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Meta Analysis

Association between Women's Empowerment and Other Socio-Demographic and Nutritional Factors on Stunting among Children Aged 6 to 59 Months: Data from 2016 EDHS

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ABSTRACT

Background: Stunting is the most prevalent form of malnutrition in children under five years of age in Ethiopia. Evidence supporting women's impact on reducing child stunting is limited. In this paper, we examine the association between women's empowerment and socio-demographic factors on stunting among children aged 6 to 59 months.
Subjects and Method: The study used the EDHS 2016 dataset. Children aged 6-59 months whose mothers (aged 15-49 years) were living with their husbands at the time of the survey were included. We enrolled 8,496 mother and child pairs. Complex sample logistic regression analysis was employed to determine the association between child stunting and the predictors. Data analyses were employed using SPSS Version 22.
Results: Around 2,624 (31%) of the mothers were 25 to 29 years old. In the 12 months before the survey, around 45% (3,806) of the mothers were employed; 2,072 (54%) of them had seasonal jobs, and the 1,734 (45%) remaining mothers had full-time employment. Among employed mothers, about 50.5% (1,921) had not received payment for their work. Household wealth index (AOR= 1.9; 95% CI= 1.44 to 2.73) and maternal height (AOR= 1.9; 95% CI= 1.28 to 2.82), and having a boy child (AOR= 1.3; 95%CI= 1.08 to 1.46) is more liked associating with stunting. But maternal attitude towards wife-beating (AOR= 1.1; 95% CI= 0.89 to 1.26) had no association with it.
Conclusion: children born from the poorest households, low maternal height (<145cm), and male sex have increased risk of stunting. Lastly, Mothers' economic and socio-familial empowerment do not predict the risk of child stunting.

Keywords: stunting, empowerment, women, Ethiopian demographic health survey.

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BACKGROUND

Malnutrition is defined by the World Health Organization (WHO) as the difference between nutrient and energy intake and the

need of the body to ensure homeostasis, basic functions, and, in the case of children, development. Malnutrition plays a pivotal role in child mortality and morbidity from infectious diseases, as well as in delayed mental and motor development(Rytter et al., 2014). It can be categorised as acute malnutrition (insufficient weight relative to height), chronic malnutrition, or stunting (inadequate length or height for ages)(R et al., 2017). Stunting is a form of malnutrition from which children fail to reach the normal international standard of height/length for their age. It is caused by experiences of chronic nutritional deprivation ("WHO launches the Nutrition Landscape Information System (NLIS)," 2010). Children under five years of age are vulnerable to malnutrition, and children aged 12-23 months are more likely affected by stunting when compared to other age groups (Musbah & Worku, 2016; Yalew, 2013). The adverse effect of stunting leads to impaired cognitive and mental development, poor school performance, and low adult wages and productivity. Overall, stunting negatively impacts the socio-economic development of a nation (Yang et al., 2018). Child stunting can occur in the first 1,000 days after conception and is related to many factors, including socio-economic status, dietary intake, maternal nutritional status, infectious diseases, micronutrient deficiencies, and the environment (Mohammed et al., 2019).

Stunting affects 154.8 million children under five years of age worldwide, although it decreased by 23% between the years 2000 and 2016 (WHO, 2018). Nearly 40% of stunting occurred in Africa, and its prevalence increased by 16% over the same period (WHO, 2020). The prevalence of stunting is high in Ethiopia, similar to LMICs, although the country has substantially reduced the rate from 57% to 38% between 2000 and 2016. Furthermore, the prevalence of stunting varies across regions in the country, accounting for 41%, 46%, and 39.1% in Benishangul-Gumuz, Amhara, and SNNP regions, respectively (Ethiopian central Stastical and International, 2016; Musbah and Worku, 2016). Previous studies conducted in the SNNP region and Ethiopia have shown that child age, child sex, maternal education, household wealth index, maternal BMI, and mother's height were all significantly associated with child stunting at $p<0.05$ (Ali et al., 2017; Hagos et al., 2017; Musbah and Worku, 2016).

Stunting has now become the focus of several high-profile initiatives like Scaling up Nutrition and the Nutrition for Growth Summit; Sustainable Development Goal (SDG), and the World Health Organization (WHO) Maternal, Infant and Young Child Nutrition resolution to reduce stunting among children under five years of age (UNICEF et al., 2017). Similarly, over the past two decades, Ethiopia has implemented various interventions to address the high prevalence of malnutrition in the country. The government has adopted the innovative "'Seqota" Declaration to end child by the year 2030, promoting nutrition security in some of the most food-insecure areas of the country. A main goal in the declaration is to achieve zero stunting in children under two years of age. The declaration implementation plan focuses on delivering high impact nutrition-specific and nutrition-smart interventions across multiple sectors including health, agriculture, water, education, and social protection (Bach et al., 2020).

Despite these efforts, stunting remains a major problem in Ethiopia. Women's decision-making power and control of resources may help explain the causes of malnutrition, as women are responsible for household food preparation in 85-90% of cases surveyed in a wide range of LMIC (Endalew & Bizuayehu, 2015). Women are often primary

caregivers and can therefore directly influence their children's nutrition. Improvements in various empowerment indicators have been associated with improvements in maternal and nutrition outcomes (van den Bold et al., 2013).

Women's empowerment involves the ability to influence decision making in regard to economic, socio-familial, cultural, interpersonal, and legal issues (Ali et al., 2017). Economically empowered women are more involved in income-generating activities and control over finances, and often have significant control over food purchase, either to their children's benefit or to the improvement of their own diet or nutritional status. Women's socio-familial empowerment is characterized by their freedom of mobility and decision making, as well as by their attitude towards domestic violence regarding interpersonal or family affairs. Also, socio-familial empowerment enhances the ability to acquire resources, such as information and support from friends and relatives (Hameed et al., 2014).

The lack of economic empowerment for women jeopardizes growth and poverty reduction and leads to less favourable development outcomes for women and their children (Mebratie et al., 2014). Women with lower socio-familial empowerment are at higher risk of being unhealthy, mentally depressed, or injured as the result of limited access to reproductive health services and the higher risk of domestic violence (Hannan et al., 2016). Thus, their poor physical and mental health may indirectly hinder childcare and the provision of timely, independent, and proper feeding (Na et al., 2015).

There is limited knowledge of whether women's empowerment has an impact on the prevalence of child stunting in the context of Ethiopia. Hence, this study aims to determine the association between women's empowerment and child stunting among mothers aged 15-49 years who have children aged 6-59 months.

SUBJECTS AND METHOD

1. Study Design

A cross-sectional study was conducted from January 18, 2016, to June 27, 2016. The survey collected nationally representative population-based data. The data was collected by the Central Statistical Agency (CSA) in collaboration with the Ethiopian Public Health Institute (EPHI) and the Minister of Health (MoH). This study used the subsamples of the national survey of the 2016 EDHS dataset.

2. Population and Samples

The sampling in the 2016 EDHS is a stratified, two-stage sampling procedure used to recruit a nationally representative sample. Each region was stratified into urban and rural areas, yielding 21 sampling strata. In the first stage, a total of 645 EAs (202 in urban areas and 443 in rural areas) were selected with probability proportional to EA size (based on the 2007 PHC) and with independent selection in each sampling stratum. In the second stage, a fixed number of 28 households per cluster was systematically selected for participation in the survey. The sample was expected to generate an estimated 16,663 completed interviews with women aged 15-49. It also includes all children under the age of five years eligible for height and weight measurements. For the analysis reported in this paper, a recoded (KR) dataset was used. The study population was currently married women of reproductive age (15–49 years) who were living with a husband or partner, had one or more children aged 6-59 months, and were alive at the time of the survey. In this study, a total sample size of 8,496 women and child pairs from the 2016 EDHS were considered for this analysis.

3. Study Variable

The dependant variable for this study was child stunting for children aged 6–59 months. The independent variables were categorized into economic and socio-familiar empowerment dimensions. The economic empowerment variables are respondents' occupation, type of women's earnings, the seasonality of a respondent's job, women's incomes compared to their partners, and a decision on a respondent's income use. The socio-familial empowerment dimension variables include decisions on the respondent's health care; decisions on large household purchases; decisions on whether the respondent can visit her family or relatives; and women's attitudes toward partners' domestic violence. The study also includes socio-demographic and nutritional variables such as the child's age, sex, place of birth, region, mother's age, education, BMI, and height.

4. Operational Definition of Variables

The dependent variable child is defined as stunted; the percentage of children aged 0 to 59 months whose height for age is below minus two standard deviations (stunting) was classified dichotomously as "1 or 0" 1 normal and 0 stunted. Women's empowerment refers here to both women's economic and socio-familial empowerment. Women's economic empowerment refers to women's capacity to participate in income-generation activities and control their earnings to benefit themselves and their families. The following women's economic empowerment variables were coded as nominal categorical variables: respondent occupation (yes or no), seasonality of work (seasonal or throughout the year), earning type ("in kind only", "in cash and in-kind"), income comparison ("I don't know", "partner does not bring money", "about the same", "less than him", "more than him", and "not paid"), a decision on income use ("husband" and "alone or jointly"). The socio-familial dimension of empowerment refers to women's ability to make decisions on large household purchases measured as a nominal categorical variable ("alone or jointly" and "husband"), a decision on respondent health care measures as a nominal categorical variable ("alone or jointly" and "husband"), a decision on the respondent family visit (coded as "alone or jointly" and "husband"), and women's attitude on domestic violence measures as a nominal categorical variable ("positive attitude" and "negative attitude" A positive attitude toward domestic violence refers to a woman's belief that a husband is justified in hitting or beating his wife in one of the following situations: if the wife goes out without telling her husband, neglects the children, argues with her husband, refuses sex with her husband, or burns food. A negative attitude towards domestic violence refers to a woman's belief that a husband is not justified in hitting or beating his wife in any of the following situations: if the wife goes out without telling her husband, neglects the children; argues with her husband; refuses sex with her husband, or burns food. The socio-demographic variables such as place of resident coded a nominal categorical variable (Urban and rural), and respondent age measures as ordinal categorical variable ("15-19", "20-24", "25-29", "30-34", "35-39", "35-39", "40-45" and "45-49"), education level measures as an ordinal categorical variable ("no education", "primary education", "secondary education" and "higher"), wealth index measures as ordinal categorical variable "poorest", "poorer", "middle", "richer" and "richest"), BMI codes as an ordinal categorical variable ("<18.5", "18.5-24.9", "25- 29.9" and ">30").

5. Study Instrument

EDHS used standardized questionnaires that were administered to collect the data. The survey questionnaire was pretested using major local languages. The data were

collected through face-to-face interviews. We used specific questions that were included in the survey instrument and directly related to employment, gender roles, decision-making, and biometrics questions such as child weight and maternal BMI.

6. Data Analysis

Descriptive statistics of independent and dependent variables were presented as frequency distributions and percentages. Complex sample binary logistic regression analysis was employed to determine the association between child stunting and the predictor variables. A multivariable analysis was performed using variables that are significant at p values < 0.05 level of binary analysis with 95% confidence interval. In addition, multicollinearity was ruled out (Variance inflation factor <5).

7. Research Ethics

Ethical clearance is not applicable because it is a secondary data review; the DHS study was cleared for ethics, and datasets are publicly accessible. Access to the data set was officially granted by the Demographic Health Survey Program after submitting a request outlining the purpose of the study (https://dhsprogram.com/data/new-use-registration.cfm). The researcher accessed the datasets on January 28, 2019 (Federal Democratic Republic of Ethiopia Ministry of Health, August 2017).

RESULTS

Women's level of empowerment

As shown Figure 2, in the 12 months before the survey, about 3,806 (45%) of mothers were employed, 2,072(54%) had a seasonal job, and 1,734 (45%) had full-time employment. Amongst employed mothers, 1,921 (50.5%) of them had not received their earnings, and 807(54%) were paid less than their partners. Approximately 1,352(90%) of the mothers decided alone or jointly with their partners on how to use their income (Figure 1).

About 2,015 (24%) mothers participated in decision-making on large household purchases, and approximately 1,517 (18%) claimed that their husbands were the only decision-makers regarding family visits. Among the respondents, 5,855(69%) of them had a positive attitude toward domestic violence in one of the following situations: going out without telling the husband, neglecting the children; arguing with the husband; refusing sex with the husband, or burning food (Figure 2).

Socio- demographic and nutritional characteristics

Out of the total sample included in this study, 2,624 (31%) were 25-29 years of age. Among the interviewed mothers, 5,682 (67%) never attained any formal education. Moreover, 3,962(47%) of the women were living in a poor household. Pertaining to maternal body mass index, 6,083 (74%) of the respondents were in a normal range, Kg/m^2 (18.5 - 24.9). Among the mothers who participated in the study, 8,098 (97.8%) of them had a height above 145 cm, not short in stature. (Table1). Amongst children under five years of age, 2,897 (34%) of them were 6 – 23 months of age, and male sex accounted for 4,391(52%) (Table1).

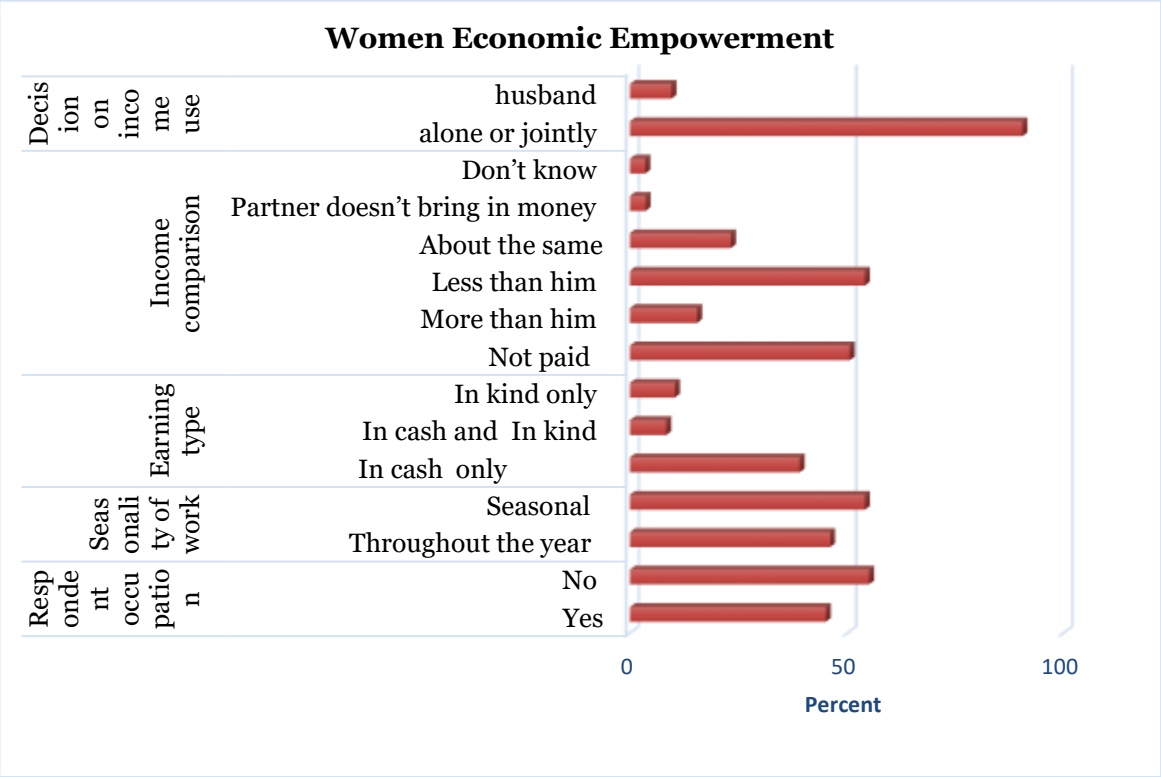

Figure 1. Women's economic empowerment indicators among mothers age 15- 49 years from 2016 EDHS datasets (N=8,496)

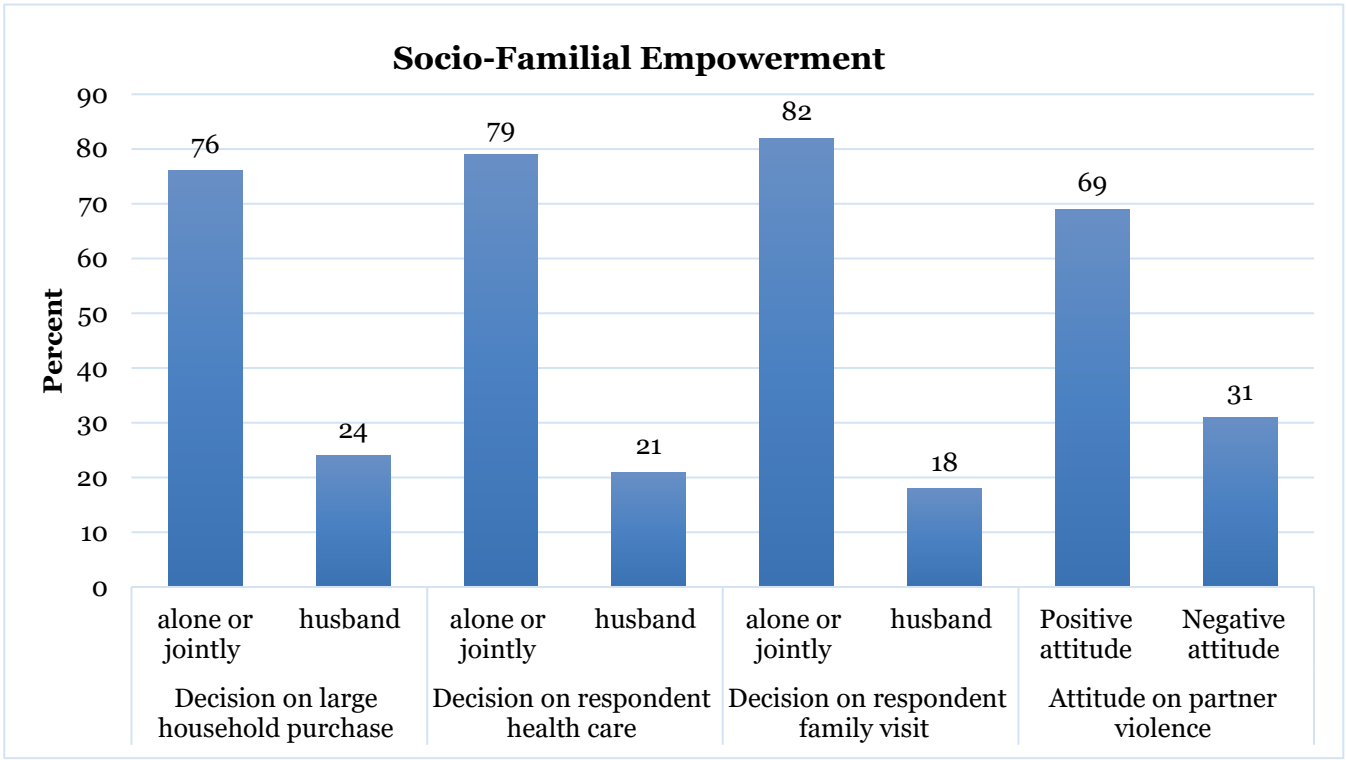

Figure 2. Women's Socio-familial empowerment indicators among mothers age 15- 49 years from 2016 EDHS datasets (N=8,496)

The effect of women's empowerment and other socio- demographic and nutritional factors on child stunting

The multivariable logistic regression analysis showed that maternal height, child's sex, and household wealth index indicated significant association with child stunting. Mothers short in stature or whose height is less than 145cm were 1.9 times more likely to have a stunted child compared to mothers whose height is 145<= cm (AOR: 1.9; 95%CI:1.280, 2.82). Socio-economic factors were another determinant of stunting. Mothers from the poorest households were 1.9 times more likely to have stunted children when compared to mothers from households (AOR= 1.9; 95%CI= 1.44 to 2.73). In addition, when comparing child stunting among children of different sex, male children were 1.3 times more likely to be stunted than female children (AOR= 1.3; 95%CI= 1.08 to 1.46). Among women's empowerment indicators, decisions on large household purchases, decisions concerning family visits, and mothers' attitudes toward domestic violence were not statistically significant in multi-variable logistic regression (Table 2).

Table 1. Socio- Demographic and nutritional characteristics of mothers aged 15-49 years, 2016 EDHS (N=8,496)

Variable	Options	Frequency (N)	Percentage (%)
Place of residence	Urban	908	11
	Rural	7,588	89
Respondent's age	15-19	198	2
	20-24	1,501	18
	25-29	2,624	31
	30-34	1,998	24
	35-39	1,376	16
	40-44	594	7
	45-49	204	2
Education	No education	5,682	67
	Primary	2,245	27
	Secondary	365	4
	Higher	201	2
BMI (KgBB/m²)	< 18.5	1,638	20
	18.5- 24.9	6,083	74
	> 25	504	6
Wealth Index	Poorest	1,977	23.3
	Poor	1,985	23.4
	Middle	1,811	21.3
	Rich	1,521	17.9
	Richest	1,201	14.1
Maternal height	<145 cm	186	2.2
	>145 cm	8,098	97.8
Child's age	6-23 month	2,897	34
	24- 35 month	1,770	21
	36-47 month	1,848	22
	48-49 month	1,981	23
Child's sex	Male	4,391	52
	Female	4,105	48

Table 2 Multivariable logistic regression analysis for socio- demographic, women's empowerment, and other potential factors associated with child stunting among children aged 6 – 59 months (N= 8,496)

Variables	Category	Number	Percentage (%)	AOR (95% CI)
Place of Residence	Urban	908	10.5	1.0
	Rural	7,588	89.5	1.2(0.830 -1.729)
Maternal Height	< 145	189	2.2	1.9(1.280 - 2.82) *
	≥ 145	8,307	97.8	1.0
Maternal BMI	Thin	1,731	20.5	1.9 (0.908 - 3.981)
	Normal	6,113	73.2	1.8 (0.905- 3.748)
	Overweight	411	5	1.1 (0.510- 2.370)
	Obese	105	1.2	1.0
Wealth index	Poorest	1,945	22.5	1.9(1.441- 2.726) *
	Poor	1,954	23.7	1.8(1.319- 2.550) *
	Middle	1,817	21.5	1.5(1.091- 2.091) *
	Rich	1,519	18.3	1.3(.977- 1.749)
	Richer	1,180	13.9	1.0
Child's sex	Male	4,330	51.4	1.3(1.077- 1.463) *
	Female	4,087	48.6	1.0
Decisions on large household purchases	Partner	2,327	23.7	1.1(0.807- 1.243)
	Jointly/ alone	6,088	76.3	1.0
Decisions about family visits	Partner	1,840	17.8	1.2(0.939- 1.481)
	Jointly/alone	6,565	82.2	1.0
Attitude towards domestic violence	Positive attitude	5,836	69.2	1.1(0.889- 1.256)
	Negative attitude	2,581	30.8	1.0
N observation = 8,496				
-2 log likehood = 11149.936[a]				
Negelkerke R^2= 41%				

DISCUSSION

In this study, one in every two mothers have some form of employment, but half of the employed mothers do not receive payment, indicating low economic empowerment and economic inequality at the household level. The cause of this can be attributed to the fact that traditionally, mothers are more responsible for domestic activities such as childcare and household chores, preventing them from having enough time to actively participate in income generation activities that would empower them economically. Moreover, this study showed that these components of women's economic empowerment did not have a significant association with child stunting. This finding is not supported by the study conducted in Andhra Pradesh, India (Shroff et al., 2009), where the prevalence of stunting is 40%, or the study conducted in Bangladesh (Bhagowalia et al., 2012), which revealed that maternal economic empowerment and freedom to spend their own money was positively associated with child stunting. This discrepancy may be due to the variation in cultural, environmental, and national food habits/ consumption of the study's population.

Mothers' participation in decisions regarding large household purchases and their freedom to visit relatives were not determinant factors for child stunting. This study's result is consistent with previous studies conducted in India and Zambia (G et al., 2018; Shroff et al., 2009). This result

suggests that a child's growth is not affected by household decision-making and mothers' freedom of movement. Moreover, mothers had a high level of positive attitudes towards domestic violence committed by their husbands in some household scenarios, indicating an overall tolerance of domestic violence. This indicator measures women's level of acceptance of societal norms that perpetrate violence against women and deprive women of their independence necessary for a woman's sense of self-esteem. Mothers are considered to have high self-esteem if they do not agree with any of the listed reasons as justification for a husband to beat his wife; if a mother does agree with any of said reasons as justification for domestic violence, her self-esteem is considered to be low (Khan and Islam, 2018). Mother positive attitude towards domestic violence is caused by the patriarchal nature of a society that justifies the violation of women's rights and hinders their self-determination. Furthermore, mothers' low level of education predisposes them to the problem. This study also shows that mothers' attitudes towards domestic violence was not significantly associated with child stunting. This finding is consistent with previous studies conducted in India (Shroff et al., 2009), Tanzania (Ross-Suits, 2010), and Lao (Kamiya et al., 2017).

Sex of the child is an important determinant of child stunting; a male child is more likely to be stunted than a female child, indicating inequality in health between boys and girls under five years of age. These findings were supported by a cohort study conducted in pre-term infants and children that depicted both morbidity and mortality to be consistently higher in males than females in early life. The difference was reported to have persisted even after adjusting for gestational age and body (Wamani et al., 2007). Therefore, the cause might be due to some biological difference between male and female children. The finding concurs with previous studies conducted in Ethiopia (Ali et al., 2017; Hagos et al., 2017; Musbah and Worku, 2016).

This study found that maternal short stature (<145 cm), according to an international report from ACC/ SCN, was associated with an increased risk of having stunted children. It further showed that mothers' chronic malnutrition is a risk factor for child stunting. This might be due to shared environmental factors contributing to chronic nutritional deficiencies that modify genetic factors and move through the intergenerational cycle of malnutrition. It is essential to note that during the first 12 months of a child's life, the relationship between a mother's and child's malnutrition is affected by the biological consequences of maternal malnutrition during lactation. This study's finding is consistent with similar research reports concerning the association between maternal and child nutrition in SNNPR, Ethiopia (Negash et al., 2015), and Ghana (Ali et al., 2017), where child stunting was significantly associated with the mothers' height.

Another determinant factor of child stunting was household wealth status. Children living in poor households had a greater risk of stunting than those living in households, as revealed in previous studies (Hong, 2007; Monday et al., 2018). Children living in poor households may not be provided with proper nutrition during the complementary feeding period during which children need the essential nutrients necessary for full potential growth. Also, poor households may not have access to clean water and proper sanitation, the predisposing factors determining children's likelihood of becoming infected with various communicable diseases. Furthermore, poor

households are less likely to afford care and treatment for children who may be exposed to both macro and micronutrient deficiencies (Azupogo et al., 2019; Soboksa et al., 2020).

One limitation of this study is that the cross-sectional nature of the data made it impossible to establish a causal link between the various independent variables and child stunting. As a result of the weak measurement of DHS women's empowerment indexes, the various women's empowerment indicators are not comprehensive. Also, not all elements of the DHS women's empowerment indexes refer to each other in the same way, or to various explanatory variables that are difficult to measure. DHS measures women's empowerment at the household level, which may not reflect level of empowerment at the individual level.

This study showed that both mothers' height and household income were associated with childhood stunting. Thus, promoting women's nutritional improvement (specifically during their childhood), and effective dietary intervention for children born from poor families may help to address the problem. This study further concludes that mothers' economic and socio-familial empowerment aspects do not necessarily determine the likelihood of child stunting.

AUTHOR CONTRIBUTION

YSB, MBG, MY conceived and designed the study; YSH collected and analyzed the data and prepare the manuscript; LFA Reviewed the first draft of the paper; All authors have read and approved the final version of the manuscript.

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The thesis is conducted as a partial fulfilment for MSc. In Public health. Thus, it doesn't have funding

CONFLICT OF INTERESTS

The authors declare that they have no competing interests

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