

Abbreviated Women Empowerment in Agriculture Index and Child Nutritional Status in Hawella District, Sidama Region, Ethiopia; a Community Based Cross-sectional Study

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Abstract

Background

Malnutrition remains to be one of the world's most serious and least addressed socio-economic and health problems. In Ethiopia, agriculture is of the main occupation interlinked with human nutrition where woman make up a large percentage of the workforce.

Objective

To assess the relationship between abbreviated women's empowerment in agriculture index (A-WEAI) and nutritional status of their children in Hawella district of Sidama region, Southern Ethiopia.

Methods

A community-based cross-sectional study was conducted in Hawella district. A total 338 mothers with their children aged 6–59 months were participated in the study. The data was collected using modified, pre-tested and structured questionnaires adapted from literatures and women's empowerment in agriculture index module A-WEAI Version. Anthropometric measurement data of children was collected using precise digital scale and stature meter. Data entry was done through Epi Data version 3.1. Woman empowerment was measured based on A-WEAI. Anthros software was used to compute height-for-age and weight-for-height and < -2 SD was taken as cut-off points for both stunting and wasting. A statistical package for social sciences version 23.0 software was for data analysis. The statistical significance was considered at p value < 0.05 .

Results

The prevalence of stunted and wasted among children were 40.5% (95% CI: 34.9, 45.6) and 12.1% (95% CI: 8.9, 16), respectively. Based on the five domains of empowerment (5DE) indicators, nearly 57% of women were empowered. The age of the mother (AOR = 2.6, 95% CI: 1.07–6.25), marital status of mothers (AOR = 6.4, 95% CI: 2.01–2.71), place of birth (AOR = 4.5, 95% CI: 2.12–9.49), and maternal educational status (AOR = 2.8 95% CI: 1.29–6.23) were factors independently associated with wasted children. Whereas, factors such as family size (AOR = 2.3, 95% CI: 1.03–5.13), overall women empowerment (AOR = 2.3 95% CI: 1.03–5.13), access to and decision on credit (AOR = 3.7, 95% CI: 1.56–7.47), and control over use of income (AOR = 9.4, 95% CI: 3.92–22.35) were associated with stunting in children.

Conclusion

this study provides evidence that intervention is needed to prevent child malnutrition through enhancing women empowerment in agriculture.

Introduction

Globally, malnutrition in children aged under 5 years persists at unacceptably high levels.¹⁻³ It remains one of the world's most serious but least addressed socio-economic and health problems with the single largest contributor to disease in the world^{4,5}. Africa and Asia bear the greatest share of all forms of malnutrition, more than half of all stunted children under five lived in Asia and two out of five lived in Africa⁶. Under nutrition is the major risk factor in Africa which causes 2.9 million deaths annually⁷. In Ethiopia, 37% of children under five are short for their age or stunted, 7% of children are wasted, and 21% of all children are underweight⁸.

Agriculture is the main occupation of about 80% of people living in rural areas of developing countries⁹ and it is intrinsically interlinked with nutrition in many ways through which increased food for own consumption, increase in income, reduction in market prices, and changes in preferences¹⁰⁻¹². In developing countries, women make up a large percentage (43%) of the workforce in agriculture, almost 50% in eastern and southeastern Asia and sub-Saharan Africa¹³. Hence, women empowerment is key factors that influence outcomes on nutrition¹⁴ and is not just necessary for their well-being, but also a means to broader agricultural development and nutrition security¹⁵.

Women empowerment's have an edge over child nutritional status. Its effect in reducing child malnutrition was larger than estimated for other determinants¹⁶ and influences child nutrition through three major pathways: food security, caring practices for women and children, and health environment quality¹⁷. In addition to their roles as agricultural producers and income earners, women are more likely to be caregivers and food providers within their families throughout the world, and thus are considered the guardians of household food security and nutrition^{18,19}.

Even though improvement in women's empowerment status is a key factor in child nutrition, its relative importance is not clearly understood as many researchers use as indicators of education, employment or wealth status. Previous studies in Ethiopia examined the malnutrition status of children and its associated factors²⁰⁻²⁵. However, to the best of our knowledge, there are no published studies that have evaluated the relationship between abbreviated women empowerment in agricultural index and nutritional status of their children in the Hawella Tula district of Sidama regional state, Southern Ethiopia.

Materials and Methods

Description of Study Area,

The study was conducted in South Ethiopia, Sidama regional state, Hawella district. It is located 272 Km to the south east of Addis Ababa.

Study Design and Sampling

A community-based cross-sectional study design was carried during February, 2020 through June, 2020. The study participants were women and their children aged 6–59 months in the study area. The sample size was determined using single population proportion formula considering the following assumptions: 95% confidence interval (CI), 5% margin of error, and prevalence of under nutrition is 27.6% proportion of child under nutrition from the study conducted in Damot Gale district Southern Ethiopia ²⁶. The required sample size for this study was 307; after adding 10% for non-response rate, the final sample size was 338. The mothers with their children were selected using systematic random sampling techniques and health extensions family folder was used as sampling frame from 3 kebeles which had been identified by the lottery method. Finally, the study participants were allocated proportionally for each kebele based on the number of mothers having child aged less than 5 years.

Data Collection

The data was collected using modified, pre-tested and structured questionnaire to assess socio-demographic and economic status of mothers having children aged 6–59 months. The data to determine woman empowerment was collected using questionnaire adapted from women's empowerment in agriculture index module A-WEAI Version ²⁷. Additionally, anthropometric measurement data of children was collected using United Nation's International Children's Fund (UNICEF) SECA portable, digital scale with precision of 100 gm and stature meter. The weighing equipment was standardized with standard weights before taking every measurement. The weight was taken on barefoot and minimal cloths. For child less than 1 year of age, the "mother-and-baby function" was used to determine the body weight of child while being held in the arms of the mother. The measurement of height/length of children was carried using height board. The height was recorded after checking by two persons to the nearest 0.1 cm. The recumbent length in children younger than 24 months of age and standing height for 24 months onwards was also measured.

Quality control

The content of the questionnaire was edited, reordered and modified to improve clarity. The revised questionnaire was then pre-tested on 5% of respondents outside the study area. The questionnaire was created in English but then translated and administered in local language (*Sidaamu Afoo*). The consent of the respondents was obtained prior to administration of the questionnaire. All questionnaires were followed by a face-to-face interview. Four interviewers were trained to conduct assessments. The interviewers were BSc holders with educational background in public health sciences. To administer the questionnaire, the questions were read aloud, with respondents given enough time (25–30 minutes) to respond for the questionnaire. The data was checked for completeness, accuracy, and consistency on daily basis. Finally, data was entered in to Epi-data software by two independent data entry clerks and then validation of duplicated data files were made to ensure data quality.

Ethical consideration

This study was reviewed and approved by Institutional Review Board of Hawassa University, College of Medicine and Health Sciences (Ref. No: IRB/026/12). Anonymity of the participants was kept by informing them that their name and personal identifiers were not written on the questioner. The interviewer had explained the objective, benefit and risk of the study to get informed consent from each study subject. Participants were informed that they have full right to participate or refuse participation in the study and the right to stop in the meantime while administering questioner if not feeling comfortable, keeping in mind the rationale of the study and benefit of individual response.

Statistical Analysis

The pre-coded data were entered into Epi Data version 3.1 and WHO Anthro software was used to compute Z-score (height-for-age and weight-for-height) according to WHO reference standard taking < -2 SD from the median of the reference population were considered stunted and, wasted, respectively. Then, the data were exported and analyzed using the Statistical Package for the Social Sciences version 23.0 (IBM SPSS, ver. 23, Armonk, NY). The distribution of the variables were explored and data cleaning was performed to identify outliers/inconsistence, errors and missing. Descriptive statistics were used to determine demographic characteristics of the participants.

The woman empowerment was determined using 5DE aggregate index which comprises six component of binary indicators (Table 1), each of the six indicator is assigned a value of one if the individual's achievement is adequate and a value of zero if the individual's achievement is inadequate, The empowerment score is the weighted percentage of dimensions in which a person has achieved adequacy and the woman considered as empowered when the adequate achievements is $\geq 80\%$.

The bivariate analysis was done to identify factors associated with malnutrition. Those variables in the bivariate analysis with P value less than 0.25 were included into the multivariable logistic regression model to control for all possible cofounders. Finally, the adequacy of the model was checked by using Hosmer and Lemeshow goodness-of-fit. The Crude Odd Ratio (COR) and Adjusted Odd Ratio (AOR) with 95% Confidence interval (CI) were calculated to measure the strength of association between dependent and independent variables. Statistical significance was set at $P \leq 0.05$.

Table 1
The domains, indicators, inadequacy cut-offs, and weights in the A-WEAI

Domain	Indicator	Inadequacy cut-off	Weight
Production	Input in production decision	Inadequate if individual participates BUT does not has not at least some input in decisions; or she does not make the decisions nor feels she could	1/5
Resource	Ownership of asset	Inadequate if household does not own any asset or if household owns the type of asset BUT she/he does not own most of it alone	2/15
	Assess to and decision on credit	Inadequate if household has no credit OR used a source of credit BUT she/he did not participate in ANY decisions about it	1/15
Income	Control over use of income	Inadequate if participates in activity BUT has no input or little input in decisions about income generated, or does not feels she/he can make decisions regarding wage, employment and major household expenditures	1/5
Leadership	Group membership	Inadequate if is not part of at least one group; inadequate if no groups reported in community	1/5
Time	Workload	Inadequate if works more than 10.5 hours a day	1/5

Results

Socio demographic characteristics of respondents

Demographic characteristics of the study population are presented in Table 2. A total of 338 mothers with children aged 6–59 months were included in the study with response rate of 100%. The mean age of mothers and children were 29.25 years and 25.86 months, respectively. Reported households head by respondents indicated that majority (91.7%) of the household heads were male. About 57.7% of mothers reported having one child only aged less than five years. Nearly 54% of children were male and the majority (64.2%) of children was delivered at health facility. Approximately 75%) of mothers indicated that they initiated breast feeding 1 hour after delivery. About 70.1% of mothers didn't practice exclusive breast feeding.

Table 2
; Socio demographic characteristics of mother
with children in the study area (n = 338)

Characteristics	n (%)
Maternal age	
16–31	200(59.2)
> 31	138(40.8)
Head of household	
Male	310(91.7)
Female	28(8.3)
Maternal education	
Informal education	172(50.9)
Formal education	166(49.1)
Maternal occupation	
House wife	290 (85.8)
Employed	48(14.2)
Marital status	
Married	317(93.8)
Single	21 (6.2)
Family size	
≤ 5	171 (50.6)
> 5	167 (94.4)
Number of under five children	
1	195 (57.7)
≥ 2	143 (42.3)
Age of index child	
6–11	61(18)
12–23	97 (28.7)
24–35	79 (23.4)
36–47	69 (20.4)

Characteristics	n (%)
48–59	32 (9.5)
Sex of index child	
Male	182 (53.8)
Female	156 (46.2)
Birth interval (Month)	
< 24	50 (14.8)
25–47	232 (68.6)
> 47	56 (16.6)
Place of birth	
Health facility	217 (64.2)
Elsewhere	121(35.8)
Initiation of breast feed	
Immediately after delivery	85 (25.1)
1hr after delivery	253 (74.9)
Exclusive breast feeding	
Practiced	101 (29.9)
Non practiced	237 (70.1)

Nutritional status of children

The prevalence of stunted and wasted among children were 40.5% (95% CI: 34.9, 45.6) and 12.1% (95% CI: 8.9, 16), respectively.

Abbreviated women empowerment in agricultural index

According to the 5DE indicators, nearly 57% of women were empowered. However, about 42.9% of non-empowered had adequate achievements in 59.1% of domains. Thus, the overall 5DE was $57.1\% + (59.1\% \times 42.9\%) = 0.824$. The abbreviated women empowerment in agricultural index analysis indicated that the adequate achievement proportion of women was 99% on ownership of asset, 89.3% on group membership, 89.1% on control over use of income, 84.6% on decision of credit and 71.9% on input in production decision and 3.6% on work load.

Factors associated with nutritional status of children

The regression analysis showed that age of the mother (AOR = 2.6, 95% CI: 1.07–6.25), marital status of mothers (AOR = 6.4, 95% CI: 2.01–2.71), place of birth (AOR = 4.5, 95% CI: 2.12–9.49), and maternal educational status (AOR = 2.8 95% CI: 1.29–6.23) were factors independently associated with wasted children (Table 3). Whereas, factors such as family size (AOR = 2.3, 95% CI: 1.03–5.13), overall women empowerment (AOR = 2.3 95% CI: 1.03–5.13), access to and decision on credit (AOR = 3.7, 95% CI: 1.56–7.47), and control over use of income (AOR = 9.4, 95% CI: 3.92–22.35) were associated with stunting in children (Table 4).

Table 3
Factors associated with wasted children in Hawella district, Sidama region, Southern, Ethiopia

Variables	Wasted		COR 95%CI	AOR
	Yes	No		
Maternal age				
16–31	31(15.5)	169(84.5)	2.3 (1.11,4.96)	2.6(1.07,6.25)
>31	10(7.2)	128(92.8)	1	1
Maternal education				
Informal	29(16.9)	143(83.1)	2.6 (1.28,5.29)	2.8 (1.29,6.23)
Formal	12(7.2)	154(92.8)	1	1
Marital status				
Married	34(10.7)	283(89.3)	1	1
Single	7(33.3)	14(66.7)	4.2(1.57,11.03)	6.4 (2.01,2.71)
Family size				
≤ 5	28(15.5)	153(84.5)	1	1
> 5	13(8.3)	144(91.7)	0.5 (0.25,0.99)	2.3(0.98,5.22)
Place of birth				
Health facility	14(6.5)	203(93.5)	1	1
Elsewhere	27(22.3)	94(77.7)	4.2(2.09,8.31)	4.5(2.12,9.49)

Table 4
; Factors associated with stunting in Hawella district, Sidama region, Southern Ethiopia

Variables	Stunted		COR 95% CI	AOR
	Yes	No		
Maternal age				
16–31	52(26.0)	148(74.0)	0.2 (0.14,0.35)	0.2 (0.11,1.36)
> 31	85(61.6)	53(38.4)	1	1
Maternal education				
Informal	78(50.0)	78(50.0)	2.1(1.341,3.242)	1.3 (0.844,2.337)
Formal	59(32.4)	123(67.6)	1	1
Family size				
≤ 5	58(32.0)	123(68.0)	1	1
> 5	79(50.3)	78(49.7)	2.1 (0.30,0.72)	2.8 (1.70,4.55)
Woman empowerment				
Empowered	70(33.5)	75(66.5)	1	1
Non empowered	67(34.72)	126(65.2)	1.7 (1.13,2.73)	2.3 (1.03,5.13)
Access to and decisions on credit				
Adequate	83(34.2)	160(65.8)	1	1
Inadequate	54(56.8)	41(43.2)	2.5 (1.56,4.12)	3.4(1.56,7.47)
Control over use of income				
Adequate	97(33.9)	189(66.1)	1	1
Inadequate	40(76.9)	12(23.1)	6. 5(3.26,12.95)	9.4(3.92,22.35)

Discussion

This study is one of the few studies that have examined the association between women empowerment and child nutritional status and the first study that used the 5DE sub-index of the A-WEAI to measure women's empowerment in Ethiopia. The findings indicate that 57.1 percent of women were empowered in 5DE in Hawella district Sidama regional state southern Ethiopia. The allover 5DE (five domain of empowerment) score was 0.824. Overall, women empowerment in agricultural index is significantly associated with child stunting. In addition to this two of the five domains of indicators (5DE) were significantly associated with stunting: access to decision on credit and control over use of income. By

contrast, overall women empowerment and none of the indicators of abbreviated women's empowerment in agriculture were not associated with wasting.

The overall composite women empowerment is significantly associated with child stunting. Non empowered women were two times more likely to have stunted child than the empowered women. This is similar with study done in Benin ²⁸ which showed positive associations between women's composite empowerment and chronic child malnutrition. This could be due to disempowered women may have limitation in enabling more equitable distribution of household nutritional foods, health decision-making, caregiving or professional health-related responsibilities. However, the empowered women have better nutritional status and provide higher quality care and food to their children. Women's empowerment is a pathway to increase child nutrition due to positive links between child and maternal health. Inclusive involvement and education of women in sustainable and nutrition-sensitive agriculture improves household nutrition by increasing access to diverse, nutrient-rich diet. Women gaining access to land, production decision, credit services, finance and control over use of income in rural areas leads to increases in agricultural production and improved food security and nutrition security and care of child. Women empowerment provides greater economy to women results in food security ²⁹⁻³²

From the five domains of empowerment indicators access to and decisions on credit and control over use of income were associated with stunting. Women having inadequate achievement in access to and decision on credit were nearly four times more likely to have stunted child than women having adequate achievement. The possible explanation may be women with inadequate achievement in access to credit and make decisions may have limitation in participating in income-generating activities, enabling them to smooth consumption and avoid food shortages. This suggesting that households that women have access to credit and make decisions may leads in supporting greater food consumption and better child care, which could minimize the incidence of food shortages or severe disease and infections that results in under nutrition ³³.

Women with inadequate achievement in control over use of income have nearly ten times more likely to have stunted child than women having adequate achievement. This is due to women who cannot control over use of income may have difficulties in allocating expenditures and nutritious foods that benefit their children. This shows that a woman's who control over resources within households has more effective care their children. Besides, control over resources gives her the ability to weigh the costs and benefits of alternative uses of resources ³⁴.

Other socioeconomic factors associated with child under nutrition were family size, maternal age, maternal educational status, and place of birth. Child in the house hold with family seize more than five had three times more likely to be stunted than the counterpart. These are in line with studies done in eastern Hararge Ethiopia. ^{35,36} the possible explanation is may be because of the dependency burden and resource competition, including food and caring practices, associated with large number of children within the household. ³⁷

Children with mother having informal education have 1.32 times more likely to be wasted than mother having formal education. These are similar with studies done in Ethiopia^{38 39} and Pakistan.⁴⁰ Women who receive even a minimal education are aware than those who have no education of how to utilize available resources for the improvement of their own and families nutritional status. Education may enable women to make independent decisions, to be accepted by other household members, and to have greater access to household resources that are important to nutritional status.⁴¹

The findings of this study showed that place of birth of mother is a significant predictor of nutritional status of children. Children whose mothers had home birth were higher risk of being wasted than children whose mothers had health facility delivery. This finding is in line with study conducted in Ethiopia⁴². This might be due to information gap regarding child feeding practices and care due to their poor health care seeking behavior to their children.⁴³

Conclusion

Overall, women empowerment and two of the five domain of women's empowerment in agriculture index were associated with child nutritional status. Hence the study highlights the need of intervention to prevent malnutrition through enhancing women empowerment in agriculture and increase maternal participation in access to and decisions on credit and control over use of their income that affects child nutritional status.

Abbreviations

AOR	Adjusted Odds Ratio
A-WEAI	Abbreviated Women's Empowerment in Agriculture Index
CI	Confidence Interval
COR	Crude Odd Ratio
DE	Domain of Empowerment
IRB	Institutional Review Board
SPSS	Statistical Package for Social Sciences
UNICEF	United Nation's International Children's Fund
WHO	World Health Organization

Declarations

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Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare no competing interests

Authorship contribution statement

Selam Fentahun participated in the project design, execution, acquisition of data, analysis and interpretation the data, drafting and writing the manuscript. **Meskerem Jisso** participated in acquisition of data, analysis and interpretation of the data, drafting and editing manuscript. **Yemisrach Shiferaw** participated in data entry, analysis and interpretation, manuscript editing and review. **Betelehem Eshetu**, **Achamyelesh Gebretsadik** participated in data analysis, interpretation and manuscript review.

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We declare and affirm that this is our original work. We followed all ethical and technical principles for data collection, analysis, and compilation of the work. During study, the participants were told they could refuse or withdraw at any time if they are not interested to proceed. We confirm that all experiments were carried out in accordance with applicable guidelines and regulations (such as the Declaration of Helsinki). Finally, we declare that this work has not been published nor submitted to any other journals for publication in part or in whole.

Ethics approval and Consent to participate

Priority data collection, this study was reviewed and approved by Institutional Review Board of Hawassa University, College of Medicine and Health Sciences (Ref. No: IRB/026/12). We confirm that all data collections were performed in accordance with relevant guidelines and regulations (such as the Declaration of Helsinki). Informed consent was obtained from participants and in case of minors informed consent was obtained from parents/legal guardians.

Consent for publication

Not applicable

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