ORIGINAL RESEARCH

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Severity of malnutrition among underweight children and family-related factors: A cross-sectional analysis of data from the 2019 Ethiopian Demographic and Health Survey (EDHS)

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Abstract

Background and Aims: Malnutrition is one of the key factors in children's inappropriate physical and mental development. It is a significant issue that results in the deaths of 3.5 million children under the age of 5 every year worldwide. This study's primary goal was to pinpoint important family-related causes of underweight child malnutrition in Ethiopia.

Methods: The data were gathered from the Central Statistical Agency's 2019 Ethiopian Demographic and Health Survey. Data were examined using descriptive statistics and an ordinal logistic regression model after the sample was chosen using a stratified, two-stage cluster sampling approach.

Results: Overall 6101 underweight children were involved in the study of which 5019 (82.27%) were severely underweight, 28 (0.46%) were moderately underweight and 1054 (17.28%) were mild. The result showed that, birth order ($p < 0.001$), partners education, ($p < 0.001$), partner occupation ($p < 0.001$) and type of place of residence ($p < 0.001$) were associated with child malnutrition and also child from poorest family ($p = 0.01$, adjusted odds ratio [AOR]: 0.745, CI: −0.534, −0.056), children from workless partner ($p = 0.169$ AOR:CI: 1.855, −0.262, 1.498), and female children ($p < 0.001$, AOR: 0.793, CI: −0.369, −0.093) were severely malnourished.

Conclusions: wealth index combined, sex, and region have statistically significant effect on Severity of malnutrition. Female children were highly malnourished. Children in Amhara, Afar, and Tigray region were highly affected by severe malnutrition relative to other regions. Hence, the government is recommended to impose action on child nutrition in the area as it is a public health issue.

KEYWORDS
DHS, malnutrition, odds ratio, ordinal logistic regression

1 | BACKGROUND

Child malnutrition, which includes both under- and over-nutrition, is a global health issue. The three primary anthropometric indicators (AIs) used to measure child nutritional status are stunting, wasting, and underweight.[1] Underweight is a direct indicator of both chronic and acute malnutrition since it represents both low height-for-age and low weight-for-age. Contrarily, it has been estimated that the underlying cause of around half of all child fatalities globally is under nutrition, which is the study's main emphasis. Because of this, malnutrition is a serious public health and development issue not only in developing nations but also globally.[2]

Malnutrition is a significant health issue that kills 3.5 million children worldwide each year. While child malnutrition has generally decreased during the 1990s, it has been rising throughout Africa during that time. More than 25% (143 million) of under-5 children in the developing countries are malnourished.[2]

Although malnutrition is rapidly decreasing in the last two decades, it is still a major public health problem particularly in underdeveloped countries.[3] Stunting and wasting afflict 159 million and 50 million children worldwide, respectively, according to research derived from data collected from 2000 to 2019. One in every 13 children worldwide was wasted, and malnutrition is to blame for one-third of all infant deaths. Malnutrition in children has an impact on their academic performance, physical, and mental growth over the course of their life, and it is a sign of the economic and health state of a nation. Children who are smaller at birth and children whose moms are thin (with a BMI < 18.5) are more prone than children from their counterparts to be stunted, wasted, or underweight.[4]

In Sub-Saharan Africa (SSA), Ethiopia has the second-highest rate of malnutrition. According to the 2005 Ethiopia Demographic Health Survey (EDHS), roughly 47% and 11%, respectively, of Ethiopian children under the age of 5 were stunted and wasted. Additionally, 38% of them were underweight, and 11% of them were seriously underweight.[5]

After 5 years, in 2011 EDHS, underweight decreased from 38% to 29% while severe underweight was slightly declined from 11% to 9%. Among regional states of Ethiopia, the highest underweight prevalence was observed in Amhara region which is 33.4%. According to a cohort of children's ages, those between the ages of 24 and 35 months have the largest percentage of underweight children (34%) and those under 6 months had the lowest percentage (10%).[6]

Ethiopia has made very little progress in recent years in lowering the frequency of child malnutrition. Between 1995 and 2000, the rate of wasting increased slightly, from 9.2% to 9.6%. However, throughout the same time period, the percentage of severely wasted children decreased by 47.1% (from 3.4% to 1.8%). A significant portion of this reduction can be attributed to changes in rural regions, where severe wasting was cut in half. When the data are broken down by gender, it is clear that boys did better in 1995–1996 in terms of both wasting and severe wasting whereas females did better in 1999–2000.

Anthropometrical measures, typically weight and length, are used to assess children's health as a function of growth (or height). Understanding the causes of malnutrition is essential to combating it. By utilizing binary logistic regression, both empirical and qualitative investigations on the factors of child malnutrition have been carried out in Ethiopia. However, the ordinal nature of severity of underweight child malnutrition is missed. Therefore, the primary goal of this study was to use the ordinal logistic regression model to discover the determinant variables of underweight child malnutrition in Ethiopia.

2 | METHODS

2.1 | Study population and sampling design

The study used the 2019 EDHS national data, which included anthropometric measurements for 6101 (weighted) children that were complete and tenable.[7] Each region was stratified into urban and rural regions as part of the 2019 EDHS sample selection process, which produced data for 6101 children's characteristics.[7] The weight-for-age anthropometric index is a very accurate general measure of the nutritional health of a community.

2.2 | Variables

The children's nutritional status was assessed using weight-for-age and divided into three groups: severely undernourished (Z-score 3.0), moderately undernourished (Z-score 3.0 to −2.01), and nourished (Z-score 2.0). Inferring dietary status from the continuous variable from weight for age is hence an ordinal response variable.

The following factors are regarded as independent variables in the study: birth order, husband's education level, husband's and partner's employment, region, number of household members, wealth index combined, and child's sex.

2.3 | Statistical analysis

We conducted a descriptive analysis based on the valid data acquired, utilizing frequency distribution, percentage, and a test of association using chi-square distribution. For identifying risk factors of severity of malnutrition among Ethiopian children, ordinal logistic regression model or the commutative logit model, $\text{logit}(P(Y \leq j)) = \frac{P(Y \leq j)}{1 - P(Y \leq 1)}$, Y = the dependent variable and, $J = 1,2....J-1$ has been used to identify the risk factors.[8]

SPSS version 26 was used for data administration, cleaning, and analysis. When testing hypotheses to find associations, differences, and correlations, variables were recorded for the intended categorization, and $p < 0.05$ was used to determine significance.

3 | RESULTS

The prevalence of underweight child malnutrition was examined and related risk variables were identified using descriptive and ordinal logistic regression techniques, respectively.

In this study, a total of 6101 malnourished youngsters from two city administrations and nine regional states were taken into account. Based on the outcome from descriptive statistics, 5019 (82.27%) of them were severely malnourished while 28 (0.46%) and 1054 (17.28%) of them were moderate and mild malnourished, respectively. From this study, 3146 children were males and 2955 of them were females. According to the sex of children, 2630 (83.6%), 19 (0.6%), and 497 (15.8%) of males were severe, moderate, and mild malnourished respectively while 2389 (80.8%), 9 (0.3%), and 557 (18.8%) of female were severe, moderate, and mild, respectively (Table 1).

About 1256 and 4845 respondents were from urban and rural settings, respectively. 932 (74.2%), 6 (0.5%), and 318 (25.3%) of the malnourished children in urban areas fall into the severe, moderate, and mild categories, whereas 4087 (84.4%), 22 (0.5%), and 736 (15.2%) of the malnourished children were in rural area.

Almost half of children (51.17%) were in the birth order one up to three while 31.5% and 17.33% of them are in four up to six and more than seven birth orders in the family, respectively.

In the first birth order category (1 up to 3), 2499 (80%), 13 (0.4%), and 610 (19.5%) of them were severely underweight, moderately underweight, and mildly malnourished, respectively. In a birth order of 4–6, about 84.5% of them are severely malnourished while 0.5% and 15% of them are moderately and mildly malnourished, respectively.

Based on partner education level, nearly half of malnourished children (2627, 43.1%) come from uneducated partners of which 2254 (85.8%) and 362 (13.8%) of them are severely and mildly malnourished. About 81.1%, 76.6%, and 69.9% of children from the partner with primary, secondary, and higher education are severely malnourished, respectively.

According to regional states, the maximum severely malnourished children are found in Amhara region (89.4%) followed by Afar (88.1%), Tigray (88%), and Beninshangul Gumuz (85.9%) regional states. On the other hand, about 61.2% of malnourished children from Addis Ababa administration are severely malnourished followed by Harari (77.9%) and SNNPR (77%) regional states.

At a 5% level of significance, the wealth index combined, place of residence, child's gender, region, partner's employment, birth order number, and the number of household members all had a statistically significant relationship with child malnutrition (Table 2).

3.1 | Ordinal logistic regression

To identify the important risk variables for underweight malnutrition in children in Ethiopia, a multiple ordinal logistic regression model was fitted in this study. To choose explanatory factors, univariate analyses were used. The variables wealth index ($p < 0.001$), region ($p < 0.001$), sex of child ($p = 0.002$), and occupation ($p < 0.001$) from the univariate analysis were statistically significant, and those with a significant relationship at a 25% level of significance were taken into account in the multiple ordinal logistic regression analysis. Using the backward elimination method, the final ordinal logistic regression model was fitted.

For the ordinal logistic regression model, the test of parallel lines revealed a p-value > 0.99, which is higher than the 5% level of significance. This meant that the proportional odds assumption seems to have been true for the model (Table 3).

According to the results of the multiple logistic regression analysis, the severity of child underweight malnutrition in ethiopia is significantly influenced by the sex of the child, region, partner's employment, and wealth index (Tables 4 and 5).

The sex of children was found statistically significant for the severity of child underweight malnutrition in Ethiopia. The chances of being severely malnourished in the joint categories of moderate and mildly child malnutrition for male children was 0.795 (95% CI: −0.369, −0.093) times less than that of female children. Likewise, for a male child the odds of being moderately malnourished towards the combined categories of severely and nourished malnutrition was 0.793 (95% CI: −0.369, −0.093) times less than that of female children.

Children's region was discovered to be a significant risk factor for the severity of child malnutrition in Ethiopia. When other model factors were held constant, Oromia children had a higher risk of being severely malnourished than the combined categories of moderately and mildly malnourished (adjusted odds ratio [AOR] = 1.606: CI = 0088, 0.860). Children in Somalia had higher adjusted chances of being severely malnourished than the combined categories of moderately and slightly malnourished (AOR = 1.54; CI = 0.029, 0.835) than did children in Dire Dawa.

The likelihood of being severely malnourished versus the combined categories of moderately and mildly malnourished for children who live in SNNP was 1.925 (CI = 0.271, 1.038) times higher than those who live in Dire Dawa.

The odds of being severely malnourished versus the combined categories of moderately and mildly malnourished for children who live in Harari was 1.682 (CI = 0.092, 0.948) times higher than those Dire Dawa residents. The likelihood of being extremely underweight malnutrition versus the combined categories of moderately underweight and nourished for children who live in Addis Ababa was 2.809 (CI = 0.616, 1.451) times higher than those who live in Dire Dawa.

Based on partner occupation, the odds ratio for children whose parents' occupation is professional/technical was 2.743 (CI = 0.130, 1.889). This demonstrated that the adjusted likelihood of being extremely malnourished versus the sum of the categories of mildly malnourished towards child malnutrition whose partner's occupation is professional/technical was 174.3% more than children who didn't know their occupations. The odds ratio for children whose family occupation is sales was 2.861 (CI = 0.175, 1.928). They showed that the adjusted odds of being severely malnourished child malnutrition versus the combined categories of moderately and mildly malnourished whose parents' occupation was sales were 186.1% higher than children whose parents didn't know their occupation.

TABLE 1 Descriptive statistics of explanatory variables by children underweight malnutrition status EDHS, 2019

Variable	Category	Severe	Moderate	Mild
			Childs Underweight Malnutrition Status	
Birth order number				
	1–3	2499 (80%)	13 (0.4%)	610 (19.5%)
	4–6	1625 (84.5%)	9 (0.5%)	288 (15%)
	>6	895 (84.7%)	6 (0.6%)	156 (14.8%)
Partner education level				
	No education	2254 (85.8%)	11 (0.4%)	362 (13.8%)
	Primary	1535 (81.1%)	8 (0.4%)	350 (18.5%)
	Secondary	482 (76.6%)	4 (0.6%)	143 (22.7%)
	Higher	342 (69.9%)	4 (0.8%)	143 (29.2%)
	Don't know	34 (77.3%)	0 (0%)	10 (22.7%)
Partner occupation				
	Did not work	445 (83.2%)	2 (0.4%)	88 (16.4%)
	Professional/technical	307 (74.3%)	3 (0.7%)	103 (24.9%)
	Clerical	25 (73.5%)	0 (0%)	9 (26.5%)
	Sales	328 (71.9%)	4 (0.9%)	124 (27.2%)
	Agricultural employee	2603 (85.2%)	11 (0.4%)	442 (14.5%)
	Skilled manual	320 (75.3%)	3 (0.7%)	102 (24%)
	Unskilled manual	192 (83.5%)	1 (0.4%)	37 (16.1%)
	Other	194 (78.2%)	1 (0.4%)	53 (21.4%)
	Don't know	56 (90.3%)	0 (0%)	6 (9.7%)
	Services	177 (79.4%)	2 (0.9%)	44 (19.7%)
Region				
	Tigray	623 (88%)	1 (0.1%)	84 (11.9%)
	Afar	460 (88.1%)	2 (0.4%)	60 (11.5%)
	Amhara	627 (89.4%)	1 (0.1%)	73 (10.4%)
	Oromia	726 (80.8%)	6 (0.7%)	166 (18.5%)
	Somali	495 (80.2%)	6 (1%)	116 (18.8%)
	Benishangul	425 (85.9%)	2 (0.4%)	68 (13.7%)
	SNNPR	600 (77%)	3 (0.4%)	176 (22.6%)
	Gambela	362 (83.8%)	4 (0.9%)	66 (15.3%)
	Harari	257 (77.9%)	1 (0.3%)	72 (21.8%)
	Addis Ababa	199 (61.2%)	1 (0.3%)	125 (38.5%)
	Dire Dawa	245 (83.3%)	1 (0.3%)	48 (16.3%)
Sex				
	Male	2630 (83.6%)	19 (0.6%)	497 (15.8%)
	Female	2389 (80.8%)	9 (0.3%)	557 (18.8%)
Types of residence				
	Urban	932 (74.2%)	6 (0.5%)	318 (25.3%)
	Rural	4087 (84.4%)	22 (0.5%)	736 (15.2%)

TABLE 1 (Continued)

Variable	Category	Severe	Moderate	Mild
		Childs Underweight Malnutrition Status		
Wealth index combined				
	Poorest	1693 (85.6%)	14 (0.7%)	270 (13.7%)
	Poorer	905 (86.1%)	5 (0.5%)	141 (13.4%)
	Middle	753 (84.1%)	3 (0.3%)	139 (15.5%)
	Richer	656 (81.5%)	1 (0.1%)	148 (18.4%)
	Richest	1012 (73.7%)	5 (0.4%)	356 (25.9%)
Number of house hold members				
	2–5	2426 (81.5%)	12 (0.4%)	540 (18.1%)
	6–10	2465 (83.0%)	16 (0.5%)	488 (16.4%)
	11–19	128 (83.1%)	0 (0.0%)	26 (16.9%)

TABLE 2 Test of association of children underweight malnutrition status and explanatory variables EDHS, 2019

Independent variable	X^2-value	Degree of freedom	p-value
Birth order number	23.204	4	0.000
Partners education level	87.642	8	0.000
Partner occupation (grouped)	91.014	18	0.000
Number of household	4.269	4	0.371
Region	1.905E2	20	0.000
Sex of child	12.592	2	0.002
Type of place of residence	71.724	2	0.000
Wealth index combined	1.082E2	8	0.000

TABLE 3 Test of parallel lines for ordinal logistic regression result

Model	−2LogLikelihood	Chi-square	df	p-value
Null hypothesis	2417.206			
General	2411.242	5.964	25	1.000

For the severity of malnutrition in Ethiopian children, the child parents' wealth index was revealed to be a statistically significant influence. Children with the lowest, medium, and highest wealth indices had chances of 0.745 (CI = −0.534, −0.056), 0.660 (CI = −0.676, −0.154), and 0.751 (CI = −0.552, −0.02), respectively. This implied that for children whose parental wealth index is the poorest, poorer, and middle, the adjusted odds of being severely malnourished toward child malnutrition versus the combined categories of moderate and mild malnutrition were 25.5%, 34%, and 24.9%, respectively, less than for children whose parental wealth index is the richest.

The results of this study generally indicate that the severity of malnutrition varies depending on a number of factors. It was more prevalent among children from uneducated households who worked in agriculture. Additionally, it dropped among children from metropolitan areas, wealthy families, and the richest families.

4 | DISCUSSION

This study has attempted to determine the risk variables for severity malnutrition in children using 2019 EDHS data. Ordinal logistic regression analysis was used to conduct the study. Child's gender, region, partner's profession, and wealth index combined were found as statistically significant associated with severity of child malnutrition.

According to the study, the family wealth index was highly correlated with how severely malnourished an Ethiopian kid was. Children from low-income families were more likely to have severe malnutrition than those from high-income families. This result is congruent with a research conducted in the North West Ethiopian region of East Gojjam Zone.[9] Similar results were documented in studies by Umesh et al. since 2020 whose findings indicated household food access as a significant predictor of child malnutrition.[10] Similar study was conducted in Ethiopia using 2016 EDHS data at Tigray region in northern Ethiopia which found poor household wealth linked with a rise in underweight, wasting, and stunting.[11,12] A study by Neima et al., since 2017 further discovered, which concurs with our findings, that region and wealth status were elements that were independently related to the degree of child malnutrition in countryside of Ethiopia.[6] This demonstrates that the poorest families are more likely to have severely malnourished children because they cannot afford to feed their babies.

In this investigation, the children's sex was also found statistically significant covariate for severity of child malnutrition in Ethiopia. When compared to male children, female children were shown to have much worse malnutrition. This study was contradicted with a study done in Afar region Ethiopia. It claimed that male children had a higher risk of being impacted by child malnutrition.[13,14] Overall, on

TABLE 4 Result of ordinal logistic regression for children underweight malnutrition status

Variable	Category	B	SE	Wald	df	p-value	Odds ratio	95% confidence interval Lower bound	Upper bound
Underweight category									
	Intercept	2.183	0.468	21.744	1	0.000	8.873	1.265	3.101
		2.217	0.468	22.416	1	0.000	9.180	1.299	3.134
Partner occupation									
	Did not work	0.618	0.449	1.895	1	0.169	1.855	−0.262	1.498
	Professional/technical	1.009	0.449	5.058	1	0.025	2.743	0.130	1.889
	Clerical	1.076	0.589	3.343	1	0.067	2.933	−0.077	2.230
	Sales	1.051	0.447	5.524	1	0.019	2.861	0.175	1.928
	Agricultural-employee	0.589	0.438	1.811	1	0.178	1.802	−0.269	1.448
	Services	0.755	0.466	2.631	1	0.105	2.128	−0.157	1.668
	Skilled manual	0.836	0.451	3.441	1	0.064	2.307	−0.047	1.720
	Unskilled manual	0.676	0.470	2.070	1	0.150	1.966	−0.245	1.597
	Others	0.953	0.460	4.287	1	0.038	2.593	0.051	1.855
	Don't know (Reff)	.	.			.			
Region									
	Tigray	−0.108	0.211	0.262	1	0.609	0.898	−0.521	0.305
	Afar	−0.127	0.227	0.315	1	0.575	0.881	−0.572	0.317
	Amhara	−0.208	0.217	0.921	1	0.337	0.812	−0.633	0.217
	Oromia	0.474	0.197	5.804	1	0.016	1.606	0.088	0.860
	Somali	0.432	0.206	4.416	1	0.036	1.54	0.029	0.835
	Benishangul	0.110	0.220	0.250	1	0.617	1.116	−0.321	0.541
	SNNPR	0.655	0.196	11.198	1	0.001	1.925	0.271	1.038
	Gambela	0.089	0.223	0.158	1	0.691	1.093	−0.348	0.526
	Harari	.520	0.218	5.68	1	0.017	1.682	0.092	0.948
	Addis Abeba	1.033	0.213	23.518	1	0.000	2.809	0.616	1.451
	Dire Dewa (Reff)								
Sex of child									
	Male	−0.232	0.070	10.764	1	0.001	0.793	−0.369	−0.093
	Female (Reff)								
Wealth index combined									
	Poorest	−0.295	0.122	5.874	1	0.015	0.745	−0.534	−0.056
	Poorer	−0.415	0.133	9.717	1	0.002	0.660	−0.676	−0.154
	Middle	−0.286	0.136	4.454	1	0.035	0.751	−0.552	−0.020
	Richer	−0.144	0.132	1.194	1	0.275	0.866	−0.403	0.115
	Richest (Reff)								

this study, on the contrary of other studies females are more exposed for severity of malnutrition than males.

The result of this study showed that region is a significant predictor for child malnutrition in Ethiopia. Children from Amhara and

Afar region were more malnourished. The results of this study were in line with those of a study conducted in Ethiopia by Teklie et al., which found that children residing in the Afar, Oromia, and Somali areas, respectively, had a 32%, 33%, and 60% lower chance of being

TABLE 5 Result of Univariate analysis for child malnutrition and dependent variables

Factors (independent variables)	Coefficients	Std. Err.	z	p > z	95% confidence interval
Partner occupation (grouped)	0.1158029	0.0312635	3.70	0.000	0.0545277, 0.1770782
Partner education level	−0.0002338	0.001637	−0.14	0.886	−0.0034422, 0.0029747
Region	0.0641114	0.012829	5.00	0.000	0.038967, 0.0892558
Sex of child	0.2176145	0.0696727	3.12	0.002	0.0810586, 0.3541705
Type of place of residence	−0.0733255	0.1101753	−0.67	0.506	−0.2892651, 0.1426141
Wealth index combined	0.098406	0.029351	3.35	0.001	0.0408792, 0.1559328
Birth order	0.1170016	0.0804361	1.45	0.146	−0.0406502, 0.2746535

underweight than children living in the Tigray region.[12] This result was also similar with the study done in East African districts in Ruanda, Uganda, and Tanzania), and Ghana.[15,16]

The study also found that parents' occupation is a very reliable indicator of how severe child malnutrition is in Ethiopia. In Hauzen District, Tigray Region, a similar conclusion was also made, indicating that children of jobless mothers were 2.4 times more likely to be underweight.[17] Based on this study, we draw the conclusion that farmers had more severe child malnutrition.

5 | CONCLUSIONS, RECOMMENDATIONS, AND LIMITATIONS

5.1 | Conclusions

In this study, a total of 6101 malnourished children have been considered and among those, 82.27% of them were severely malnourished, 0.46% of them were moderately malnourished and the rest 17.28% of them were mild. The study found that severity of malnutrition was highest among female children, Children in Amhara region, Afar region, and Tigray region.

This study also indicates that: Partner occupation, wealth index combined, child's gender, and the region were statistically important factors of the severity of children malnutrition in Ethiopia. Hence, further studies will be conducted on other factors like: sibling, wives, extended family. And primary healthcare needs to take screening much more seriously, because those who are identified as underweight are more prone to suffer from severe malnutrition. This shows that there is a significant delay in their diagnosis, and by the time the diagnosis is made, they will also most likely need more serious and rapid intervention.

6 | LIMITATION OF THE STUDY

The study was conducted in Ethiopia while national conflict took place and the situation was not good to collect all factor variables. Therefore, there was inaccessibility of some important factors of malnutrition on EDHS records like (sibling, chronic diseases, antenatal care, wives, extended family, parent illiteracy, the level of hygiene ...). but the effects of those missed factors antenatal care,[18] inappropriate feeding practice and diarrheal,[19] age of mother at birth and birth interval[20] were observed on other studies. So, all factor variables were not incorporate in the analysis part because they leads to miss conclusion of the result and they were excluded from the study. In addition, since our study is a cross-sectional study and we cannot correctly estimate the cause-and-effect relationship.

AUTHOR CONTRIBUTIONS

Gedif M. Alemayehu: Conceptualization; data curation; formal analysis; investigation; methodology; resources; software; validation; writing – original draft; writing – review & editing. **Kebadu T. Cherie**: Conceptualization; data curation; formal analysis; investigation; methodology; resources; software; validation; writing – original draft; writing – review and editing. **Ayele G. Chernet**: Conceptualization; data curation; formal analysis; investigation; methodology; resources; software; validation; writing – original draft; writing – review and editing.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Following formal online registration and submission of the project title and description, the data was requested from the CSA website and obtained. Access to the data is available at http://www.statsethiopia.gov.et/.

ETHICS STATEMENT

The CSA authority upholds a variety of ethical guidelines and practices for the survey and also obtains informed consent from survey participants before data collection. Additionally, we have received permission from the CSA to use the data via the DHS website. Therefore, no other institutions' ethical approval or participant agreement are required for the study.

TRANSPARENCY STATEMENT

The lead author Gedif M. Alemayehu affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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