to conceive a boy. Furthermore, the family may give mothers a higher status if they have a son, which enables them to allot more time to taking care of their son. The odds of continued breastfeeding were 1.28 times higher among children with a preceding birth interval of >24 months compared with their counterparts. This finding was in line with a study conducted in Turkey (Yalçın et al., 2014). This might be due to the fact that children with a long birth interval could be breastfed for a long time as the mother continues to breastfeed their children to increase the birth spacing associated with the contraceptive role of breastfeeding. Children of mothers from rural areas were less likely to continue breastfeeding than those from urban areas. This finding was consistent with a study conducted in Brazil (Santana et al., 2018). This might be due to the fact that rural women are more likely to deliver outside of health facilities (i.e., home) without a health-professional birth attendant. Women from urban areas are also more likely to get breastfeeding-related information via mass media than women who reside in rural areas. Children of mothers from eastern, central, and southern Africa were more likely to continue breastfeeding compared with children of mothers from western Africa. This might be due to the fact that socio-cultural and health care systems differ in different sub-Saharan African countries. Program planners and nutrition policymakers can use this information to prioritize and implement specific interventions for breastfeeding continuation and maintenance.

The present study has the following strengths. First, the present study was conducted in 21 SSA countries using a multilevel analytical approach that identified both individual and community-level factors associated with CBF. Second, the results of this study are representative of the entire SSA because the study uses nationally representative data from each country. Finally, the findings of this study had greater implications for policy and practice. The study also has some limitations. There might be a possibility of recall bias as the outcome was assessed based on the study subjects self-reports. Variables like maternal attitude and knowledge towards continued breastfeeding are not incorporated in this study, as DHS did not collect this information. Besides, the cause-and-effect relationship between CBF and explanatory variables could not be established due to the cross-sectional nature of the study.

Conclusion

In the present study, nearly two-thirds of children aged 12 to 23 months in sub-Saharan African countries continued breastfeeding. Higher odds of continued breastfeeding were reported among older, educated, and married women, working mothers, wealthier households, grand multiparous women, home delivery, attending ANC visits, vaginal delivery, single birth, younger children, male children, long preceding birth interval, urban residence, and mothers from eastern Africa. Therefore, women's empowerment, improving maternal healthcare services, and giving special attention to unmarried and younger women, primiparous women, women with multiple births, mothers with female children, and mothers from rural areas are recommended to improve breastfeeding continuation and maintenance.

List of abbreviations: AOR: Adjusted Odds Ratio; ANC: Antenatal Care; CBF: Continued Breastfeeding; CI: Confidence Interval; DHS: Demographic and Health Survey; ICC: Intra-class Correlation Coefficient; IYCF: Infant and Young Child Feeding; MOR: Median Odds Ratio; PCV: Proportional Change in Variance; SSA: sub-Saharan Africa; VIF: Variance Inflation Factor; WHO: World Health Organization

Ethical Approval and Consent to Participate

Permission was granted to download and use the data from http://www.dhs.program.com before conducting the study. Ethical clearance was obtained from the Institution Review Board of the DHS Program, ICF International. The Institution Review Board approved procedures for DHS public-use data sets. Identifiers for respondents, households, or sample communities were not allowed in any way, and the names of individuals or household addresses were not included in the data files. Data were fully anonymized before I accessed them. The number for each EA in the data file does not have labels to show their names or locations. There were no patients or members of the public involved since this study used a publicly available data set.

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References

Al-Kohji, S., Said, H. A., & Selim, N. A. (2012). Breastfeeding practice and determinants among Arab mothers in Qatar. *Saudi Med J, 33*(4), 436-443.

Aliaga A, R. R. (2006). Cluster optimal sample size for demographic and health surveys. *7th International Conference on Teaching Statistics–ICOTS*.

Baker, P., Smith, J., Salmon, L., Friel, S., Kent, G., Iellamo, A., . . . Renfrew, M. J. (2016). Global trends and patterns of commercial milk-based formula sales: is an unprecedented infant and young child feeding transition underway? *Public health nutrition, 19*(14), 2540-2550.

Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., . . . Black, R. E. (2013). Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? *The lancet, 382*(9890), 452-477.

Breastfeeding 2023. (February 7, 2023). *The lancet*.

Brown, K. H., Stallings, R. Y., de Kanashiro, H. C., Lopez de Romana, G., & Black, R. E. (1990). Effects of common illnesses on infants' energy intakes from breast milk and other foods during longitudinal community-based studies in Huascar (Lima), Peru. *The American journal of clinical nutrition, 52*(6), 1005-1013.

Chen, C., Yan, Y., Gao, X., Xiang, S., He, Q., Zeng, G., . . . Li, L. (2018). Influences of cesarean delivery on breastfeeding practices and duration: a prospective cohort study. *Journal of Human Lactation, 34*(3), 526-534.

Chowdhury, R., Sinha, B., Sankar, M. J., Taneja, S., Bhandari, N., Rollins, N., . . . Martines, J. (2015). Breastfeeding and maternal health outcomes: a systematic review and meta-analysis. *Acta paediatrica, 104*, 96-113.

Cohen, S. S., Alexander, D. D., Krebs, N. F., Young, B. E., Cabana, M. D., Erdmann, P., . . . Turini, M. (2018). Factors associated with breastfeeding initiation and continuation: a meta-analysis. *The Journal of pediatrics, 203*, 190-196. e121.

Corsi DJ, N. M., Finlay JE, Subramanian S. (2012). Demographic and health surveys: a profile. *International journal of epidemiology, 41*(6), 1602-1613.

Cozma-Petruț, A., Filip, L., Banc, R., Mîrza, O., Gavrilaș, L., Ciobârcă, D., . . . Miere, D. (2021). Breastfeeding Practices and Determinant Factors of Exclusive Breastfeeding among Mothers of Children Aged 0–23 Months in Northwestern Romania. *Nutrients, 13*(11), 3998.

Croft T, M. A., Allen CK, Arnold F, Assaf S, Balian S, et al. (2020). Guide to DHS Statistics: DHS-7 (version 2). *Rockville, MD: ICF*.

Doma, H., Tran, T. D., Tran, T., Hanieh, S., Tran, H., Nguyen, T., . . . Fisher, J. (2021). Continuing breastfeeding for at least two years after birth in rural Vietnam: prevalence and psychosocial characteristics. *International breastfeeding journal, 16*(1), 1-10.

Gebremedhin, S. (2019). Core and optional infant and young child feeding indicators in Sub-Saharan Africa: a cross-sectional study. *BMJ open, 9*(2), e023238.

Ghosh, P., Rohatgi, P., & Bose, K. (2022). Determinants of time-trends in exclusivity and continuation of breastfeeding in India: An investigation from the National Family Health Survey. *Social Science & Medicine, 292*, 114604.

Jayachandran, S., & Kuziemko, I. (2011). Why do mothers breastfeed girls less than boys? Evidence and implications for child health in India. *The Quarterly journal of economics, 126*(3), 1485-1538.
Kent, M. M. (1981). Breast-Feeding in the Developing World: Current Patterns and Implications for Future Trends. Reports on the World Fertility Survey 2.
Lamberti, L. M., Fischer Walker, C. L., Noiman, A., Victora, C., & Black, R. E. (2011). Breastfeeding and the risk for diarrhea morbidity and mortality. *BMC Public Health, 11*(3), 1-12.
Lamberti, L. M., Zakarija-Grković, I., Fischer Walker, C. L., Theodoratou, E., Nair, H., Campbell, H., & Black, R. E. (2013). Breastfeeding for reducing the risk of pneumonia morbidity and mortality in children under two: a systematic literature review and meta-analysis. *BMC Public Health, 13*, 1-8.
Liston, F. A., Allen, V. M., O'Connell, C. M., & Jangaard, K. A. (2008). Neonatal outcomes with caesarean delivery at term. *Archives of Disease in Childhood-Fetal and Neonatal Edition, 93*(3), F176-F182.
Mekonnen, M., Kinati, T., Bekele, K., Tesfa, B., Hailu, D., & Jemal, K. (2021). Infant and young child feeding practice among mothers of children age 6 to 23 months in Debrelibanos district, North Showa zone, Oromia region, Ethiopia. *PloS one, 16*(9), e0257758.
Mulugeta, A., Temesgen, H., Gebremariam, M., Redae, G., Abay, M., & Kassyou, H. Determinants of age appropriate breastfeeding practices among 6–23 months old children from rural and urban communities of Tigray, Northern Ethiopia.
Organization, W. H. (2021). Indicators for assessing infant and young child feeding practices: definitions and measurement methods.
Organization, W. H., & UNICEF. (2003). *Global strategy for infant and young child feeding*: World Health Organization.
Pretorius, C. E., Asare, H., Genuneit, J., Kruger, H. S., & Ricci, C. (2020). Impact of breastfeeding on mortality in sub-Saharan Africa: a systematic review, meta-analysis, and cost-evaluation. *European Journal of Pediatrics, 179*, 1213-1225.
Queiros, P. d. S., Batista de Oliveira, L. R., & Martins, C. A. (2009). Factors that interfere with exclusive breastfeeding: perceptions of nursing mothers. *REVISTA DE SALUD PUBLICA-CORDOBA, 13*(2), 6-14.
Rawat, R., & Tirkey, N. N. (2021). Female genital mutilation practice, associated factors, and its consequences on women's reproductive health in Senegal. *International Journal of Population Studies, 7*(1), 94-107.
Righard, L., & Alade, M. O. (1990). Effect of delivery room routines on success of first breast-feed. *The lancet, 336*(8723), 1105-1107.
Sankar, M. J., Sinha, B., Chowdhury, R., Bhandari, N., Taneja, S., Martines, J., & Bahl, R. (2015). Optimal breastfeeding practices and infant and child mortality: a systematic review and meta-analysis. *Acta paediatrica, 104*, 3-13.
Santana, G. S., Giugliani, E. R. J., Vieira, T. d. O., & Vieira, G. O. (2018). Factors associated with breastfeeding maintenance for 12 months or more: a systematic review. *Jornal de pediatria, 94*, 104-122.
Senarath, U., Dibley, M., & Agho, K. (2007). Breastfeeding practices and associated factors among children under 24 months of age in Timor-Leste. *European journal of clinical nutrition, 61*(3), 387-397.
Sommet N, M. D. (2017). Keep calm and learn multilevel logistic modeling: a simplified three-step procedure using Stata, R, mplus, and SPSS. *International Review of Social Psychology, 30*, 203-218.
Tarrant, R. C., Younger, K. M., Sheridan-Pereira, M., & Kearney, J. M. (2011). Factors associated with duration of breastfeeding in Ireland: potential areas for improvement. *Journal of Human Lactation, 27*(3), 262-271.
THAN, N. B. L. T. M. (2022). The global cost of not breastfeeding.
Victora, C. G., Bahl, R., Barros, A. J., França, G. V., Horton, S., Krasevec, J., . . . Rollins, N. C. (2016). Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *The lancet, 387*(10017), 475-490.
Victora, C. G., Horta, B. L., De Mola, C. L., Quevedo, L., Pinheiro, R. T., Gigante, D. P., . . . Barros, F. C. (2015). Association between breastfeeding and intelligence, educational attainment, and income at 30 years of age: a prospective birth cohort study from Brazil. *The Lancet Global Health, 3*(4), e199-e205.
WHO. (9 August 2023). Continued breastfeeding for healthy growth and development of children. *e-Library of Evidence for Nutrition Actions (eLENA)*.
WHO. (2023). Breastfeeding.
Yalçın, S. S., Yalçın, S., & Kurtuluş-Yiğit, E. (2014). Determinants of continued breastfeeding beyond 12 months in Turkey: secondary data analysis of the Demographic and Health Survey. *Turkish Journal of Pediatrics, 56*(6).
Zhao, M., Wu, H., Liang, Y., Liu, F., Bovet, P., & Xi, B. (2020). Breastfeeding and mortality under 2 years of age in sub-Saharan Africa. *Pediatrics, 145*(5).