

Trends of inequalities in early initiation of breastfeeding in Ethiopia: Evidence from Ethiopian Demographic and Health Surveys, 2000-2016

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Research

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Abstract

Background

Early initiation of breastfeeding (EIBF) is a cost-effective and straightforward activity with numerous neonates' survival benefits. Thus, any disparity would result in an unacceptably high rate of neonatal death at the national level, and disparities among sub-groups regarding EIBF have not been well explored in Ethiopia. Therefore, this study aimed at assessing the trends of socioeconomic inequalities in EIBF in Ethiopia.

Methods

The Ethiopian demographic and health survey 2000 to 2016 data and the World Health Organization's (WHO) Health Equity Assessment Toolkit (HEAT) were used to investigate the inequalities in early breastfeeding initiation across the wealth quantile, educational level, residence and subnational region. Difference, ratio, slope index of inequality, relative index of inequality and population attributable risk were used as equity summary measures. A 95% uncertainty interval was calculated to declare the significance of the disparity in each point estimate.

Results

The magnitude of EIBF practice has fluctuated over the last seventeen years, with 47.4% in 2000, 66.2% in 2005, 51.5% in 2011 and 73.3% in 2016. In 2011, a significant change in inequality was observed in wealth- and educational status, whereas in 2016, inequalities were found in the subnational regions. Furthermore, in all survey years, the simple dispersion measure indicated no inequality in EIBF based on residence differences. However, there was high dispersion both in Difference and Ratio in Ethiopia across all survey years based on Ethiopia's sub-national region. In 2016, Afar (42.0%; 95% UI: 34.7–49.7), Tigray (63.0%; 95% UI: 56.6–69.0) and Amhara (66.0%; 95% UI: 59.7–71.8) were the three least EIBF practiced regions in Ethiopia. If the regional performance disparities in 2016 were reduced to an insignificant level, the EIBF proportion at the national level would increase by 17.2% (95% UI: 2.2–32.2).

Conclusion

In Ethiopia, the trend of socioeconomic inequality in EIBF has increased significantly over the past seventeen years. The disparity in EIBF was observed in all measures of dispersion in 2011. In all survey years, the northern part of Ethiopia (Afar, Tigray and Amhara regions) performed worse than the rest of the country. Therefore, interventions targeting them would significantly improve the national level performance of EIBF for the subsequent reduction of neonatal mortality.

Background

Early initiation of breastfeeding (EIBF) is breastfeeding to newborn initiated within the first hour of birth (1). World Health Organization (WHO) recommended the EIBF be practised within one hour of birth to benefit both the neonate and the mother (2). In 2018, an estimated 22% of early neonatal death were attributed to the late initiation of breastfeeding worldwide (3, 4). The failure of EIBF in the first hour of birth is estimated to double the risk of neonatal death (5, 6). Even though EIBF is cost-effective and easily implements activity with significant implications for saving neonates' lives, only 42% of all newborns breastfeed within the first hour of birth (7). This value often varied globally, with high-income countries having a higher value than low- and middle-income countries (8).

Although EIBF in Ethiopia increased from 48.8% in 2000 to 75.7% in 2016 (9), it is still far from the national target of 92% by 2020 (10). The recent prevalence of EIBF was 83.7% in southern Ethiopia (11), 73.1% in the Dembecha district of North West Ethiopia (12) and 42.8% in Arbaminch (13). However, it didn't show the trend across the equity stratifies.

In Bangladesh, the early initiation of breastfeeding increased as time progressed, and it was faster for the female child than the male child (14). The prevalence of EIBF was 41.5% in India, with significantly different proportions estimated for those who resided in rural (41.0%) and urban (42.9%) and between educated pregnant and among subnational regions of India (15). A study in Indonesia showed that EIBF increased from 2002 to 2017, with more significant increases among women from higher wealth quintiles and lived in Java and Bali (16). A study in Uganda revealed that 67.8% of children get EIBF despite children from the poorest households having lower odds of EIBF (17).

A study conducted elsewhere identified the socioeconomic factors associated with EIBF. The main factors identified by studies were the mother's residence, educational status, wealth status, mothers' age, and the subnational region from where the pregnant women came (11–14, 18). The 2010 report of the Federal Ministry of Health revealed that EIBF was lowest in Amhara (38%) and Somali regions (40%) and highest in the South Nation Nationality of People (SNNP) (67%) and Dire Dawa regions (66%) (10).

Assessing the disparity of EIBF across different dispersion measures would give complete evidence to identify the gap and allow for more effective intervention. In Ethiopia, however, there are limited studies on the socioeconomic inequality measure of EIBF. Moreover, no study was conducted using the WHO recommendation to assess inequality that shows the trend over time. The WHO recommends inequality to be measured using the absolute and relative measures by applying complex and simple dispersion measures of aggregation for the selected health indicator to compare the disparities across the subnational region, residence, age, sex, economic status, and educational status.

This study would give impactful evidence by comparing the fundamental inequality stratifies for the point on time measure of EIBF dispersion across the country through the WHO recommendation and showing the trend of socioeconomic disparity. Therefore, this study aimed to assess the observed trend of socioeconomic inequality of EIBF in Ethiopia for the past seventeen years using the Ethiopian demographic and health surveys from 2000 to 2016.

Methods

Study setting and period

Ethiopia is the second highly populated country in Africa, with 116,831,357 people according to the latest United Nations data from 2021 (19). Based on the world bank report, Ethiopia is one of the world's poorest country, with a per capita income of US\$850 in 2019 (20). Ethiopia has a three-tiered healthcare delivery structure. The primary level includes the primary hospitals, the health centres and the health posts in which essential and non-specialized health services are provided. The secondary level contains the general hospitals and provides curative services, and the tertiary level consists of the comprehensive specialized hospitals that provide super-specialist cares.

Study design, data source and sampling procedure

The data used in this study were from four nationally representative cross-sectional surveys, the Demographic and Health (DHS) Surveys conducted in Ethiopia in 2000, 2005, 2011 and 2016. These surveys provide data on key demographic indicators, such as maternal and child healthcare practices over time.

The DHS data started to be collected in Ethiopia in 2000, and the 2016 DHS data is the fourth and the latest DHS. The Ethiopian DHS was collected using the cluster sampling technique classifying the country into two stages' enumeration areas. The enumeration areas were classified with a proportional probability depending on the population size. In the first stage, the independent selection was employed in each sampling enumeration areas. In the second stage of selection, a systematic selection of the newly created household listing from a fixed number of households per cluster was selected with an equal probability. For this study, the number of women aged 15 to 49 years who gave birth two years preceding the survey was 15,367, 14,070, 16,515 and 15,683 in 2000, 2005, 2011 and 2016, respectively (21–24).

Variables and inequality measures

Early initiation of breastfeeding was the outcome variable for which inequality was measured. It was calculated as the ratio of women with live birth and put their newborn infant to the breast within one hour of delivery to the total number of women with a live birth in the two years before the survey.

The inequality is disaggregated in the education, place of residence, economic status and subnational regions. The educational status was classified as no education, primary education and secondary education and above. The economic status was categorized into five quantiles from the poorest (quantile 1) to the richest (quantile 5) sequentially. The residence was classified as rural and urban, and the sub-national regions included the nine regions and two city administrations. However, the place of residence and sub-national region segregations didn't show the sequence. The trend on the socioeconomic inequality of early initiation of breastfeeding was presented using table and figures for each of the four Ethiopia Demographic and Health Survey (EDHS) periods. The disaggregation included the computed point estimates with a corresponding 95% Uncertainty Interval (UI).

Data analysis

The data were obtained as part of the WHO's Health Equity Assessment Toolkit (HEAT) software (25). The 2021 updated online version (version 4.0) HEAT software was used for this study. More than 30 critical health indicators on reproductive, maternal, and child health were included in the updated version. Besides, six inequality dimensions (age, sex, economic status measured as wealth decile or wealth quantile, education, place of residence, and subnational region) was included to perform inequality assessment for more than 450 international household surveys conducted in 115 countries between 1991 and 2018. The HEAT software's essential purpose was to run the country's health equity assessment and compare it with the other countries' inequality. The software allows to perform the summary measure of health inequality and segregate the data across the different dispersion measures.

The measure of inequality can be performed through relative and absolute inequality measures, which can be simple or complex. The criteria for selecting the type of measurement of inequality depend on the type of variable that the disparity is segregated, ordering variable or non-ordering variable. In this study, Difference (D), Ratio (R), Relative Index of Inequality (RII), Slope Index of Inequality (SII) and Population Attributable Risk (PAR) were used as a summary measure of dispersion for the EIBF trend in Ethiopia. These summary measures were selected due to their more comprehensive application to the inequality assessment (26–28).

The first two (D and R) are the simple inequality measures, whereas the rest are complex inequality measures. D and SII are the absolute measures of inequality, but R and RII are relative inequality measures.

The difference, the simple and complex measure of inequality, is calculated as the mean percentage of EIBF in the one group subtracted from the mean percentage of EIBF in the other subgroup. Ratio, the simple and relative measure of inequality, is calculated as the percentage of early initiation of breastfeeding percentage in one subgroup to the mean percentage of breastfeeding early initiation in the other subgroup. The two main limitations of simple measures were the ignorance of the middle subgroups and not considering population size.

Slope index inequality is the complex and absolute measure of inequality that applies to natural ordering subgroups like education and wealth. It performs inequality by ranking from the disadvantaged subgroup to the advantageous subgroup; thus, positive value shows that the EIBF is more prevalent in the advantageous subgroup. The negative value shows the EIBF is more prevalent in the more disadvantaged subgroups. The RII, a complex and relative measure of inequality determined by dividing the predicted EIBF from the highest rank to the lowest rank of the entire distribution. The complex measure of

inequality addresses the limitation of the simple measure of inequality by producing a single value expressing the disparity across the subgroups considering the population's size. RII and SII were not measured for residence, and subnational region equity stratifies because they are not ordered variables.

Population attributable risk is the absolute measure of inequality that shows how much the disparity is eliminated by improving early initiation of breast feeding in the population relative to the best performing subgroup, keeping the improvement rate constant as the reference subgroup.

To declare statistically significant disparity across stratifies, the Difference, SII and PAR 95% Uncertainty Interval shouldn't include zero and the Ratio and RII 95% Uncertainty Interval shouldn't include one. There was no change in inequality over the survey years if an overlap on the summary measures uncertainty intervals. Moreover, this paper prepared according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (29) for study findings' logical and scientific representations.

Ethical considerations

The Institutional Review Board of Ethiopia and the Inner-City Fund international approved the DHS conducted in Ethiopia. The institution conducted and funded the survey completed the necessary ethical clearance.

Results

The proportion of early initiation of breastfeeding across equity stratifies and survey years

The trend of EIBF was assessed across the four equity stratifies for each of the four survey years from 2000- 2016 Ethiopian DHS. The point estimate of the proportion of EIBF in each survey year was computed with the 95% Uncertainty Interval (UI) (Table 1).

This study indicated a fluctuation in Ethiopia's EIBF practice for the last seventeen years, with 47.4% in 2000, 66.2% in 2005, 51.5% in 2011 and 73.3% in 2016 (Figure 1).

The EIBF among the poorest quantile increased from 52.3% in 2000 to 73.9% in 2016. However, in the richest quantile, the EIBF rose from 44.3% in 2000 to 74.4% in 2016. Surprisingly, the EIBF decreased in both extreme quantiles, in the 2011 survey year, from 69.9 to 48.5 in the poorest quantile and 61.7 to 57.8 in the richest quantile.

The study also revealed that the EIBF practice fluctuated among women of no education, with the lowest percentage in the 2011 survey but increased from 47.8% in 2000 to 73.4% in 2016. However, the EIBF practice persistently increased among women with secondary and above education from 40.4% in 2000 to 72.3 in 2016.

The finding of this study indicated that EIBF practice in rural and urban areas fluctuated between survey years, with the lowest being in 2011, similar to the wealth quantile. However, the EIBF increased from 47.8% in 2000 to 73.4 in 2016 and 44.0% in 2000 to 72.6% in 2016 between rural and urban.

Furthermore, the EIBF practice fluctuates in Tigray, Afar, Amhara, Oromia, Somalia, Benshangul, Harari and Dire Dawa but persistently increasing only in Addis Ababa. However, it is much higher in the 2016 survey year than in the 2000 survey year in all subnational regions. The highest EIBF practice was recorded in 2000, 2005, 2011 and 2016 survey years in Harari (64.1%), Dire Dawa (90.3%), SNNPR (66.5%) and Dire Dawa (90.5%), respectively. In contrast, the lowest EIBF practice was recorded in 2000, 2005, 2011 and 2016 in Tigray and Amhara (28.4% each), Tigray (52.2%), Amhara (37.5%) and Afar (42.0%) regions, respectively (Figure 2).

Early initiation of breastfeeding inequality based on different summary measures of inequality

Both relative and absolute measure of disparity was employed in this study (Table 2). The absolute measure of dispersion, Difference and SII, showed wealth-related inequality in 2000, 2005 and 2011. However, the simple and relative measure of dispersion, ratio, showed no wealth-related inequality on EIBF in Ethiopia in each survey years. Consequently, the complex and relative measure of dispersion, RII, revealed wealth-related inequality in 2005 and 2011, but not on the rest of the survey years.

Moreover, difference and RII showed inequality in EIBF only in 2005 on mothers' educational status. In the 2011 survey year, the ratio showed inequality in EIBF. However, SII showed significant disparities in the educational levels of mothers in EIBF in 2005 and 2011.

Furthermore, the simple dispersion measure indicated no inequality in EIBF based on residence difference in all survey years. However, there was high dispersion both in Difference and Ratio in all survey years based on the sub-national regions.

The study also indicated that PAR of wealth and educational status-related inequality was zero in the first two survey years and zero for the last survey year for education-related inequality. The PAR was 6.3 and 1.1 for the previous two survey years in wealth-related inequality and 12.6 for the 2011 survey year of educational inequality. The PAR of 2000, 2005, and 2016 survey year was zero but 5.6 for the 2011 survey year based on the residence stratified of EIBF. However, based on the sub-national region, significant PAR was found in all survey years with 16.7, 24.1, 15.0, and 17.2 for 2000, 2005, 2011 and 2016 survey years, respectively.

Overall, the study revealed that a significant change in inequality was observed in 2011 in wealth-related inequality and educational status inequality. In contrast, in 2016, significant disparities were observed in the sub-national regions (Figure 3).

Discussion

Equity is one of the performance measures of health systems. Addressing the inequality in EIBF would have a significant impact on reducing the neonatal mortality set target of less than 12% by the end of 2030 (30). This study provided the magnitude and trend analysis of socioeconomic inequalities in the early initiation of breastfeeding in Ethiopia using the WHO health equity monitor database.

Our findings showed that Ethiopia's EIBF trend increased by 1.5, from 47.4% in 2000 to 73.3% in 2016. The increment rate in EIBF is in line with the rate of increment in Indonesia (16). However, the finding is lower than the achievement in Ghana (31), where the proportion of EIBF increased by a factor of 3.0 from 1998 to 2014 and Bangladesh (14), where the rate of EIBF increased by a factor of 2.0 between the year 2004 and 2014. The difference might be due to the short duration observed in Ghana (6 years) and Bangladesh (4 years) than Ethiopia (17 years).

However, the 2016 proportion of EIBF in Ethiopia was higher than the percentage in Ghana (55.1%) (31), Sudan (69%) (32), Papua New Guinea (60%) (33) and among 30 SSA (Sub Saharan Africa) countries, 50.0% (34) in 2014. However, it is much higher than those of studies conducted in Indonesia (57.29%) in 2017 (16), Bangladesh (51.24%) in 2014 (14) and India (41.5%) in 2016 (15). The discrepancy might be due to the health extension program's application in Ethiopia's health care system. The health extension workers identify pregnant mothers and refer them to the nearby health facilities for delivery to obtain information on the importance of EIBF from health care providers. The result also remembers Ethiopia's achievement of the millennium development goal of child mortality reduction three years before the deadline (35).

The 2016 proportion of EIBF was in line with SSA countries' range, 17–82% (36). However, the practice of EIBF in Ethiopia is lower than the prevalence of EIBF in Angola (98.4%) (37). The discrepancy might be explained by the absence of the WHO's highly recommended baby-friendly hospital initiative in Ethiopia (38, 39).

Besides, the study revealed that in 2011, significant changes in wealth-related inequality and educational status inequality were observed, whereas, in 2016, significant disparities were observed in the subnational regions. The disparity might be due to the program's implementation difference that Ethiopia's northern parts are the most politically unstable areas.

Our finding shows that in the 2000 and 2005 surveys, the proportion of EIBF was almost 8% higher among the poorest mothers than the richest mothers, yet, in the year 2011, it was 9.2% higher among the richest mothers than the poorest mothers. However, inequality difference in EIBF disappeared in the 2016 survey year.

Regarding the educational status inequality dimension, the proportion of EIBF was 13.4% higher among mothers having secondary and above educational status than none educated mothers in the 2011 survey year. However, before and after the 2011 survey year, there is no inequality difference in Ethiopia's EIBF practice. This shows promising progress in the Ethiopian healthcare delivery for the impactful reduction of neonatal mortality. This finding contradicts the studies conducted in India (15) and Indonesia (16), where EIBF significantly differ in rural-urban and maternal education. This difference could have resulted from the socio-economic disparity between the study settings.

Although no inequality difference in EIBF observed in residence in all survey years, a high inequality difference was observed in the region where the mother resides. The inequality difference observed was recorded with the difference of 35.7%, 38.0%, 29.1% and 48.5% being in 2000 the highest in Harari (64.1%), lowest in Tigray (28.4%) in 2005, the most elevated in Dire Dawa (90.3%) lowest in Tigray (52.2%), in 2011 the highest in SNNPR (66.5%) lowest in Amhara (37.5%) and in 2016 the most elevated in Dire Dawa (90.5%) lowest in Afar (42.0%). The regional difference was also observed in the study conducted in Ghana (31), where the upper east region had a high proportion of EIBF compared with the western region of Ghana, Guinea (33), where the islands region had a lower proportion of EIBF as compared to those in the southern part and Indonesia (16) mother from the Java and Bali region has a lower proportion of EIBF practice.

Besides adjusting for the population's size in each subgroup, there was no wealth-related inequality in EIBF in the 2016 survey year. However, there was wealth-related inequality with RII in 2005 and 2011 and SII in 2000, 2005 and 2011. In 2000 the richest mothers were 7.1% less practised than the poorest households. In 2005 the richest had 0.9 times less proportion of EIBF practice and had 8.8% less practice of EIBF than the poorest mothers. In 2011 the wealthiest mothers 1.2 times more proportion than the poorest mothers and had 8.7% more proportion of EIBF practice. The lowest proportion of EIBF among the richest mother might be due to the richest mothers' delivery at the private health facilities where live birth was less than the birth in public health facilities.

In the same way, considering the mothers' population size, there was significant RII in 2005 and SII in 2005 and 2011. In 2005, mothers with secondary and higher education were 0.8 times less likely to practice EIBF and had an 11.7% less proportion of EIBF than mothers with no education. In 2011, secondary and higher education had 6.5% more EIBF practice than mothers with no education. The difference might be explained by the fact that education increases individuals' awareness level, with potentially improved breastfeeding information access. In 2000 and 2005, if the less performed region achieved as the highest performer region, the national level EIBF proportion would be increased by 16.7% and 24.1%, respectively. In 2011 if the poorest quantile performed as the richest quantile, the no educated performed as the secondary and above educated mothers, if the rural mothers performed as the urban mothers and less performed regions performed like the good performed regional, the national level proportion of EIBF would be increased by 6.3%, 12.6%, 5.6% and 15.0%, respectively.

In 2016, the wealth-related inequality and regional disparity were attributable to the national level proportion of EIBF with the PAR of 1.1% and 17.2%, respectively. In 2016 only if the regional performance disparity were eliminated the national level EIBF proportion would increase by 17.2%.

The study has limitations that need to be considered while interpreting the results of the study. The study used cross-sectional datasets that there wouldn't be used for a causal relationship. A retrospective data collection used in this study might be prone to recall bias.

Conclusion

The trend on socioeconomic inequality of EIBF in Ethiopia increased significantly with in the past seventeen years. The disparity on EIBF was observed in all measures of dispersion in 2011. Regional disparity is the only category where inequality observed in 2016. The northern part of Ethiopia (Tigray, Afar and Amhara) performed less than Ethiopia's other parts in all survey years. Therefore, interventions targeting those regions would significantly improve the national level performance of EIBF for the subsequent reduction of neonatal mortality.

Abbreviations

DHS

Demographic and Health Survey; EDHS:Ethiopia Demographic and Health Survey; EIBF:Early Initiation of Breast Feeding; SSA:Sub-Saharan Africa; WHO:World Health Organization

Declarations

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Authors' contributions

TA involved from beginning to design, data acquisition, analysis and interpretation, and drafting the manuscript and ED involved in data interpretation and the manuscript for the final submission. The authors read and approved the final manuscript for publication.

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Availability of data and materials

The datasets supporting this article's conclusions are available online as part of the WHO health monitoring database. The DHS data can be acquired online from the DHS database through formal request available at <https://dhsprogram.com/>.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare that he has no competing interests.

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Tables

Table 1: The trend of early initiation of breastfeeding by different inequality measures across the various dimensions of inequality dimensions in Ethiopia (EDHS 2000–2016)

| Dimensions | Years 2000 | | | 2005 | | | 2011 | | | 2016 | | |
|-------------------------------|------------|------|------|----------|------|------|----------|------|------|----------|------|------|
| | Estimate | LB | UB | Estimate | LB | UB | Estimate | LB | UB | Estimate | LB | UB |
| Wealth quantile | | | | | | | | | | | | |
| Quantile 1 (Poorest) | 52.3 | 47.6 | 57.1 | 69.9 | 65.1 | 74.3 | 48.5 | 43.2 | 54.0 | 73.9 | 69.1 | 78.1 |
| Quantile 2 | 48.7 | 44.3 | 53.3 | 66.8 | 62.0 | 71.3 | 50.9 | 46.0 | 55.9 | 75.6 | 70.6 | 79.9 |
| Quantile 3 | 42.0 | 37.2 | 47.0 | 66.5 | 61.9 | 70.8 | 50.7 | 45.8 | 55.6 | 73.4 | 69.0 | 77.4 |
| Quantile 4 | 49.4 | 44.2 | 54.6 | 64.6 | 59.7 | 69.2 | 51.4 | 45.1 | 57.6 | 69.0 | 63.3 | 74.1 |
| Quantile 5 (Richest) | 44.3 | 39.6 | 49.1 | 61.7 | 55.3 | 67.7 | 57.8 | 52.1 | 63.2 | 74.4 | 68.9 | 79.3 |
| Educational status | | | | | | | | | | | | |
| No education | 47.8 | 44.9 | 50.7 | 67.5 | 64.5 | 70.4 | 50.7 | 46.9 | 54.4 | 73.4 | 70.6 | 76.1 |
| Primary education | 47.8 | 41.8 | 53.8 | 61.6 | 56.6 | 66.3 | 51.5 | 46.8 | 56.2 | 74.1 | 70.0 | 77.9 |
| Secondary education and above | 40.4 | 32.0 | 49.5 | 61.1 | 52.4 | 69.1 | 64.1 | 54.9 | 72.3 | 69.8 | 62.9 | 75.9 |
| Residence | | | | | | | | | | | | |
| Rural | 47.8 | 44.9 | 50.6 | 66.6 | 63.8 | 69.3 | 50.6 | 47.1 | 54.1 | 73.4 | 70.9 | 75.8 |
| Urban | 44.0 | 38.4 | 49.7 | 61.0 | 52.0 | 69.3 | 57.1 | 50.3 | 63.7 | 72.6 | 66.0 | 78.3 |
| Subnational region | | | | | | | | | | | | |
| Tigray | 28.4 | 21.7 | 36.2 | 52.2 | 45.9 | 58.5 | 44.7 | 38.1 | 51.5 | 63.0 | 56.6 | 69.0 |
| Afar | 30.5 | 22.7 | 39.7 | 82.4 | 74.0 | 88.5 | 59.6 | 52.7 | 66.1 | 42.0 | 34.7 | 49.7 |
| Amhara | 28.4 | 22.9 | 34.7 | 59.8 | 53.9 | 65.5 | 37.5 | 31.2 | 44.2 | 66.0 | 59.7 | 71.8 |
| Oromia | 58.4 | 54.6 | 62.1 | 67.8 | 62.4 | 72.7 | 52.6 | 46.6 | 58.5 | 76.7 | 72.9 | 80.1 |
| Somalia | 50.3 | 33.7 | 66.7 | 85.4 | 78.4 | 90.5 | 39.6 | 31.2 | 48.5 | 78.2 | 71.7 | 83.5 |
| Benishangul | 46.7 | 36.3 | 57.4 | 68.7 | 58.3 | 77.5 | 42.2 | 33.0 | 52.1 | 71.7 | 66.0 | 76.8 |
| SNNPR | 54.1 | 48.1 | 60.0 | 69.8 | 65.8 | 73.6 | 66.5 | 61.0 | 71.6 | 77.1 | 71.7 | 81.7 |
| Gambela | 47.7 | 39.3 | 56.3 | 69.1 | 59.5 | 77.2 | 59.3 | 46.6 | 70.8 | 67.1 | 60.7 | 73.0 |
| Harari | 64.1 | 58.6 | 69.2 | 73.0 | 60.3 | 82.8 | 64.6 | 57.5 | 71.2 | 89.4 | 84.5 | 92.9 |
| Addis Ababa | 48.3 | 42.7 | 53.9 | 59.1 | 49.8 | 67.7 | 62.0 | 54.3 | 69.0 | 67.5 | 60.5 | 73.8 |
| Dire Dawa | 46.1 | 37.3 | 55.1 | 90.3 | 86.5 | 93.0 | 66.0 | 60.1 | 71.4 | 90.5 | 86.5 | 93.5 |
| Total | 47.4 | | | 66.2 | | | 51.5 | | | 73.3 | | |

Table 2: Early initiation of breastfeeding in Ethiopia based on different summary measures of inequality (EDHS 2005–2016)

| Dimensions | Measure of inequality | Years | | | 2005 | | | 2011 | | | 2016 | | |
|---------------------|-----------------------|---------------|-------|------|----------|-------|------|-------------|------------|--------------|-------------|-------------|--------------|
| | | 2000 Estimate | LB | UB | Estimate | LB | UB | Estimate | LB | UB | Estimate | LB | UB |
| Wealth quantile | D | -8.0 | -14.8 | -1.3 | -8.2 | -16.0 | -0.5 | 9.2 | 1.5 | 17.0* | 0.6 | -6.3 | 7.5 |
| | R | 0.8 | 0.7 | 1.0 | 0.9 | 0.8 | 1.0 | 1.2 | 1.0 | 1.4 | 1.0 | 0.9 | 1.1 |
| | RII | 0.9 | 0.8 | 1.0 | 0.9 | 0.8 | 0.9 | 1.2 | 1.1 | 1.3 | 1.0 | 0.9 | 1.0 |
| | SII | -7.1 | -12.2 | -2.0 | -8.8 | -13.8 | -3.9 | 8.7 | 3.5 | 13.9 | -3.0 | -7.7 | 1.6 |
| | PAR | 0.0 | -2.9 | 2.9 | 0.0 | -2.7 | 2.7 | 6.3 | 3.6 | 8.9 | 1.1 | -1.3 | 3.5 |
| Education | D | -7.3 | -16.6 | 2.0 | -6.5 | -15.4 | 2.4 | 13.4 | 3.9 | 22.9* | -3.7 | -10.7 | 3.4 |
| | R | 0.8 | 0.7 | 1.1 | 0.9 | 0.8 | 1.0 | 1.3 | 1.1 | 1.5 | 1.0 | 0.9 | 1.1 |
| | RII | 0.9 | 0.8 | 1.1 | 0.8 | 0.8 | 0.9 | 1.1 | 1.0 | 1.3 | 1.0 | 0.9 | 1.1 |
| | SII | -4.6 | -11.9 | 2.8 | -11.7 | -18.3 | -5.2 | 6.5 | 0.3 | 12.6 | -1.5 | -6.8 | 3.7 |
| | PAR | 0.0 | -0.7 | 0.7 | 0.0 | -0.8 | 0.8 | 12.6 | 11.5 | 13.6 | 0.0 | -1.1 | 1.1 |
| Residence | D | -3.8 | -10.2 | 2.5 | -5.6 | -14.7 | 3.5 | 6.5 | -1.1 | 14.1 | -0.8 | -7.4 | 5.8 |
| | R | 0.9 | 0.8 | 1.1 | 0.9 | 0.8 | 1.1 | 1.1 | 1.0 | 1.3 | 1.0 | 0.9 | 1.1 |
| | PAR | 0.0 | -0.5 | 0.5 | 0.0 | -0.4 | 0.4 | 5.6 | 5.0 | 6.2 | 0.0 | -0.5 | 0.5 |
| Subnational regions | D | 35.7 | 26.8 | 44.6 | 38.0 | 31.0 | 45.1 | 29.1 | 20.6 | 37.5 | 48.5 | 40.2 | 56.8* |
| | R | 2.3 | 1.7 | 2.9 | 1.7 | 1.5 | 2.0 | 1.8 | 1.5 | 2.1 | 2.2 | 1.8 | 2.6 |
| | PAR | 16.7 | 11.4 | 22.0 | 24.1 | 18.1 | 30.0 | 15.0 | 12.3 | 17.7 | 17.2 | 2.2 | 32.2 |

* Significant with 95% Uncertainty interval; D: Difference; R: Ratio; RII: Relative Index of Inequality; SII: Slope Index of Inequality; PAR: Population Attributable Risk; LB: Lower Bound; UB: Upper Bound

Figures

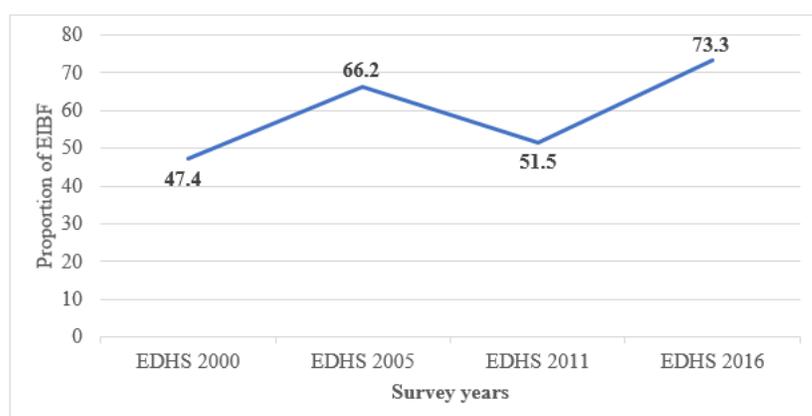


Figure 1

The trend of proportion of early initiation of breastfeeding across the four rounds of the EDHS (2000 to 2016) in Ethiopia.

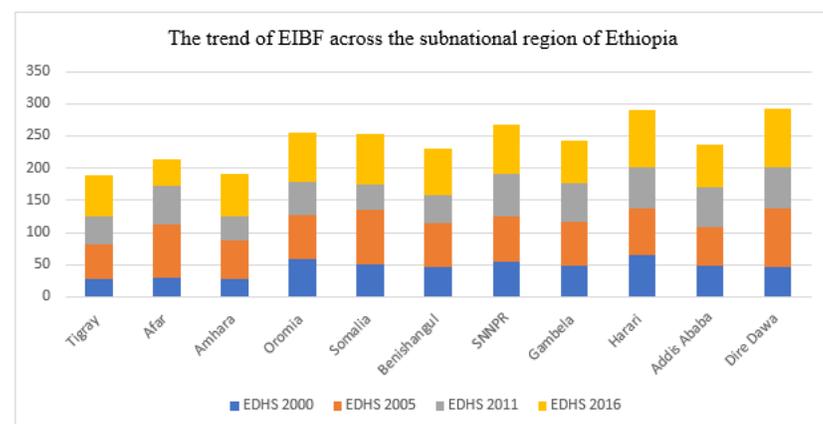


Figure 2

The trend of early initiation of breastfeeding for the past seventeen years in Ethiopia across the subnational regions.

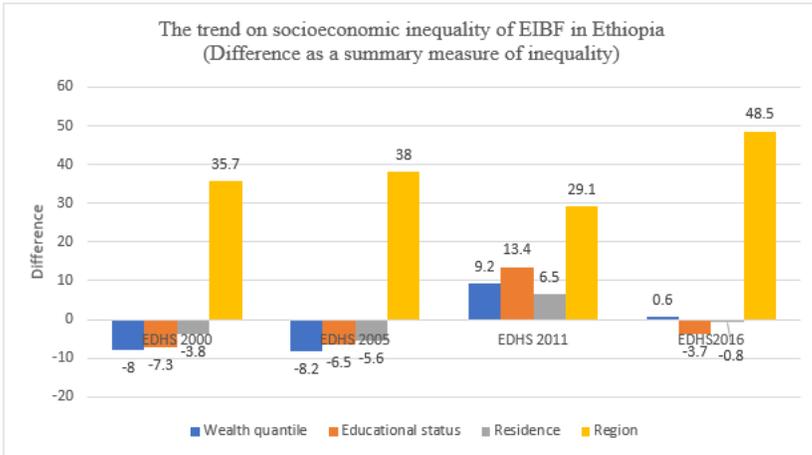


Figure 3

The trend on socioeconomic inequality of EIBF in Ethiopia (Difference as a summary measure of inequality)