

Effect of Maternal Education, Early Marriage and Prenatal Care on Child Undernutrition in Ethiopia

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Abstract Studies done before identified that children in developing countries suffered from consistent undernutrition problem. This study identified the effect of maternal education, prenatal care and early marriage on child undernutrition problems in the four dominant regional states of Ethiopia (Tigray, Amhara, Oromia and SNNP). The study considered the four nationally representative demographic and health survey data collected by the World Bank in 2000, 2005, 2011 and 2016. The child undernutrition problems (stunting, underweight and wasted) computed based on the standardized index developed by the World Health Organization. On average 47.55%, 39.22% and 9.34% of the sample children in the four round surveys were stunted, underweight and wasted, respectively. Sample children from Amhara regional state had severe stunting and underweight problems as compared to the other regional states of the country. The logit model result revealed that experienced and educated mothers have significant effect of reducing the child undernutrition in Ethiopia. Children from mothers with age interval of 35-45 years and graduated from secondary and/or high school have strong probability of being free from stunted, underweight and wasted in the country. The model result also shows that children with an average or more birth weight have lower probability of suffering from childhood undernutrition. Additionally, the study found that children from rural areas have strong prevalence for undernutrition as compared to the urban ones. In connection to this, the household wealth quintals have significant effect on child undernutrition, wherein children from rich family have lower probability of prevalence to stunting and underweight. Finally, the study recommended that the concerned part should work on expanding mother's education, prenatal care and awareness of rural households to reduce the national level child undernutrition problem significantly.

Keywords: *undernutrition, maternal education, birth weight, prenatal care, Ethiopia*

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1. Introduction

Currently, the global nutrition situation is a picture of extremes fasting and feasting, and wasting and obesity. Undernutrition, and more specifically, deficiencies in essential nutrients, is the underlying cause of an estimated 3.5 million deaths each year [1]. Undernutrition is the outcome of insufficient food intake and recurrent infectious diseases [10]. According to recent comparative risk assessments, undernutrition is estimated to be the leading contributor to the global burden of disease and death [5] mostly in developing countries. Undernutrition contributes to nearly half of all deaths in children under 5 and it is widespread in Asia and Africa [2]. The problem puts children at greater risk of dying from common infectious diseases, increases the frequency and severity of such infections, and significantly contributes to delayed recovery. Interaction of undernutrition and infection create a potentially disastrous sequence of worsening illness and deteriorating nutritional status. UNICEF reported that poor nutrition in the first 1,000 days of a child's life could result in stunted growth, which is irreversible and

associated with impaired cognitive ability and reduced school and work performance.

Food and Agriculture Organization (FAO) [3] estimated that about 795 million of the 7.3 billion people in the world were suffering from chronic undernourishment in 2014-2016. Almost all the hungry people live in developing countries, representing 12.9% of the population in those countries. Based on the institution's report there are 11 million undernourished people in developed countries. There was about 42% reduction in the proportion of undernourished people between 1990-92 and 2012-14 in developing countries. Despite this progress, around 14% of the overall population remains chronically undernourished in the developing world. There has been least progress in the sub-Saharan Africa (SSA), wherein more than one in four people remain undernourished implies that the region has the highest prevalence in the world. Nevertheless, undernourishment in SSA has declined from 33.2% in 1990-92 to 23.2% in 2014-16, but the number of undernourished people has actually increased.

Undernourished children are highly susceptible to common childhood illness like diarrhoea, respiratory infections and worm infestations. Global statistics for surviving undernourished children indicate that approximately

171 and 100 million children are stunted and underweight, respectively [9]. The United Nation report in 2013 estimated that 165 and 101 million children from developing countries were stunted and underweight, respectively. More than 25% of all under 5 in the developing world are underweight, wherein nearly three quarters live in just 10 countries [5]. In SSA more than one-quarter of children under 5 are underweight wherein Nigeria and Ethiopia alone account for more than one-third of all underweight children in the region. This circumstance shows severity of child undernutrition problem in many developing countries. The problem remains persistent in most of SSA countries [10]. It contributes importantly to child mortality and carries long-term consequences of malnourishment that reduced cognitive development and lower economic contribution. Household food insecurity is associated with higher odds of stunting and underweight in Bangladesh, Ethiopia, and Vietnam [11].

The income inequality-health hypothesis postulates that population health and mortality are importantly influenced by income distribution within the country [6]. Income inequality increment raises mortality at birth and up to age of 15 [7]. This indicates that to manage both prenatal and post-natal care properly the households should have the required income level. Child malnutrition is one of the parameter to measure health status of a society wherein World Health Organization (WHO) recommends for health equity among nations. Undernutrition reflects lack of income, not enough food, and unhygienic surroundings situations that affect all members of the household [8]. However, some argued more broadly that undernutrition mainly attributed to household's asset, education, antenatal care, and birth intervals in addition to accessing potable water and modern toilet facilities.

The recent statistical reports in Ethiopia show that 28% of the population is under absolute poverty, which implies that more than 28 million people have income of below one US dollar per day. Undernutrition is an underlying cause (53%) of infant and child deaths in the country [4]. There is a substantial undernutrition variation in Ethiopia among different regional states and city administrations. For instance, the prevalence of child stunting is above the national average (40%) in Affar (49%), Tigray (44%), Southern Nation and Nationalities People (SNNP) (44%) and Amhara (42%) regional state [12]. Undernutrition problem remains so high in the country and it needs continuous substantial effort to examine the factors that aggravate the problem [10]. Thus, this study tried to investigate the effect of maternal education, prenatal care and early marriage on child undernutrition problems in Ethiopia considering the four dominant regional states.

2. Materials and Methods

2.1. Type and Source of Data

The study used Demographic and Health Survey (DHS) data collected from the four dominant regional states (Tigray, Amhara, Oromia and SNNP) of Ethiopia considering sample households from both the rural and urban areas in 2000, 2005, 2011 and 2016. The four dominant regions of the country took more than 65% of the national level survey in the four rounds (Table 1).

Figure 1 reveals that the four dominant regional states (Blue colored part) covered significant part of the country, which may enable easy generalizations about the national level.

Table 1. Sample distribution among regional states

Region	Sample size	Percentage share in each survey				Current time percentage	Percentage from the national DHS
		2000	2005	2011	2016		
Tigray	4,332	19.12	16.05	20.47	21.22	18.55	10.63
Amhara	5,348	24.57	23.88	22.04	20.07	22.89	13.51
Oromia	7,468	32.68	31.74	29.99	32.48	31.97	18.08
SNNP	6,212	23.63	28.33	27.49	26.23	26.59	15.13
Total	23,360	100.00	100.00	100.00	100.00	100.00	57.35



Figure 1. Geographic location of the four major regional states in Ethiopia

2.2. Method of Data Analysis

The study used descriptive and simple mathematical tools to analyze the data in order to achieve the predefined objectives. Simple mathematical tools like percentage, mean, ratio, frequency, tabulation as well as statistical tests like t-test and χ^2 -test were used to substantiate the description analysis.

Additionally, the study utilized logit regression considering the core independent explanatory variables and other supportive explanatories. The regression model can predict the probability of having undernourished child for the given set of independent variables. The three types of child undernutrition problems constructed as binary variables, in which children of below -2 standard deviations of the WHO median reference for **height-for-age**, **weight-for-age** and **weight-for-height** are stunted, underweight and wasted, respectively [13]. The binary version of a logistic regression model best fits, when the dependent variable in question has two categories that are mutually exclusive and cannot be ordered in any meaningful way. The binary logit model for identifying the determinants of child undernutrition prevalence is:

$$P(X) = \frac{\exp(\alpha + \beta X)}{1 + \exp(\alpha + \beta X)} \tag{1}$$

The log of odds ratio can take the following form:

$$\log\left(\frac{P_i}{1-P_i}\right) = \alpha + \beta X_i \tag{2}$$

log odds (P) = $\alpha + \beta$ for $X_i = 1$, log odds (P) = α for $X_i = 0$.

The marginal effect of X_i on the dependent variable could be measured as:

$$(P_i(1 - P_i))\beta_i \tag{3}$$

The unknown parameters β_i are typically estimated by maximum likelihood estimation.

3. Result and Discussion

3.1. Trend of Child Undernutrition Problems

Many of the sample children (48.35%) were stunted followed by underweight (33.01%). The percentage of undernourished children in Amhara and Tigray were larger than the other two regional states. The proportion of

stunted children (54.86%) and underweight (37.69%) were high in Amhara regional state followed by Tigray that were 49.40% and 34.01%, respectively (Figure 2). More than half of the sample children from Amhara regional state were stunted, which indicated that the problem was severe in the region as compared to the others. Relatively smaller proportions of the sample children were wasted, which indicate the co-existence of stunting and underweight was low in the sample regional states of the country.

Table 2. Overall proportion of undernourished children

Regional state	Stunted	Underweight	Wasted
Tigray	49.40	34.01	11.86
Amhara	54.86	37.69	12.24
Oromiya	43.62	29.43	10.75
SNNP	47.80	32.62	10.14
Average	48.35	33.01	11.14

Note: Percentage from the total sample households of the regions.

Figure 2 below revealed that the three child undernutrition problems showed continuous reduction in the four regional states from the initial survey (2000) to the last (2016). The trend is smooth for Oromia and SNNP, but it exhibits oscillatory movement for Tigray. There is decreasing trend in recent survey years (2005, 2011 and 2016) in the proportion of stunted child than what it was in the initial survey year (2000). The proportion of stunted children in Amhara regional state (62.81%) was highest in 2000 followed by Tigray (60.20%) regional state (Figure 2), wherein more than half of the sampled children suffer from the problem. The proportion of children with the problem was high in Amhara regional state for the four consecutive sample surveys 2000, 2005, 2011 and 2016. More than half (54.39%) of the sample children were stunted in 2000 while the percentage reduced to 38.76% in 2016 after 16 years, which showed 15.63% reduction. Similar circumstance exhibited in Amhara and SNNP regional states in which there was reduction by 19.52% and 22.65% in 2016, respectively from what they had in the initial survey year (2000). Though the reduction was not large enough like the previous regions, but Oromia regional state exhibited 19.84% reduction in the percentage of stunted children from 2000 to 2016. There was relative disparity among underweight children in 2005 as compared to the situation in 2000, 2011 and 2016 for the four dominant regional states sampled in this research.

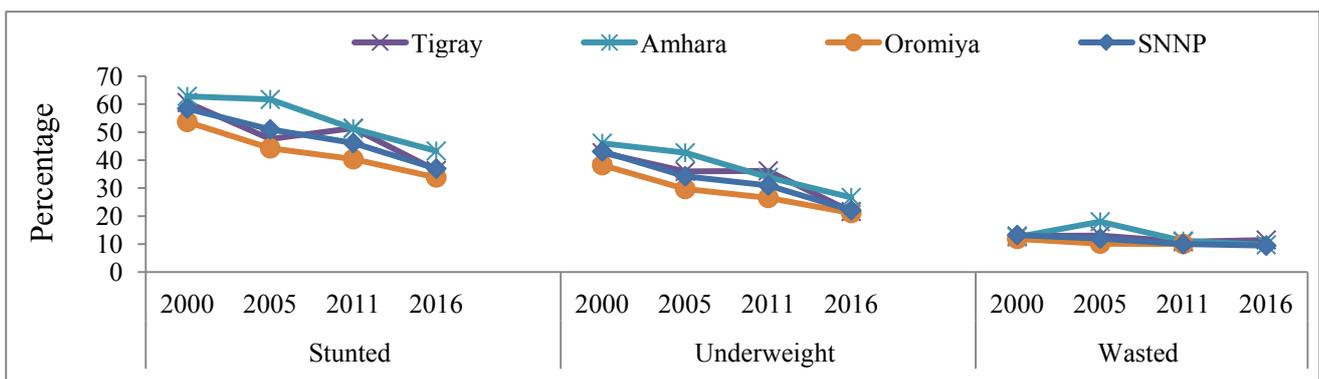


Figure 2. Trend of child undernutrition in the four dominant regional states of Ethiopia

Though the trend was not sharp, but there was reduction in the proportion of underweight children from 2000 (47.04%) to 2016 (31.47%). Children from Oromia regional state had better nutritional status wherein the percentage of underweight children was lower as compared to the other regional states. Children from Amhara regional state suffer the most from the problem of underweight in 2000 and 2005 even though there was significant improvement in 2011 and 2016 after five years. The proportion was severe in Amhara regional state in 2000 (48.25%) followed by SNNP (47.11%), in which there was continuous reduction for the former region showing 21.02% reduction from 2000 to 2016. Percentage of underweight children in Oromia regional state also shows continuous reduction from the initial survey year (2000) to the last (2016). The trend was not consistent for Tigray and SNNP regional states.

The overall percentage of wasted children showed continuous reduction from the initial survey in 2000 to the last in 2016 for the sampled regional states (Figure 2). In most of the survey years the percentage of wasted children was more than 10% in Tigray regional state. The trend of wasted children was rewarding for Oromia as compared to the other regional states wherein continuous reduction exhibited from the initial to the last survey year. This implies that, there is subsequent reduction in the prevalence to undernutrition problems in Ethiopia. The percentage of children with undernutrition decreased from the first (2000) to the last survey (2016), which is a consistent result with the Global Nutrition Report (GNR) of the country in 2014. Report of the institution shows that the prevalence of stunting for children under 5 in 1992, 2000, 2005 and 2011, respectively were 67%, 57%, 51% and 44%, respectively [15].

Figure 3 shows that there is wider inequality concentration of stunted child since each of the sample regions have

distantly located Lorenz curve from the 45⁰ line. Children sampled from Oromia and SNNP had relatively wider disparity in the undernutrition problem (Figure 3). This indicates that there are children with severe undernutrition problem that result in generating larger average concentration coefficient. The inequality was very wide for Oromia regional state, which implies there are children with severe stunting. The average value of stunting was high for Oromia regional state with the highest standard error, which indicates the wider disparity among sample households. The figure also shows that there is wider disparity in the concentration of undernourished child, stunted, for sample children from Oromia and SNNP. These regional states had highly similar concentration curve for the child undernutrition problem in each percentage level, wherein they have highly unequal centration among sample children within each region. Figure 3, shows that the average concentration coefficient of stunted in Tigray was the lowest as compared to the other sample regions, which states that the disparity of the problem is relatively normal in this region.

The concentration curve for underweight children in each sample regional state has similar trend to that of stunting. Oromia and SNNP regional states had wider gap from the centre (45⁰) (Figure 4), which indicates severity of the inequality among sample children from each regional state. The disparity was high for SNNP as compared to Oromia regional states, which indicates that the former region has higher number of children with severe undernutrition problem, underweight. The two regions have wider gap from the population level curve while Amhara and Tigray regions have narrower, which indicates that the latter two regions have relatively normal concentration. There is no clear difference in the concentration curve of Amhara and Tigray regional state since one curve lay over the other throughout each percentage level, 0 to 1(Figure 4).

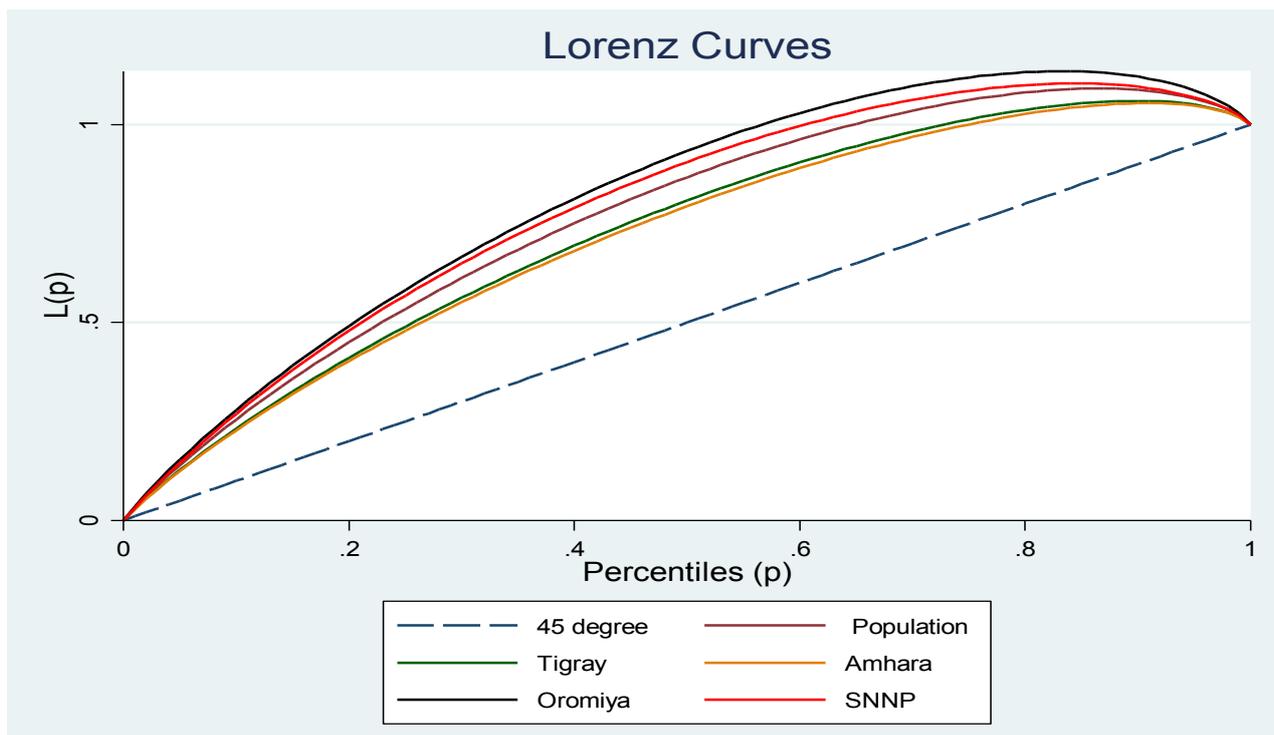


Figure 3. Stunting concentration curve in each sample regional state

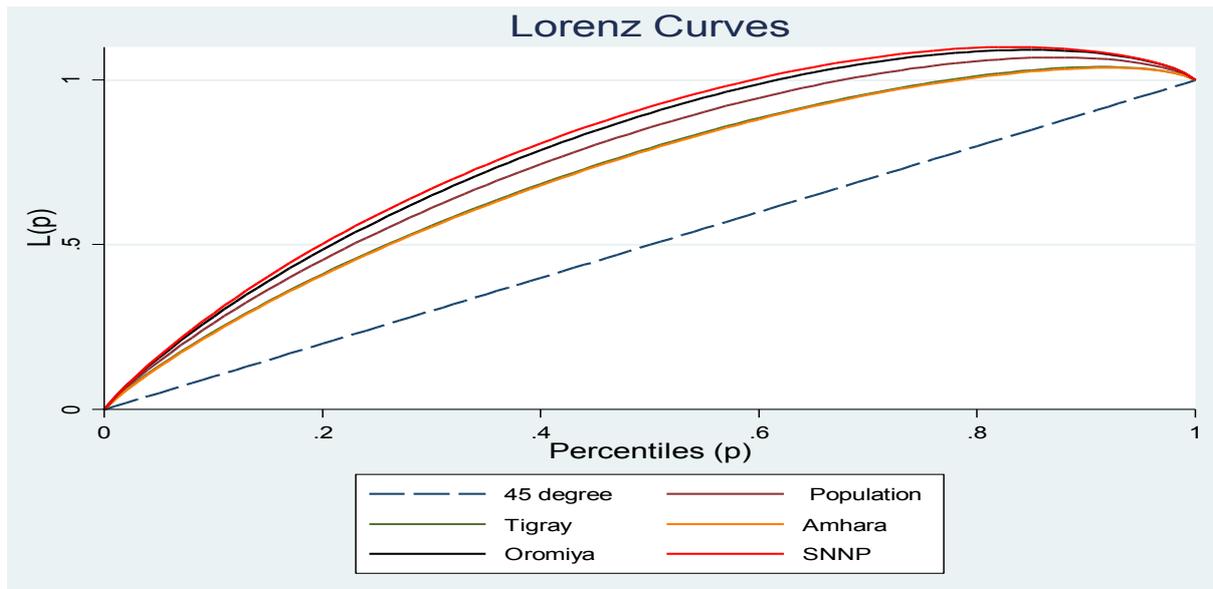


Figure 4. Underweight concentration curve for each sample regional state

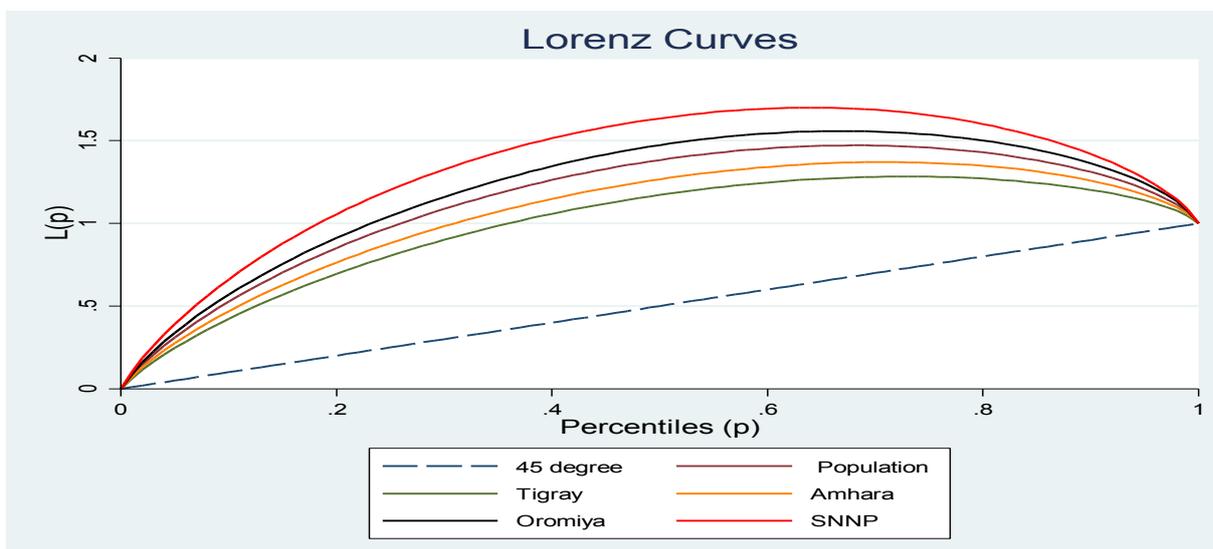


Figure 5. Wasted concentration curve for each sample regional state

Unlike the previous concentration curves for stunting and underweight, Figure 5 for wasting shows clear disparity among children from the sample regional states. This implies that there is clear difference in the concentration level of wasted children among the sampled regions.

The concentration curve in SNNP shows wider difference in the severity of wasted among children in the regional state while children from Tigray have relatively normally distributed concentration index of wasted (Figure 5). The concentration curve for Amhara and Oromia regional states were near to the population level from above and below, respectively.

3.2. Household Characteristics and Child Undernutrition

More than three quarter (76.73%) of the sample household heads has no formal education, and 19.72% of them were primary school graduate as to the four round survey data. The trend of child undernutrition for households with no formal education was severe in the four round survey

years, which implies that the problem was serious for children from those households (Figure 6). The prevalence of children from the three dimensions of undernutrition was high for households with no formal education. Figure 6 show that there is inverse relationship between household head's education level and child under nutrition problem in the study area. Children from households with better education have lower prevalence to child under nutrition problem. The stunting, underweight and wasted problems of children from households' headed by primary and secondary school graduate consistently reduced.

Table 3 shows that children with very large birth weight have lower probability (41.26%) of being stunted in their childhood. However, children with smaller than average and very small birth weight have 54.74% and 52.95% probability of suffering from the problem of stunting, respectively. This implies that the prenatal care might have strong correlation with the childhood undernutrition. Children with very small birth weight have 40.26% and 14.96% probability of being underweight and wasted in their childhood (Table 3).

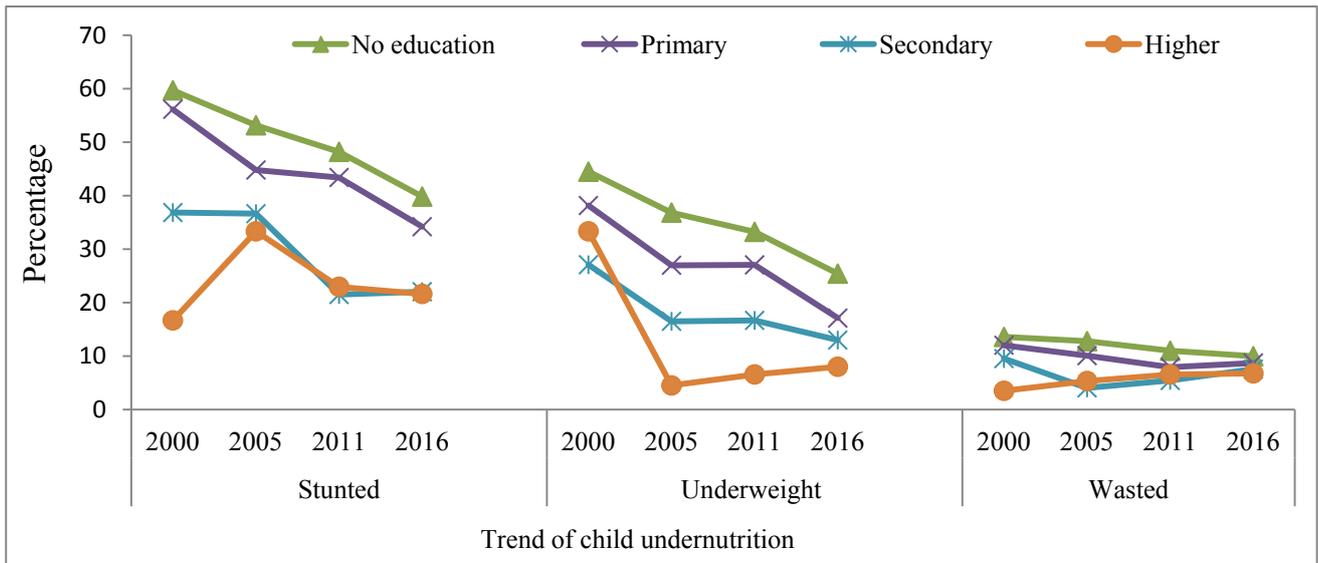


Figure 6. Interaction of household head education and prevalence to child undernutrition

Table 3. Birth weight and prevalence to undernutrition

Child birth weight	Stunted	Underweight	Wasted
Very large	41.26	23.2	7.69
Larger than average	46.92	30.79	9.7
Average	47.31	30.79	10.37
Smaller than average	54.74	43.01	14.01
Very small	52.92	40.26	14.96

(stunting, underweight and wasted) in rural areas was severe in the sample regional states. There is large rural-urban discrepancy in child nutritional status in Ethiopia, which may be primarily explained by the significant differences in households’ asset ownership and utilization in the two areas. Access to assets and awareness of utilization among households may be the reason behind the significant difference in the child undernutrition problem and variability between the rural and urban areas. Households in the urban areas may be better in accessing and utilizing assets as compared to the rural and mostly remote households.

3.3. Child Undernutrition in the Rural and Urban Areas

Table 4 reveals that there is statistically significant difference in the child undernutrition between rural and urban areas, wherein the indices for rural children were high. This indicates that the child undernutrition problem

Figure 7 shows that there is consistent disparity in the child undernutrition between the urban and rural dwellers in the four survey years. The households from rural areas suffer more from the three dimensions of child undernutrition problem in each survey years.

Table 4. Child undernutrition problems in urban and rural areas

Type of problem	Residence	Mean	St.error	t-value	P-value
Height-for-age (Stunted)	Urban	-1.4113	0.0448	8.495	0.000
	Rural	-1.8369	0.0133		
Weight-for-age (Underweight)	Urban	-1.2184	0.0383	11.21	0.000
	Rural	-1.6678	0.0107		
Weight-for-height (Wasted)	Urban	-0.4669	0.0319	7.72	0.000
	Rural	-0.7284	0.0090		

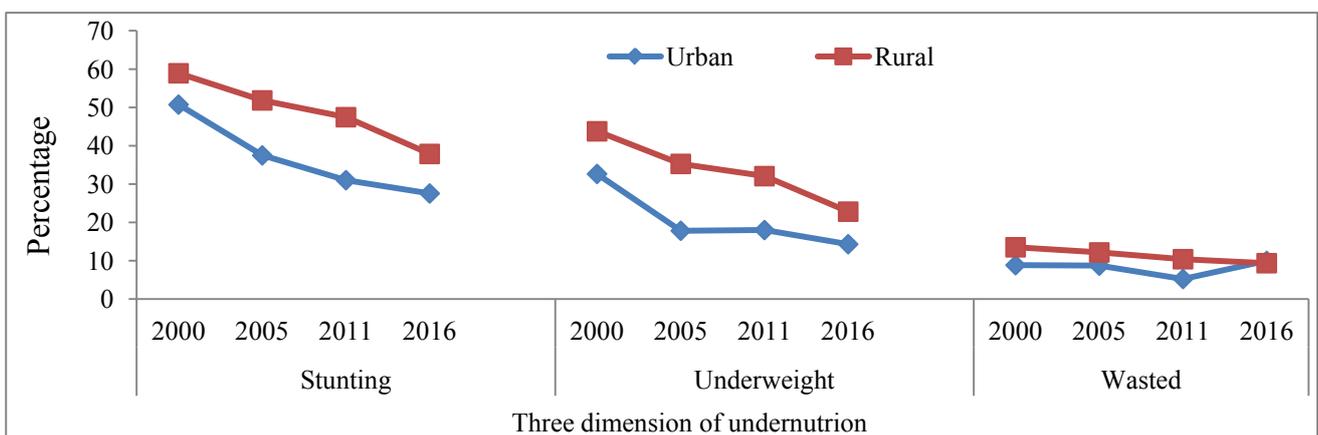


Figure 7. Residential place and prevalence to child undernutrition

3.4. Model Result and Discussion

The following model result shows that many of the variables considered in the regression have significant effect in affecting child undernutrition problem of the study area. Some of the demographic characteristics of the household significantly reduced the probability of suffering from child undernutrition. Increment in the age of the mother significantly reduces the probability of children undernutrition problems (stunting, underweight and wasted). The positive and significant coefficient of the age group 20-24 on stunting revealed that children from younger mothers have positive probability of suffering from stunting. The negative and significant effect of the age group 35-39, 40-44 and 45-49 show that increment in age of the mother has positive effect of reducing child stunting and underweight problems. The magnitude of the coefficient for the different mother's age group exhibited increasing trend, which implies that children from relatively more experienced mothers have better probability of being free from undernutrition problems. The covariate indicates that more experienced mothers have positive effect on reducing child undernutrition problem as compared to the youngest ones. The model result revealed that children from younger mothers have positive prevalence to child undernutrition problem in Ethiopia.

The study considered other covariates that are related to

motherhood to identify its effect on the prevalence of child undernutrition in Ethiopia. The variable, early marriage, has positive and significant effect of aggravating the child undernutrition problem in the country. Early marriage may create the opportunity to have child at early age of the woman without having all the required experiences and capability to take a care and manage children properly, which would directly result in having undernourished child. The children from a woman who married early would have significant probability of being stunted, underweight and wasted as to the model result presented on Table 5.

Additionally, the study considered effect of child birth weight on the prevalence to child undernutrition problems in Ethiopia. The model result shows that child birth weight has significant effect on their future fate. Children with an average or more birth weight has positive effect of reducing childhood undernutrition. Children with very large weight at birth have 37.4%, 74.2% and 69.0% probability of being free from stunting, underweight and wasting, respectively, in their childhood as compared to those children with smaller birth weight (Table 5). The model result revealed that children with below average and smaller birth weight have positive probability of being undernourished in their childhood. Effect of the covariate on reducing undernutrition increases with increment in the birth weight of the child as to the model result (Table 5).

Table 5. Logit regression model result

Explanatory variables	Stunting		Underweight		Wasted		
	Coefficient	R. Std. Err.	Coefficient	R. Std. Err.	Coefficient	R. Std. Err.	
♥Age group	20-24	0.155*	0.088	0.115	0.096	-0.149	0.132
	25-29	0.110	0.087	0.135	0.095	-0.263**	0.130
	30-34	-0.037	0.091	0.056	0.099	-0.187	0.137
	35-39	-0.215**	0.098	-0.173*	0.105	-0.279*	0.147
	40-44	-0.513***	0.111	-0.383***	0.119	-0.256	0.165
	45-49	-0.615***	0.138	-0.726***	0.149	-0.721***	0.221
Early marriage	0.040***	0.002	0.041***	0.002	0.016***	0.004	
■ Birth weight	Below average	-0.083	0.058	-0.068	0.058	-0.156*	0.082
	Average	-0.231***	0.047	-0.441***	0.048	-0.406***	0.068
	Above average	-0.312***	0.057	-0.522***	0.059	-0.520***	0.087
	Very large	-0.374***	0.060	-0.742***	0.064	-0.690***	0.097
♣ Maternal Education	Primary	-0.106**	0.041	-0.210***	0.045	-0.160**	0.067
	Secondary	-0.594***	0.101	-0.484***	0.116	-0.314*	0.172
	Higher	-0.698***	0.215	-1.047***	0.307	-0.170	0.343
Rural residence	0.162**	0.074	0.293***	0.083	0.164	0.121	
♠ Region	Amhara	0.085*	0.049	0.010	0.051	-0.037	0.075
	Oromiya	-0.203***	0.046	-0.148**	0.049	-0.039	0.071
	SNNP	0.005	0.048	0.047	0.051	-0.068	0.075
♦ Wealth quintile	Second	-0.077	0.048	-0.103**	0.050	0.005	0.072
	Middle	-0.134**	0.048	-0.151***	0.049	-0.077	0.073
	Fourth	-0.192***	0.049	-0.270***	0.051	-0.200**	0.077
	Highest	-0.346***	0.062	-0.298***	0.066	-0.145	0.097
Household size	-0.026***	0.009	-0.028***	0.009	-0.020	0.014	
Age of the head	0.001	0.002	0.002	0.002	-0.001	0.003	
Constant	-0.924***	0.139	-1.990***	0.154	-2.427***	0.224	
Pseudo R ²	0.033		0.043		0.014		
Prob > χ^2	0.000		0.000		0.000		
Number of observation	17,136		17,579		17,146		

Note: ♥ The base age group was 15-20, ■ The base was birth weight was small, ♣ The base was illiterate, ♠ The base was Tigray regional state was the base, ♦ The base first quantile was the base.

The main variable of interest in this study, maternal education, has significant effect of reducing the probability of child undernutrition in Ethiopia. Children from mothers who are primary school graduate have better probability of being free from child undernutrition problems (stunting, underweight and wasted). There would be 10.6%, 21.0% and 16.0% probability of being free from stunting, underweight and wasted problems, respectively if the child is from a primary school graduate mother as compared to the illiterate ones (Table 5). In the same fashion children from mothers who are secondary and high school graduate have strong probability of being free from undernutrition problems in the study area. Children from secondary school graduate mothers have 59.4%, 48.4% and 31.4% of probability to be free from stunting, underweight and wasted, respectively (Table 5). The coefficient of the variables under maternal education increase with the education level, which implies that increment in mother education level have significant effect of reducing child undernutrition in Ethiopia. Children from high school graduate mothers have strong probability of being free from children undernutrition as compared to the others with lower education level. These all imply that increment in educational attainment of mothers would be one solution to reduce the serious problem of Ethiopian children, undernutrition.

The type of residence where the children dwell has significant effect on the prevalence of undernutrition problem (Stunting and Underweight). Children from rural households have positive probability of being stunted (16.2%) and underweight (29.3%) as compared to those in urban areas of Ethiopia. Rural households that are the production owner for every food sources crops are suffering more from child undernourishment, which may be due to lower awareness about how to utilize what they have. In connection to this, children from Amhara regional state have positive probability of suffering from child undernutrition (Stunting) as compared to the base, Tigray regional state. This implies that children from the former region has positive probability of suffering from problem of undernutrition as compared to the base regional state. In contradiction to this, children from Oromia regional state has positive effect of being free from child undernutrition problem (Stunting and Underweight) significantly. This regional state has 20.3% and 14.8% probability of reducing stunting and underweight, respectively compared to the base regional state, Tigray. Households in Oromia regional state have the potential of accessing diversified food as compared to Tigray, in which cereals produced commonly.

Household wealth increment have significant and positive effect of reducing prevalence of child undernutrition in the country. Households in the middle or more wealth quantile have better probability of reducing child stunting and underweight in the study area. The coefficient of wealth quantile increases with increment in the wealth level, which implies that relatively rich households have better effect of reducing child undernutrition problems (Stunting and Underweight). Children from relatively richest family have 34.6% and 29.8% probability of being free from stunting and underweight, respectively as to the model result (Table 5). Children from a household in the

fourth wealth quantile have 19.2% and 27.0% probability of being free from stunting and underweight, respectively as compared to the lowest wealth quantile. These all indicate that improvement in household wealth have direct and significant effect of reducing child undernutrition problem of the country. Households' capacity of accessing what children demand may be improved if there is wealth increment, which would finally result in reducing prevalence of undernutrition.

4. Conclusion and Recommendations

Child stunting problem is most common and severe compared to underweight and wasted among sample children from the four dominant regional states that cover significant proportion of the country. There is significant disparity in the magnitude of the three child undernutrition problems in the four dominant regional states. Children from Amhara regional state have larger prevalence from undernutrition compared to other regional states in each survey years. The severity of stunting, underweight and wasted problem was higher for children from Oromia and SNNP regional states. Child undernutrition concentration level has significant gap among sample regions wherein SNNP has the highest inequality in underweight and wasted while Tigray regional state has relatively normal distribution.

Majority of the country's population that has significant economic effect are rural dwellers, who suffer more from persistent child undernutrition. There is statistical difference in the severity of the child undernutrition problem between the urban and rural households. Households from urban areas are better in coping the problem than the rural ones, which may be due to better awareness and easy access to demanded materials in the urban areas. Thus, enhancing awareness and material accessibility may improve the national level undernutrition problem. All the services in the urban areas should be expanded in the rural areas to reduce child undernutrition from the majority of the population in the country. The rural society should get all the necessary mechanisms that enhance awareness to have diversified food sources that would reduce prevalence of undernutrition.

The stunting, underweight and wasted problems of children from households' headed by primary and secondary school graduate consistently reduced. Both maternal and household head education level have significant effect of reducing the child undernutrition problems of the study area. This implies that there should be enhancing the maternal education coverage to reduce child prevalence to undernutrition problems.

Experience in motherhood have significant effect of reducing prevalence to child undernutrition in the study area, which may result in better child health and nutrition level. Thus, the experiences and learning by doing should be shared by youngsters to reduce the prevalence of child undernutrition problems of the country.

Besides to the experience what the mothers' have, their academic education level has significant effect of reducing child undernutrition problem. Increasing mothers' education level has positive and significant effect on reducing

prevalence of child undernutrition. Thus, expanding the education coverage of the country to address the mothers' in rural and remote areas would have positive effect of reducing the national level child undernutrition problem.

The culture of early marriage especially in the rural areas of the country significantly affect child stunting, underweight and wasted in the study area. Early marriage may open the opportunity to have children at early age of the woman without having all the required knowledge and capacity about how to manage a child, which finally results in having undernourished child. Thus, any of the culture that provokes early marriage should be eradicated to reduce the child undernutrition problem in the country.

The child weight at birth has significant effect on reducing the probability of childhood undernutrition. The prenatal care should be there to reduce the probability of delivering underweight children that have strong probability of being undernutrition in their childhood. Thus, the concerned party should work hard not only on the post-natal care, but also on the prenatal to reduce prevalence of childhood undernutrition in Ethiopia.

Finally, the study recommended that in order to achieve sustainable human and economic growth of the country, special attention must be given to the early stages of life (both prenatal and post-natal care) that is the foundation to have developed human capital, which determine the country's future fate.

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