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THE LINK BETWEEN WOMEN'S EMPOWERMENT AND CHILD NUTRITIONAL STATUS IN CAMEROON

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ABSTRACT

***Background;** Malnutrition remains a serious problem in developing countries as many children under five continue to die as a result of malnutrition. Literature links women's empowerment to improvements in child nutritional status but empirical evidence on this link is still sparse in Cameroon.To fill this gap, this study's main purpose was to investigate the link between women empowerment and the nutritional status of children less than five years of age Materials andMethods; This study made use of the Cameroon Demographic Health Survey 2018. The methodology employed five indicators of women empowerment to construct an index for women empowerment using the Multiple Correspondence Analyses. Childnutritional status was captured using height-for-age (stunting) z-scoreThe study made use of the Heckman control function technique.*

***Results;** The resultshowed that women empowerment had a positive and significant effect on child nutritional status in Cameroon.*

***Conclusion;** These findings imply that women's empowerment is crucial in addressing the issue of malnutrition among underfive in Cameroon.*

***KEYWORDS:** Women Empowerment, Child Nutritional Status, Stunting. Undernutrition.*

1. INTRODUCTION

Adequate nutrition is essential for infants to achieve optimal growth, development, and survival [9.] children under five years of age are most vulnerable to malnutrition, particularly undernutrition[3]. A joint report from the United Nation Children Fund (UNICEF), World Health Organisation (WHO) and World Bank (WB) 2020 revealed that stunting affected 144 million (21.2%) and wasting affected 47 million (6.9%) of children under five years of age worldwide in 2019 and despite the huge progress in reducing undernutrition globally, stunting and wasting rates remained very high in developing countries [18]

Malnutrition continues to be a problem in Cameroon and it is a threat to the quality of Cameroon's human resources in the future It remains a problem because stunted children have weak cognitive abilities and are vulnerable to disease so they are at risk of low productivity in the future. The Cameroon Demographic and Health Survey (DHS) 2018 reported that about 29 percent of children under five in Cameroon are stunted [14]. A high level of child undernutrition raises concerns for Cameroon's prospects for continued economic growth. As revealed by the World Bank in 2009, Cameroon loses over US$187 million in Gross Domestic Product (GDP) to vitamin and mineral deficiencies annually[20.]This implies a cost of more than 100 billion FCFA. Cameroon will realise an increase in Government budgetary savings and productivity if there is a sustained reduction in malnutrition. Therefore, reducing all forms ofmalnutrition becomes a top policy priority.

It is argued that women who remain the primary caretakers of children can influence their children's nutrition directly through intra-household resource allocation and childcare practices and indirectly through their own health and nutritional status[2,16.] Discrimination against women in Cameroon leaves womendisempowered and perpetuatesmalnutrition in children under five years of age [7]Women's empowerment is the process of having and using resources in an agentic manner to reach certain achievements[10,13.].

John Bowlby's attachment theory of 1958 propounded those early relationships with caregivers play a major role in child development. Bowlby's attachment theory suggested that children are born with innate need to form attachments and such attachments aid in survival by ensuring that children receive care and protection from their mothers. Such attachments are characterised by clear behavioural and motivational patterns. When a woman is empowered, she becomes aware of the benefits of being more attached to her child. She follows up her child's feeding and hygiene leading to improved nutritional status. This theory is criticised on grounds that the mother is viewed as the primary attachment figure, when infect, a father or siblings can have the same type of attachment with the child.

Child nutritional status is conceptualised as an outcome that is dependent on the empowerment of the mother in the Cameroonian context. Some researchershave concluded there exist a positive association between women empowerment and child nutritional status [17,6,1.] Unfortunately, no study to the best of our knowledge has empirically analysed the effect of women empowerment on child nutritional status in Cameroon using the Heckman control function estimation technique. This study therefore filled this knowledge gap and investigated the effect of women empowerment on child nutritional status in Cameroon.

II. MATERIALS AND METHODS

This study was carried out in Cameroon using data from the Cameroon Demographic Health Survey of 2018.

Study Design*;* The article is guided by an ex-post facto research design because it gives the researcher the way out to measure the effect of women empowerment on child nutritional status in Cameroon.

Study Location; This work is conducted in Cameroon which is situated in Central Africa with neighboring countries Chad, Nigeria, Gabon, CentralAfrica Republic, Congo Brazzaville and Equatorial Guinea. According to the report of World Bank in March 2020, over 26 million inhabitants live in Cameroon. Its surface area is 475 650 km2. She is made up of 10 regions.

Study Duration; In terms of time scope the study is limited to the year 2018 when the data was collected.

Sample Size; the size of the household health survey was 33988 with 4507 children under five years who were stunted.

Methodology; This paper made use of data from Cameroon's Demographic Health Survey (DHS) 2018. The Survey was conducted using representative sampling techniques at the national level.

Five indicators were used to build the women empowerment index used to measure empowerment.in this study. The indicators were inputs in production decisions, ownership of assets, bank account, selected for domestic violence education and workload. To construct the women empowerment index, Multiple Corresponding Analyses (MCA) were used. The use of multiple corresponding analyses (MCA) was found appropriate since MCA is designed to model relationships of categorical dependent variables. In the functional form of the women empowerment index; it is assumed that $\boldsymbol{i}$ designates the empowerment dimension and WEP is the value of the composite index generated. The mathematical exposition for the index isgiven by;

$$\boldsymbol{WEP_i} = \frac{\sum_{k=1}^{K}\sum_{jk=1}^{JK} w_{jk}^{k} I_{JK}^{K}}{K}$$

Where $WEP_{\boldsymbol{i}}$ represents women empowerment index for all the dimensions or domains considered**;** K is the number of indicators; the discrete variables range from jk equal one to JK the number of categorical indicator k; I am the binary indicator corresponding to discrete variables JK; W is the weight (score of the first standardized axis of categorical variable Jk).

The index generated will likely produce both negative and positive values for the women empowerment index, thus posing some interpretations difficulty. Such problemscan be overcome through a normalisation process. The scores for women empowerment will be normalised within the range of 0 to 100. If the WEP takes the value of zero, it will be interpreted as poor empowerment while 50 and above depicts excellent empowerment. The mathematical exposition for the normalised index is given below;

$\widetilde{NWEP}_{\iota}=\frac{(\ r(\max)-WEPi\ )}{(r(\max)-r(\min))}$ x 100

Where r(max) is the maximum value while r(min) is the minimum value of WEP scores.

Child nutritional status in this paper is the dependent variable and it is measured by the height-for-age (stunting) z-score. According to World Health Organization (WHO) definition, children with height-for-age z-score below minus two standard definitions (−2SD) from the median WHO reference population are stunted [21] .Women empowerment index and child nutritional status proxy by stunting are jointly and simultaneously determined and each has a ceteris paribus behavioural interpretation, their underlying links can be depicted by the following structural equations [11,19,4]. In this model, the women empowerment index is endogenous as established from the literature.

$$CNS = \gamma_1 M_{CNS} + \vartheta_1 WEP + \varepsilon_1 \qquad 1)$$

CNS stands for child nutritional status and it is a continuous variable. M_{CNS} is a vector of exogenous variables that determine a child's nutritional status. CNS in equation 1 is stunting. The parameters $\gamma_{1,} and \vartheta_1$are parameters to be estimated in the child nutritional status – woman empowerment function nexus. The random component of the estimation is captured using the structural error termε_1. In other words, the structural error term captures both random effect and unobservable variables. From equation 1 the women empowerment index (WEP) has to be instrumented since literature has established that woman empowerment is endogenous. Women empowerment (WEP) can affect a child's nutritional status either positively or negatively depending on whether the women are poorly or highly empowered. The child's nutritional status is captured using one of the anthropometric measures heights-for-age (HAZ) z-scores. For equation 1 only stunting is captured. Stunting is used because it is a chronic form of malnutrition. The women empowerment index was derived following the formula provided above.

The estimation of the model (equation 1) using OLS without exogeneising the endogenous explanatory variable, women empowerment (WEP) will lead to bias and inconsistency in the OLS estimates. To exogenise women's empowerment, equation 2 was hypothesized as follows.

$$WEP = \gamma_2 M_{WEP} + \vartheta_2 CV + \varepsilon_2 \qquad (.2)$$

M_{WEP}Is a vector of exogenous variables that determines women's empowerment (WEP) and$\gamma_{2,}, \vartheta_2$ are parameters to be estimated for the woman empowerment function Where CV isthe instrumental variable which explains woman empowerment and does not have an effect on stunting. Equation 2 shows the relationship between covariate, instrumental variable and women empowerment. Since WEP and CNS are jointly determined, WEP is likely to be correlated with the error termε_1. Meanwhile, CNS is also correlated with ε_2 in the WEP function. The instrument used for the women empowerment index is ethnicity (Northern women) and the number of birth by women (idx94). The authors argued that the ethnicity of a woman may influence her bargaining power within the households since different ethnic groups have different social norms that serve as threat points in intra- house bargaining power. The two-stage instrumental variable was found appropriate to be used. Therefore, the study adopts an IV (2SLS) estimation technique witha residual of the WEP inserted into the child stunting equation. It is

a conventional approach to address the problem of endogeneity. To obtain a consistent estimator, the assumption of the existence of an instrumental variable (IV) that satisfies the assumption for correcting the endogeneity problem was maintained. Thus, the instrument needs to be strongly correlated with women empowerment (index generated) but not with other unobservable characteristics represented in the children's nutritional status error term. The adopted instruments for women's empowerment are ethnicity and the index of the number of birth by women. [11]argued those social norms may differ across ethnic groups with the potential to place threat sockets in intra-household bargaining and decision-making on the indicators of women empowerment. [16]in his study established that women in the northern region of Nigeria especially, the Hausas and Fulanis are less autonomous than women in the southern region (the Yorubas and Igbos).

$$CNS = \alpha_0 + \alpha_1 M_{CNS} + \alpha_2 WEP + \alpha_3 \hat{\varepsilon}_2 + \alpha_4 \hat{\varepsilon}_2 WEP + U \quad (3)$$

Where $\hat{\varepsilon}_2$ is the fitted residual of WEP, derived from the reduced form linear probability model in equation 2. $\hat{\varepsilon}_2 WEP$ is the interaction effect of the women's empowerment with its residual, and U is the error term. The inclusion of the residual $\hat{\varepsilon}_2$ controls the unobservable variables that are correlated with WEP in the CNS function in equation 3. The interaction term $\hat{\varepsilon}_2 WEP$ controls the effect of neglected non-linear interaction of unobservable variables with the input into child nutritional status and sample non-randomness respectively.

Some of the children were born at home and were not registered; estimation of the model without accounting for the selectivity bias by selecting only those children whose bio-data and characteristics were available at birth will lead to spurious regression. To account for this, equation 3 is augmented to include the inverse of the Mills ratio [IMR] as observed below.

$$CNS = \alpha_0 + \alpha_1 M_{CNS} + \alpha_2 WEP + \alpha_3 \hat{\varepsilon}_2 + \alpha_4 \hat{\varepsilon}_2 WEP + \lambda IMR + U \quad (4)$$

The IMR is used to account for the selection bias. To effectively do that, the control function model without and with interaction was employed. The control function estimation technique by Heckman handles the issue of endogeneity and selectivity bias at once.[13].

Statistical analysis

Data was analysed using STATA version 14. The endogeneity test of endogenous regressors (The Durbin Wu-Hausmann X^2 test = 32.647, p = 0.0000) showed the variable women empowerment was endogenous in the child nutrition status function. Thus, the OLS estimate was not reliable for inference. The Anderson –Rubin Wald test of joint significance of endogenous regressors was larger (7.02) than the p value (0.03). This justified that the instruments were not weak. According to the weak identification tests, the Cragg-Donald Wald F statistic of 284.352 was greater than the Stock-Yogo weak identification critical value of 19.93. This showed that the hypothesis of weak identification be rejected. The Sargan Chi- squared test statistics of 3.233 was greater than the Chi square p-value of 0.0722. Thus, indicating the validity of the instrumental variables. The under-identification test of Anderson canonical correlation LM statistic 505.981 was larger than the Chi Square (X^2) p value (0.0000). This test the null hypothesis that all instruments were valid.

3. RESULTS

Table no 1 Presents the descriptive statistics of the variables that are indicators of women empowerment. For the training on domestic violence, 53.3% of women on average took part in the training on domestic violence. Concerning ownership of a bank account, only 9.4% of women on average had an account in a bank. On family planning education, 12.9% of women averagely had education on family planning. Looking at the decision on purchases, 71.7% of women on average decided on what to purchase. For land ownership, 14.8% of women averagely own land.

Table 1: Descriptive Statistics for the Indicator of womenempowerment

Variable	Obs	Mean	Std. dev	Min	Max
Domestic violence Training (1 if women participated in the training, 0 otherwise)	33988	.533	.499	0	1
Bank Account (1 if women have a bank account, 0 otherwise)	33988	.094	.291	0	1
Family planning (1 if the women are educated on family planning, 0 otherwise)	33988	.129	.335	0	1
Decision (1 if women decided on what to be purchase, 0 otherwise)	33988	.712	.453	0	1
Land Ownership (1 if landownership, 0 otherwise)	33988	.148	.355	0	1

Source: Computed by Author using Stata version 14 from DHS (2018)

Table 2 Presents a synopsis of women empowerment index and the contribution of the various indicators to this index using the MCA. Joint decision of women in households contributes 0.142 to women empowerment as opposed to no joint decision which contributes only 0.058 to the women empowerment index. This is in line with our expectations because it holds that when women have a say on decision taking in families, it should contribute higher to their empowerment than women they are not part of decision making in their families. Surprisingly, land ownership contributes lower to the women empowerment index compared to when women do not own land. This is probably because majority of the women did not own land as presented on the descriptive statistics on Table.1. Similarly, owning a bank account contributes lower to the women empowerment index than when women do not own bank accounts. This is contrary to our expectations and can be explained by the fact that most of the women considered in the survey were not owners of a bank account. Likewise, having education on family planning contributes higher to the women empowerment index than when women do not have education on family planning which is in line with the expectations. As concerns training on domestic violence, when women are trained, it contributes higher to the women empowerment index than when they do not undergo training on domestic violence.

Table 1: Synopsis of the women empowerment index

	Overall			Dimension 1		
Categories	Mass	Quality	%inert	Coord	Sqcorr	Contrib
Joint decision						
0	0.058	0.730	0.121	1.447	0.572	0.121
1	0.142	0.730	0.049	-0.586	0.572	0.049
Land ownership						
0	0.170	0.553	0.016	0.090	0.050	0.001
1	0.030	0.553	0.091	-0.521	0.050	0.008
Owns bank account						
0	0.181	0.679	0.035	-0.473	0.672	0.041
1	0.019	0.679	0.335	4.579	0.672	0.393
Domestic violence training						
0	0.093	0.952	0.004	-0.028	0.010	0.000
1	0.107	0.952	0.004	0.025	0.010	0.000
Family planning education						
0	0.174	0.667	0.045	-0.536	0.642	0.050
1	0.026	0.667	0.301	3.615	0.642	0.338

Source: Computed by Author using Stata version 14 from DHS (2018)

Table no 3 Shows a summary of the descriptive statistics of the variables in women empowerment and child nutritional status (stunting). A total of 33988 observations were considered with 4507 children stunted. The descriptive statistics show that an average of 18% of women were empowered. Of these children who were stunted, 49 % of them were female and their ages ranged from 0 to 59 months with an average age of 4 months. For family size, 28% of families on average had a family size greater than four persons. For the educational level, on average 9% of women attained primary education, 9% attained secondary education and 1% attained higher education. The descriptive statistic further revealed that on average, 77% of household heads were male. The birth history of women from the statistic shows that on average 1.395 births were registered with a minimum of 1 and a maximum of 5 births.

Table 3: Descriptive summary of variables for Women Empowerment and Child Nutritional Status

Variable	Obs	Mean	Std. Dev.	Min	Max
Child nutrition (stunting)	45 07	-0.919	1.79	-5.99	5.85
Normalise women empowerment index	33988	18.016	20.58	0	100
Childsex(Female=1, otherwise=0	33988	0.492	0.5	0	1
Family size(more than 4=1, otherwise=0	33988	0.282	0.45	0	1
Household head (male=1, otherwise=0	33988	0.77	0.421	0	1
Mother education (primary=1,otherwise=0	33988	0.087	0.282	0	1
Mother education (secondary=1,otherwise=0	33988	0.093	0.29	0	1
Mother education (tertiary=1,otherwise=0	33988	0.01	0.099	0	1
Child age (months)	33988	3.814	11.555	0	59
Urban	33988	0.437	0.496	0	1
Rural	33988	0.563	0.496	0	1
	33988				
Womenempowerment residual	9733	0	17.866	-42.536	88.813
Womenempowerment interaction	9733	319.165	1009.243	-1150.084	8841.85
Inverse of mills ratio	33983	2.328	.932	0	3.828
Selection dep	33988	0.133	0.339	0	1
Women empowerment NORTH	33988	5.122	11.906	0	100
Index of birth history	9733	1.395	0.606	1	5

Source: Computed by Author using Stata version 14 from DHS (2018)

Table no 4 Depicts that based on the OLS estimation technique (column 1), the gender of the child, household size, household head, mother's primary, secondary and tertiary education are all positively related to stunting though the sex of the household head and the mother's primary education are not significant predictors of the level of stunting. An improvement in women empowerment increased stunting by 0.0123 standard scores and this is statistically significant at 1 %. Thus child nutritional status reduces when women are empowered. Given that women empowerment is endogenous, estimation of the results using OLS without exogenising the endogenous explanatory variable, women empowerment gives results which are bias and inconsistent.

A possible source of endogeneity is unobserved heterogeneity which is more likely in the link between women empowerment and child nutritional status as it cannot be ruled out that unobserved factors influence women empowerment and child nutrition outcomes simultaneously. Endogeneity may also arise from reverse causation between women empowerment and child nutrition outcomes. Women's empowerment may improve child nutrition when there is an increase in care and proper feeding of children, while poor child nutrition (stunting) increases the burden and time women dedicate to child-rearing or caregiving, which may likely increase some of the constraints placed on them and narrow opportunities for active participation in productive activities.

To address the problem of endogeneity, the study adopted the instrumental variable (2SLS) model with residual of the WEP inserted into the child nutrition equation. The IV (2SLS) gives more robust results than the OLS approach because it accounts for the potential endogeneity bias. The instruments selected for the empowerment index were ethnicity (northern) and woman's birth history following [11]These authors submit that the ethnicity of a woman has influence on her bargaining power within the household since different ethnic groups have different social norms that serve as threat points in intra-house bargaining power.

From column 3 of the Table, the sex of a child, household size, household head and mother's secondary and tertiary education had a positive relationship with child stunting. This implies an increase in these variables leads to a fall in the nutritional status of children. These variables significantly predict child nutritional status. It was observed that the child's age and women's empowerment are equally significant predictors of child nutritional status. The negative relationship between women empowerment and child stunting as revealed by the results is an indication that improving women empowerment is associated with increase in the child nutritional status. The Control Function estimation technique in column 4 confirms the significance of these variables in influencing child stunting.

To account for the selectivity bias in this analysis, we employed the Heckman control function estimation technique. With this estimation technique, women empowerment has a negative and significant effect on stunting as seen on the table. A unit increase in women empowerment leads to a decrease in stunting of 0.00981 standard scores and this is significant at 5%. Women empowerment is thus a significant predictor of child nutritional status. This implies an improvement in women's empowerment increases the nutritional status of children under five years of age in Cameroon. The findings of women empowerment resulting to an increase in child nutritional status is in line with studies carried out by[1 ,6,17]. Thus empowering women by giving them more powers to make decisions on household purchases will enable them to direct the income available in providing more nutritional needs of the children in the household.

A positive and significant relationship is seen in the link between mothers' secondary and tertiary education and child stunting. A year increase in mother's secondary and tertiary education leads to a 0.0826 and 1.896-point increase respectively in child stunting and a 1% level of significance. Thus with higher education, the children are left under the care of their nannies who do not provide the necessary diet to enable the children grow well. Women with higher education concentrate more on income-generating activities and attending seminars and neglect the care of their children. This contributes to the children being stunted. The Inverse Mill Ratio is significant implying the control of upward selectivity was imperative otherwise the model would have given faulty results due to the non-accountability of selectivity bias.

Table no 4: The effect of women's empowerment on child nutritional status

	(1) (OLS)	(2) 2SLS Without Residual	(3) 2SLS With Residual	(4) Control Function	(Heckman Control Function)
VARIABLES	Stunting	Stunting	Stunting	Stunting	Stunting
Child sex (Female=1, otherwise=0	0.214*** (0.0514)	0.220*** (0.0529)	0.213*** (0.0512)	0.215*** (0.0512)	0.221*** (0.0509)
Family size (greater than 4=1,otherwise=0)	0.164*** (0.0571)	0.144** (0.0591)	0.179*** (0.0572)	0.180*** (0.0568)	0.206*** (0.0357
Household head (male=1, otherwise=0	0.265 (0.164)	0.280 (0.175)	0.283* (0.170)	0.311* (0.165)	0.349** (0.169)
Mother's education(primary =1,otherwise=0)	0.124 (0.191)	0.282 (0.209)	0.275 (0.202)	0.299 (0.193)	0.327 (0.201)
Mother's education(secondary=1,otherwise=0)	0.476*** (0.181)	0.745*** (0.201)	0.740*** (0.195)	0.789*** (0.187)	0.826*** (0.195)
Mother's education(tertiary= 1, otherwise=0	1.066*** (0.297)	1.884*** (0.324)	1.739*** (0.304)	1.827*** (0.324)	1.890*** (0.304)
Child age	-0.0200***	-0.0195***	0.0201***	-0.0200***	-0.00107

	(0.00152)	(0.00153)	(0.00148)	(0.00151)	(0.00208)
normalise_women empowerment index	0.0123*** (0.00127)	-0.00895** (0.00407)	-0.00979** (0.00415)	-0.0100** (0.00447)	-0.00981** (0.00410)
Women empowerment residual			0.0248*** (0.00440)	0.0316*** (0.00544)	0.0311*** (0.00525)
Women empowerment _interaction				-0.000128** (5.21e-05)	-0.000128** (5.54e-05)
Constant	-1.009*** (0.173)	-0.699*** (0.191)	-0.664*** (0.188)	-0.648*** (0.188)	-1.503*** (0.198)
Observations	4,507	4,507	4,507	4,507	33,983
Inverse of Mills Ratio					0 .6616*** (.0504)
Athrho(correlation of CNS with sample selection residual					0.402*** (0.0326)
Sigma of CNS residual					0.549*** (0.0108)
R-squared	0.072	0.019	0.079	0.080	
Under identification test (Anderson Canon. corr. LM statistics)		505.981(0.0000)			
Cragg-Donald Wald F statistic		284.352			
Stock-Yogo weak ID test critical values:		19.93			
Sargan statistic (over identification		1.912(0.1667)	3.233(0.0722)		

test of all instruments):Chi-sq (1) P-val	
:	32.647(0.0000)
Endogeneity test of endogenous regressors: Chi-sq(1) P-val =	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Computed by authors using STATA 14

Table no 5 Shows the effect of women's empowerment on child stunting in different residential areas. It is seen that out of the total number of children observed, 2034 of them were found in the urban areas while 2473 were in rural areas. The result reveals that an improvement in women's empowerment will reduce child stunting in both urban and rural areas. An improvement in women empowerment reduces stunting by 0.0125 points in urban areas with a 5 percent level of significance. Women empowerment was thus a significant predictor of stunting in urban areas but not in rural areas.

Table 5. Sensitivity Analysis for Effect of Women Empowerment On Child Stunting for Rural andUrban Areas

Control Function		
VARIABLES	(Urban) haz06	(Rural) haz06
normalise_women empowerment index	-0.0125**	-0.00964
	(0.0054)	(0.0077)
Child sex(Female=1,otherwise=0)	0.156**	0.264***
	(0.0727)	(0.0705)
Family size(more than 4=1,otherwise=0	0.237***	-0.0221
	(0.0765)	(0.0834)
Household head(male=1,otherwise=0	0.574**	0.0506
	(0.270)	(0.205)
Mother education(primary=1,otherwise=0	0.248	0.311
	(0.305)	(0.248)

Mother education(secondary=1otherwise=0	0.834*** (0.288)	0.662** (0.260)
Mother education(tertiary=1,otherwise=0	1.916*** (0.402)	1.212 (0.739)
Child age	-0.0174*** (0.00210)	-0.0225*** (0.00211)
Women empowerment residual	0.0262*** (0.00677)	0.0297*** (0.00923)
Women empowerment interaction	-7.06e-05 (6.43e-05)	-0.000119 (9.25e-05)
Constant	-0.638** (0.299)	-0.530** (0.247)
Observations	2,034	2,473
R-squared	0.072	0.070

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Computed by authors using STATA 14

IV. DISCUSSION OF RESULTS

High rates of stunting among children are a national worry requiring interventions to reduce it. Empowering women who are the primary caretakers of children will have an impact on the nutritional status of children under five. This paper, therefore, investigated the effect of women empowerment on child nutritional status in Cameroon using data from the Cameroon Demographic and Health Survey for 2018.

Addressing this objective, the result revealed a negative effect of women's empowerment on stunting. Thusimproving womenempowerment leads to an increase in nutritional status for children under five in Cameroon. Thus, empowered women are more likely to have healthy children as compared to women who are not empowered. This finding of women empowerment increasingchild nutritional status is in line with studies carried out by, [15,22,5,] Empowering womenbrings increase in knowledge and awareness of basic health tips that helps the mother and the child. This suggests that households withempowered women are less likely to have stunted children. Empowering women increases childnutrition status since these womenpurchase the quantity and quality of the food which are necessary for children's consumption and growth. Empowered women carry out activities that improves their income and welfare status thereby reducing poverty and providing the best for their children. They use the income generated from these activities to take care of their children. The sex of the child showed significant associations with stunting. Female children had higher odds of stunting than males. This was congruent with the study from rural Somalia, where females were more stunted than their male counterparts[22.] Theresult also tied with that of a study carried out in Northern Ethiopia where Female children had higher odds of

stunting than males. This variation might be due to unmeasured factors in the caregiving behaviours of mothers because of preference. When parents are stricter with their daughters than their sons and often give more meal freedom to male children than females, it can lead to female children being stunted.

This finding was contrary to studies that opined those male children are more stunted than female children[5.,13.] In early childhood, the time girl children spend around the home might give them an advantage in the attention they receive from parents and increased access to food during food preparation. Male children, on the other hand, might spend more time out of the house, playing with other male children, resulting in greater energy expenditure and exposure to environmental risks and sources of infection[8.]

An increase in mother's level of education led to a fall in the child'snutritional status. This was unexpected but it implied with higher education, mothers spend very little time with their children. More attention was given to their income-earning activities than to their children. The children were left under the care of their nannies who may not provide the necessary diet required for growth by these children. The analysis revealed that when women receive empowerment, child stunting in the urban area fallsmore significantly than in the rural area. This can be linked to the fact that women in urban areas are open to many income-earning opportunities where they can raise money to provide their basic needs and take proper care of their children than women in rural areas. In addition, these urban areas may have better-equipped urban healthcare systems and higher access to healthcare facilities, which facilitate public health interventions. Compared to rural areas, individuals living in cities have greater availability of food and better housing, piped water, sanitation and transportation. Equally, the urban population usually have a higher economic status and employment opportunities. All of these will contribute to reducing stunting in the urban areas.

V. CONCLUSION

The purpose of the present research was to investigate the nexus between women's empowerment and children's nutritional status. Since it is considered that women are the primary caretakers of children in the household and their intra-household dynamics affect the well-being of individuals, the empowerment of women is a means to better children's nutritional status, which influences important developmental outcomes. The Cameroon demographic health survey (CDHS 2018) data was used to analyse the impact of women's empowerment on child nutritional status using height–for–age (HAZ) z-score. The results of the study showed that an improvement in women's empowerment resulted in an increase in the nutritional status of children under five in Cameroon. This study thus shows that in the interest of bringing about sustainable improvements in child nutritional status in Cameroon, the government of Cameroon as well as development partners and international agencies should consider interventions that will empower women in decision-making, particularly on household purchases.

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APPENDICES

Women empowerment index using MCA

```
women empowerment index

mca jointdecisionpurcharse landownershipj accountf domesticvmodwomen familyp

> edu

Multiple/Joint correspondence analysis         Number of obs     =     33,988

                                               Total inertia     = .00434574

    Method: Burt/adjusted inertias             Number of axes    =          2

                 |   principal               cumul

      Dimension |    inertia     percent   percent

    ------------+----------------------------------

          dim 1 |    .0024895     57.29      57.29

          dim 2 |    .0004313      9.92      67.21

    ------------+----------------------------------

          Total |    .0043457    100.00

Statistics for column categories in standard normalization

                  |          overall          |        dimension_1

      Categories |    mass quality   %inert |   coord   sqcorr contrib

    -------------+---------------------------+---------------------------

    jointdecis~e |                           |

               0 |   0.058    0.730    0.121 |   1.447    0.572    0.121

               1 |   0.142    0.730    0.049 | -0.586    0.572    0.049

    -------------+---------------------------+---------------------------

    landowners~j |                           |

               0 |   0.170    0.553    0.016 |   0.090    0.050    0.001

               1 |   0.030    0.553    0.091 | -0.521    0.050    0.008

    -------------+---------------------------+---------------------------

    accountf     |                           |

               0 |   0.181    0.679    0.035 | -0.473    0.672    0.041

               1 |   0.019    0.679    0.335 |   4.579    0.672    0.393
```

domesticvm~n						
	0	0.093	0.952	0.004	-0.028	0.010	0.000
	1	0.107	0.952	0.004	0.025	0.010	0.000
familypedu						
	0	0.174	0.667	0.045	-0.536	0.642	0.050
	1	0.026	0.667	0.301	3.615	0.642	0.338

		dimension_2		
Categories		coord	sqcorr	contrib
jointdecis~e				
	0	1.825	0.158	0.192
	1	-0.739	0.158	0.078
landowners~j				
	0	0.687	0.503	0.081
	1	-3.956	0.503	0.463
accountf				
	0	0.115	0.007	0.002
	1	-1.116	0.007	0.023
domesticvm~n				
	0	-0.650	0.942	0.039
	1	0.568	0.942	0.034
familypedu				
	0	0.253	0.025	0.011
	1	-1.709	0.025	0.075