Diarrhea and associated factors among under-5 children in Ethiopia: A secondary data analysis

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Abstract

Objectives: Diarrhea is a major contributing factor for preventable childhood morbidity and death. Despite the occurrence of diarrhea is decreasing, its effect is increasing at an alarming rate among under-5 children particularly in developing countries. The survey was aimed to assess diarrhea and associated factors among children less than 5 years (0–59 months) in Ethiopia with nationally representative data.

Methods: The data were extracted from the Ethiopian National Survey of 2016. A logistic regression model was undertaken to identify the contributing factors for childhood diarrhea. Variables with \( p < 0.05 \) were considered as independent predictors of childhood diarrhea.

Results: From a total of 10,641 under-5 children, 5483 (51.5%) were males and most of the children (62.3%) were above 24 months. About 10.2% had diarrhea 14 days before data collection, and the majority (93.1%) were born to married mothers. Receiving no treatment or advice for fever/cough (adjusted odd ratio (AOR) = 0.170, 95% confidence interval (CI): 0.139–0.208, \( p = 0.001 \)), being permanent residence (AOR = 0.583, 95% CI: 0.347–0.982, \( p = 0.043 \)), initiating breastfeeding after 24 h of birth (AOR = 1.553, 95% CI: 1.197–2.015, \( p = 0.001 \)), and lack of prenatal care (AOR = 2.142, 95% CI: 0.624–0.875, \( p = 0.001 \)) were independent predictors of diarrhea among under-5 children's in Ethiopia.

Conclusion: The result of this survey indicated that diarrhea is a significant health challenge among under-5 children. To tackle this illness, sufficient education on child and maternal health has to be provided for mothers focusing on predictive factors.

Keywords

Children, diarrhea, 0–59 months, Ethiopia

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Introduction

Globally diarrhea is a leading cause of preventable childhood illness and death.1–3 Although a previous study indicated that in Ethiopia the occurrence of diarrhea reduced from 2000 to 2016,4 the burden is highly dangerous for under-5 children by causing dehydration with significant death in infancy and childhood. The double effect of high cause-specific illness and the lack of effective intervention make diarrhea and its intervention a priority area for health services.5 Different factors like maternal-related, environmental-related, feeding-related, and child status can influence childhood diarrhea.6 In addition, monthly income, place of residence, and presence of children with less than 5 years in the household are some of the factors that are directly related to the occurrence of diarrhea in under-5 childhood.4–7

In Ethiopia, only a few mothers and primary caregivers provide good diarrheal management after its occurrence, which exacerbates the condition and even leads to death of under-5 children.8 In another way, searching for treatment in
eastern Africa including Ethiopia is lower when compared with south-eastern Asia. This low level of searching for diarrheal treatment is problematic in eastern Africa particularly in Ethiopia where treatment seeking has been somewhat limited.

Children with diarrhea will face many problems like loss of appetite and inadequate nutrient uptake that has the potential to cause weight loss and growth failure. Diarrhea also causes water and electrolyte deficit when not replaced on time. A study from Tanzania revealed that around one-third of the mothers/caregivers have no awareness regarding the determining factors for diarrhea and 30% of them perceived it occurs as part of a healthy growth stage for the child. In Ethiopia, the prevalence of poor diarrheal management practice (63%) is higher than other sub-Saharan African countries. The occurrence might be related to different factors like drinking water source that directly affects diarrhea in developing countries like Ethiopia.

As diarrhea needs immediate management, it is better to identify the determinant factors for essential treatment and good outcomes. Since the diarrheal disease is a public health problem, it needs urgent and on time management to minimize its complications. Hence, this survey aimed to reveal disclose determinant variables for under-5 diarrheal prevalence in Ethiopia.

Methods

Study design and study period

The authors used secondary data extracted from the National Demographic and Health Survey of Ethiopia in 2016. Hence, retrospective cross-sectional study was conducted using already collected data.

Inclusion criteria

- All data of under-5 children and
- All data of mother or caregiver having under-5 children were included.

Sample size determination and sampling procedure

A data extraction form was developed from previous literatures. The Ethiopian National Demographic and Health Survey (EDHS) data were accessed at (http://idhsdata.org) as a reference point. All necessary data edits and cleaning were undertaken before final data analysis. Accordingly, this study utilized data related to 10,641 under-5 children extracted from the EDHS of 2016.

Data collection method

The data set was selected with consideration of environmental and socioeconomic determinants of childhood diarrhea among under-5 children in order not to miss important variables.

Data analysis and interpretation

Extracted data were reviewed for fitness, coded, and analyzed using the Statistical Package for Social Sciences version 24.0. Bivariable and multiple variable logistic regression model were used to assess the association of determinant factors of childhood diarrhea. All variables found significant at p-value < 0.25 and 95% confidence interval (CI) in the bivariable analysis were computed into the model. Variables that were significant at p-value < 0.05 were considered determinant factors of childhood diarrhea. The findings were indicated in the form of statements and tables (Tables 1–4). The strength of the association of factors affecting the occurrence of diarrhea was assessed using the odds ratio at 95% CI.

Operational terms

- Permanent/ usual residence: The place at which a person normally spends the daily period of rest, regardless of temporary absences for purposes of recreation, holiday, visits to friends and relatives, business, medical treatment or religious pilgrimage or, in default, the place of legal or registered residence. The person living in usual residence is called “Permanent/ usual resident.”
- Visitors: Are temporary travelers for the purpose of recreation, holidays, visits to friends or relatives, business, medical treatment or religious pilgrimage without changing usual residence.

Sociodemographic and health characteristics

From the 10641 under-5 children, 5483 (51.5%) were males and 93.1% of children were born to married mothers. Most mothers were non-educated (64.3%) and 59.3% had no work during the survey. Nearly two-thirds of the children were above 24 months and 81.1% were from families with two or fewer children (Table 1).

Clinical illness of children

In the current study, anemia screen was conducted in 43.1% of children. Within this data set, 23.19% had moderate anemia, 17.38% had mild anemia, and 2.92% had severe anemia. About 14.9% had a cough or difficulty of breathing 2 weeks before the survey and 10.2% had recent diarrhea (Table 2).

Determinants of under-5 diarrhea

Binary regression was conducted to identify candidate variables for multivariate analysis to disclose determinant factors of under-5 diarrheal morbidity. Accordingly, variables
with p-value of less than 0.25 were entered together to manage the effect of confounding variables (Table 3).

Treatment seeking for fever or a cough, maternal prenatal care, duration of breastfeeding and permanent resident or visitor status at the time gap between feeding breast milk and birth were significantly associated with childhood diarrhea upon multivariate analysis.

Children receiving no treatment or advice for fever/cough were 83% times more likely to had diarrhea (adjusted odd ratio (AOR) = 0.170, confidence interval (CI) 95%: 0.139–0.208) when compared with who received treatment or advice for fever/cough. Being permanent residence (AOR = 0.583, 95% CI: 0.347–0.982, p = 0.043) was associated with lower diarrhea as compared with visitors. Children born to mothers who initiated breastfeeding after 24 h of birth were 1.5 times to manifest with diarrhea (AOR = 1.553, 95% CI: 1.197–2.015) when compared with children born to mothers who practiced breastfeeding immediately after birth. Those children whose mothers did not receive prenatal care were two times to have diarrhea (AOR = 2.142, 95% CI: 0.624–0.875) when compared with children receiving prenatal care (Table 4).

Table 1. Sociodemographic and health factors of less than 5 years (0–59 months): findings from the EDHS of 2016.

| Socioeconomic and health characteristics | Frequency (n = 10641) | % |
|------------------------------------------|-----------------------|---|
| Woman’s current marital or union status  |                        |   |
| Never married                            | 61                    | 0.6|
| Married                                  | 9903                  | 93.1|
| Living together                          | 105                   | 1.0|
| Widowed                                  | 135                   | 1.3|
| Divorced                                 | 328                   | 3.0|
| Separated/not living together            | 109                   | 1.0|
| Household wealth index in quintiles      |                        |   |
| Poorest                                  | 3993                  | 37.5|
| Poorer                                   | 1782                  | 16.7|
| Middle                                   | 1466                  | 13.8|
| Richer                                    | 1308                  | 12.3|
| Richest                                  | 2092                  | 19.7|
| Location of toilet facilities            |                        |   |
| Located within dwelling                  | 173                   | 1.6|
| Outside dwelling, in plot/courtyard      | 4839                  | 45.5|
| Other locations                          | 903                   | 8.5|
| NIU (not in universe)                    | 4726                  | 44.4|
| Highest educational level                |                        |   |
| No education                             | 6838                  | 64.3|
| Primary                                  | 2678                  | 25.2|
| Secondary                                | 734                   | 6.9|
| Higher                                   | 391                   | 3.6|
| Maternal occupation status               |                        |   |
| Not working                              | 6481                  | 60.9|
| Working                                  | 4160                  | 39.1|
| Address                                  |                        |   |
| Urban                                     | 1974                  | 18.6|
| Rural                                    | 8667                  | 81.4|
| Child’s age in months                    |                        |   |
| Less than 6 month                        | 1300                  | 12.2|
| 6–11 months                              | 807                   | 7.6|
| 12–23 months                             | 1909                  | 17.9|
| 24 and above                             | 6625                  | 62.3|
| Breastfeeding status (categorical)       |                        |   |
| Still breastfeeding                      | 4252                  | 40.0|
| Ever breastfed, not currently breastfeeding| 5814              | 54.6|
| Never breastfed                          | 575                   | 5.4|
| Sex of child                             |                        |   |
| Male                                     | 5483                  | 51.5|
| Female                                   | 5158                  | 48.5|
| Child is alive                           |                        |   |
| No                                       | 635                   | 6.0|
| Yes                                      | 10006                 | 94.0|
| Number of children in household          |                        |   |
| ≤2                                       | 8627                  | 81.1|
| ≥3                                       | 2014                  | 18.9|
| Type of resident                         |                        |   |
| Usual/permanent resident                 | 10508                 | 98.8|
| Visitor                                  | 133                   | 1.2|

NIU: not in the universe which means not applicable to them.
In this study, 10.2% of children in the EDHS had experienced diarrheal disease within 2 weeks before the survey. The result was comparable with a systematic review for Africa, which revealed that 10.3% of under-5 children experienced diarrhea. However, the result obtained was lower than previous studies conducted in Ethiopia, Cameroon (23.8%), Yemen (29.07%), and Vietnam (11%). The discrepancy in percentage may be attributed to environmental and infrastructure differences like sanitation services and water sources. Under-5 immunization coverage has increased from 24% to 39 in Ethiopia, which plays a pivotal role in diarrheal disease prevention and strengthens the immunity of under-5 children.

According to the current study, children residing in urban settings had less when compared with those children living in rural residences. This finding was in line with studies done in northwest Ethiopia, Cameroon (23.8%), Yemen (29.07%), and Vietnam (11%). The discrepancy in percentage may be attributed to environmental and infrastructure differences like sanitation services and water sources. Under-5 immunization coverage has increased from 24% to 39 in Ethiopia, which plays a pivotal role in diarrheal disease prevention and strengthens the immunity of under-5 children.

Discussion

In this present study, prevalence of diarrhea was higher in males than in females which was similar with the study from Nepal, Farta Wereda, Ethiopia, Woloyita Soddo, Bhutan, Northwest Ethiopia, and West Africa. However, the study result was in contrast with the study from Tanzania and Arbamich. Children born to mothers who initiated breastfeeding milk after 24 h of birth were 1.5 times more likely to have diarrhea when compared with children born to mothers who practiced breastfeeding immediately after birth. The finding was comparable to the studies conducted in sub-Saharan African countries.

This study also indicated that children who did not seek treatment for fever or cough were unlikely to have diarrhea when compared with children who seek help. Children who exposed to fever or cough have decreased immunity due to repeated infection and the existence of different comorbidities including diarrhea. In another way, the advice or treatment given for fever or cough may not be used for a prevention strategy of under-5 diarrhea. The finding was also consistent with the study from India which stated children who received antibiotics for their first diarrhea episode had their second episode.

The result of the study revealed that those who received antibiotics were more likely to have diarrhea when compared with counterparts. This is because prenatal care.

### Table 2. Clinical illness of children data from demographic and health characteristics of under-5 (0–59) children: finding from EDHS of 2016.

| Clinical illness of children                              | Frequency (n) | %     |
|----------------------------------------------------------|---------------|-------|
| Child had cough/difficult breathing recently             |               |       |
| No                                                       | 8337          | 78.3  |
| Yes, last 2 weeks                                        | 1586          | 14.9  |
| Don’t know                                               | 87            | 0.8   |
| NIU (not in universe)                                   | 635           | 6.0   |
| Child taken to medical facility for fever/cough treatment|               |       |
| Did not receive any treatment                            | 1182          | 11.1  |
| Received treatment                                       | 525           | 4.9   |
| System missing                                           | 8             | 0.1   |
| NIU                                                      | 8926          | 83.9  |
| Treatment or advice sought for child’s fever/cough       |               |       |
| No, received treatment                                   | 554           | 5.2   |
| Yes, no treatment or advice sought                       | 999           | 9.4   |
| System missing                                           | 8             | 0.1   |
| NIU                                                      | 9080          | 85.3  |
| Treatment or advice sought for child’s diarrhea          |               |       |
| No, received treatment                                   | 545           | 5.1   |
| Yes, no treatment or advice sought                       | 545           | 5.1   |
| NIU                                                      | 9551          | 89.8  |
| Child taken to medical facility for diarrhea treatment   |               |       |
| No                                                       | 569           | 5.3   |
| Yes, treatment at medical facility                       | 521           | 4.9   |
| NIU                                                      | 9551          | 89.8  |
| Child breathed with short and rapid breaths when had cough|               |       |
| No                                                       | 9028          | 84.8  |
| Yes                                                      | 891           | 8.4   |
| Don’t know                                               | 87            | 0.8   |
| NIU                                                      | 635           | 6.0   |

NIU: not in universe which means not applicable for them.

System missing: during extraction variables if the data revealed missed data, those variables that are not important for this study, as well it is not needed or have no effect on outcome variable of this finding.
Table 3. Bivariable logistic regression on factors associated with childhood diarrheal diseases within under-5 (0–59) children in Ethiopia: finding from EDHS of 2016.

| Variables                              | Presence occurrence of diarrhea 2 weeks prior to the survey | Total | COR CI | p-value |
|----------------------------------------|-------------------------------------------------------------|-------|--------|---------|
|                                        | No (95%)                                                    |       |        |         |
|                                        | Yes (95%)                                                  |       |        |         |
|                                        | 1300 (100.0%)                                              | 1.190 | 0.959–1.47 | 0.114 |
|                                        | 3.176 (2.611–3.864)                                         | 0.001*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
| Child’s age                            | 1189 (91.5%)                                               | 646 (80.0%)  | 1573 (82.4%)  | 6143 (92.7%)  | 609 (9.6%) | 336 (17.6%) | 482 (7.3%) | 662 (100.0%)  | 1.190 (0.959–1.47) | 0.114 |
|                                        | 111 (8.5%)                                                 | 161 (20.0%)  | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 608 (9.6%)                                                 | 465 (11.2%)  | 1909 (100.0%) | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 1.190 (0.959–1.47)                                         | 0.114 |
|                                        | 3.176 (2.611–3.864)                                         | 0.001*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 6–11 months                                                | 646 (80.0%)  | 161 (20.0%)  | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 1573 (82.4%)                                               | 608 (9.6%) | 465 (11.2%)  | 1909 (100.0%) | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 608 (9.6%)                                                 | 465 (11.2%)  | 1909 (100.0%) | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 1.190 (0.959–1.47)                                         | 0.114 |
|                                        | 3.176 (2.611–3.864)                                         | 0.001*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 6143 (92.7%)                                               | 609 (9.6%) | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 111 (8.5%)                                                 | 161 (20.0%)  | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 608 (9.6%)                                                 | 465 (11.2%)  | 1909 (100.0%) | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 1.190 (0.959–1.47)                                         | 0.114 |
|                                        | 3.176 (2.611–3.864)                                         | 0.001*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 6143 (92.7%)                                               | 609 (9.6%) | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 111 (8.5%)                                                 | 161 (20.0%)  | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 608 (9.6%)                                                 | 465 (11.2%)  | 1909 (100.0%) | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 1.190 (0.959–1.47)                                         | 0.114 |
|                                        | 3.176 (2.611–3.864)                                         | 0.001*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 6143 (92.7%)                                               | 609 (9.6%) | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 111 (8.5%)                                                 | 161 (20.0%)  | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 608 (9.6%)                                                 | 465 (11.2%)  | 1909 (100.0%) | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 1.190 (0.959–1.47)                                         | 0.114 |
|                                        | 3.176 (2.611–3.864)                                         | 0.001*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 6143 (92.7%)                                               | 609 (9.6%) | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 111 (8.5%)                                                 | 161 (20.0%)  | 336 (17.6%)  | 482 (7.3%)  | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 608 (9.6%)                                                 | 465 (11.2%)  | 1909 (100.0%) | 662 (100.0%)  | 0.848 (0.848–0.848) | 0.011*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
|                                        | 1.190 (0.959–1.47)                                         | 0.114 |
|                                        | 3.176 (2.611–3.864)                                         | 0.001*|
|                                        | 2.722 (2.343–3.163)                                         | 0.001*|
| CI: confidence interval; COR: crudes odds ratio. *Significant at p < 0.25.

includes all the care given for the child and mother for prevention of diarrhea

Limitation of the study

The study was associated with some limitations. First, this study was related to the use of retrospective secondary data, which have some issues with missing and getting inaccurate data. Second, the data were collected as per the EDHS, which can result in the loss of some of the important maternal and child relevant variables. Third, variables like dehydration, distance from the drinking water source, home-based water treatment, maternal or caregiver’s diarrheal history and handwashing practice were important variables for the outcome variable. Since these variables were not collected during the time of data collection, it results in lack of information to determine the cause and effect of these variables in this analysis. Finally, we did not calculate the sample size because we have used already collected data.

Conclusion

The result of this research indicated that there is considerable proposition of under-5 diarrhea in Ethiopia. Obtaining treatment for fever or a cough, starting breastfeeding milk after 24 h of birth, obtaining prenatal care, and being permanent resident were the determinant factors for the occurrence of diarrhea. To tackle diarrhea, appropriate incidence of education on child and maternal health has to be given for mothers by giving special attention to above-stated determinant factors. Finally, we recommend other researchers to conduct large sample size patient-based quantitative and qualitative studies for further exploration of different causes of diarrhea among under-5 children.
Table 4. Multivariable analysis result of factors associated with less than 5-year children diarrheal disease among under-5 (0–59 months): finding from EDHS of 2016.

| Variables                        | Presence occurrence of diarrhea 2 weeks prior to the survey | Total | COR       | AOR       | CI        | p-value        |
|---------------------------------|-------------------------------------------------------------|-------|-----------|-----------|-----------|----------------|
|                                 | No                           | Yes               |           |           |           |                |
| Treatment/advice sought for fever/cough | No                           | 9218 (91.4%)     | 869 (8.6%) | 10087 (100.0%) | 0.142    | 0.170 (0.139–0.208) | <0.001* |
|                                 | Yes                          | 333 (60.1%)      | 221 (39.9%) | 554 (100.0%)     | 1         |                |                 |
| Prenatal care received          | No                           | 5495 (92.7%)     | 434 (7.3%)  | 5929 (100.0%)    | 2.049    | 2.142 (0.624–0.875) | <0.001* |
|                                 | Yes                          | 4056 (86.1%)     | 656 (13.9%) | 4712 (100.0%)    | 1         |                |                 |
| Time gap between feed breast milk and birth | Within first 1 h            | 4393 (87.7%)     | 618 (12.3%) | 5011 (100.0%)    | 1         |                |                 |
|                                 | Within first 24 h            | 1170 (85.8%)     | 193 (14.2%) | 1363 (100.0%)    | 1.173    | 1.076 (0.891–1.300) | 0.447  |
|                                 | After 24 h                   | 447 (83.2%)      | 90 (16.8%)  | 537 (100.0%)     | 1.431    | 1.553 (1.197–2.015) | 0.001* |
|                                 | Don’t know/missing           | 3541 (94.9%)     | 189 (5.1%)  | 3730 (100.0%)    | 0.379    | 0.714 (0.555–0.919) | 0.009* |
| Residence                       | Urban                        | 1788 (90.6%)     | 186 (9.4%)  | 1974 (100.0%)    | 0.893    | 0.659 (0.535–0.812) | <0.001* |
|                                 | Rural                        | 7763 (89.6%)     | 904 (10.4%) | 8667 (100.0%)    | 1         |                |                 |
| Type of resident                | Permanent/usual resident     | 9439 (89.8%)     | 1069 (10.2%) | 10508 (100.0%)   | 0.604    | 0.583 (0.347–0.982) | 0.043* |
|                                 | Visitor                      | 112 (84.2%)      | 21 (15.8%)  | 133 (100.0%)     | 1         |                |                 |

COR: crude odds ratio; CI: confidence interval; AOR: adjusted odd ratio.
*Statistically significant at p < 0.05.

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Author contributions
Conceptualization: G.F. (Getahun Fetensa); methodology: G.F., F.T., and G.F.* (Ginenus Fekadu); validation: G.F., F.T., J.M., and F.T.; formal analysis: G.F. and W.E.; data curation: G.F., F.T., J.M., W.E., G.F.*, and T.H.; manuscript draft preparation: G.F.* and G.F.; review and editing of manuscript: G.F., G.F.*, J.M., W.E., G.F.*, and T.H. All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Data availability
This research used national survey data that are publicly available for research collected by the Central Statistical Agency [Ethiopia] and ICF. National Demographic and Health Survey of Ethiopia in 2016 [Data set]. Accessed (http://idhsdata.org).

Declaration of conflicting interests
The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval
The 2016 EDHS data are available to the general public by request in different formats from the Measure DHS website [http://idhs-data.org]. We applied the measure DHS by briefly stating the objectives of the study and got the permission to download the children’s’ data set in SPSS format.

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Informed consent
Informed consent was not sought for the present study because we have used the already collected from online after permission was obtained from Ethiopian Central Statistical Agency of Ethiopia.

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