Women's decision-making autonomy and their nutritional status in Ethiopia

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Abstract

The main objective of this research was to explore the relationship between women's empowerment and their nutritional status in Ethiopia. The study used nationally representative data from the 2005 Ethiopia DHS and employed logistic regression model for the multivariate analyses part. The findings indicate that more than 28% (rural=32.1%) of Ethiopian women were undernourished. Women with low decision-making autonomy are more likely (OR=1.54) to be undernourished than those with high decision-making autonomy. Women's educational attainment, employment status, and household property possession are identified as the major pathways through which the decision-making autonomy of women affects their nutritional status. It is concluded that women's decision-making autonomy is an important determinant of their nutritional status. There is a need to incorporate women empowerment as part of the national nutrition strategy and also further research is suggested to see the effects of the agro-ecological variations and cultural factors on women's nutrition.

Key words: Women's decision-making autonomy, BMI, Undernourishment

1. Introduction

Malnutrition[1] is a major public health and human development problem especially in developing countries. Worldwide, FAO estimates that, mainly as a result of high food prices, the number of chronically hungry people in the world rose by 75 million in 2007 to reach 923 million (FAO, 2008). In 2004, 92 % of all worldwide hunger related deaths were associated with chronic hunger and malnutrition (WFP, 2005). The global hunger index (GHI[2]) also shows that the world has made slow progress in reducing food insecurity since 1990. According to this report, Ethiopia is among the countries with very high GHI value (31) or among the countries with the least rank (82nd out of 88 countries). The recent advent of higher food prices has also uneven effects across countries of the world (Grebmer et al., 2008; FAO, 2008).

The status of women in a society is also one important determinant of the nutritional status of women, although not widely documented except the application of the concept in many demographic studies. Women's lower social status challenges their decision-making autonomy on the desired family size, health care-seeking behavior and the amounts and types of food fed to children and themselves and amount of time to spend on child-rearing (Haddad, 1999; Heaton and Forste, 2007). In Ethiopia, male dominance remains more pronounced in the society, public and private spheres. Women traditionally enjoy little independent decision-making on most individual and family or household issues, including the option to choose whether to get modern health services during illness, birth, reproductive health services and others (Bogalech and Mengstu, 2007).

This paper has combined two important global and national development issues, the rights of women towards decision-making and women's health in terms of nutrition. The study identifies the link between women's household decision-making autonomy and a public health and human development problem, i.e., malnutrition. The recommendation based on this finding will serve as a reference to design specific programs to solve the problem and ultimately this will contribute to the achievement of the third and fifth MDGs, i.e., women empowerment and gender equality and improving maternal health.

Although improvements in women's status is a key factor in women's health status in general and their nutritional status in particular, its relative importance is not clearly understood as many researchers fail to make distinction between the direct measures of women's decision-making autonomy and proxy indictors such as education, employment or household wealth status. In many earlier studies, most of the attention was directed to the impact of proxy variables on

[1] Malnutrition refers to any disorder of nutrition whether it is due to dietary deficiency, under-nutrition, excess diet, over-nutrition (Britannica Student Encyclopedia, 2005).

[2] GHI is a multidimensional approach to measuring hunger and malnutrition by combining three weighted indicators: the proportion of undernourished as a percentage of the population (the share of population with insufficient dietary energy intake); the prevalence of underweight in under-five children (weight loss & reduced growth); and the mortality rate of under-five children (fatal synergy between inadequate dietary intake and unhealthy environments).

nutritional status of women through the proximate determinants of malnutrition i.e. disease and inadequate dietary intake. The various aspects of women's decision-making autonomy, including their access to and control over resources have often been overlooked. Therefore, this study tries to investigate the influence of women's empowerment on their nutritional status.

The main limitation of the study is that it surveyed only women of reproductive ages, most of them mothers of one or more children (81%). The sample population in this study includes only those who are currently married (15-49), i.e., during the time of the data collection. Besides, the research findings might not be reflections of the current or most recent situation of the research questions. Pregnant women and lactating women were excluded because of fear of weight gain during pregnancy and the impact of lactation on maternal weight. DHS, being a cross-sectional data, it only allows observing associations and hence the relationship between the different independent variables and nutritional status (BMI) would contain biases of an unknown magnitude and direction or may not be seen as causal. Besides, the type of women's empowerment measured may be too crude to capture the type of empowerment that shapes nutritional status.

1.1 Background

Malnutrition and hunger have been found to increase the incidence and fatality rate of conditions that cause up to 80% of maternal death (Hall and Rosenthal, 1995). Women who are underweight prior to pregnancy and who gain little weight during pregnancy are at increased risk of complications and death (FAO, 2005). Malnourished mothers are more likely to give birth to low birth-weight babies who face a greatly increased risk of dying in infancy. They are also more likely to suffer from stunting during childhood which will greatly increase their own risk of dying during childbirth or giving birth to another generation of low birth-weight babies.

Underweight or CED is common among women in developing countries. Evidence for maternal malnutrition indicates that between 5 and 20 % of African women have a low BMI as a result of chronic hunger. In these countries there is some evidence that individuals with a BMI below 18.5 kg/m^2 show a progressive increase in mortality rates as well as increased risk of illness. Some 51.3% of women in Bangladesh were underweight, about half of them were moderately or severely underweight, with a BMI below 16.99 kg/m^2. In Africa all levels of underweight i.e., mild, moderate and severe underweight, are highly prevalent (ACC/SCN, 2000; Uthman and Aremu, 2007).

With reference to a recent cross-country study result, the prevalence of undernutrition is widespread in Burkina Faso, Niger, and Senegal, where approximately 20% of women are underweight (Bradley and Mishra, 2008). The proportions of women who are malnourished in selected sub-Saharan African countries for which a DHS was recently conducted range from 7 (Cameroon) to 37% (Eritrea). Ethiopia has one of the highest proportions of malnourished

women. The percentage age of women who are overweight or obese ranges from a low of 4% in Ethiopia to a high of 29 % in Cameroon (Macro International Inc., 2008).

Women's role in food production, preparation and child care are critical foundations for the social and economic development of a community. However, efforts in this direction are hampered by malnutrition (Oniang'o and Mukudi, 2002). Nutrition is one of the essential determinants of maternal health; the right to adequate food being one of the fundamental human rights preserved in many international documents (http://www.pdhre.org/rights/food.html).
Perhaps the greatest challenge that Ethiopia has faced today is that of food insecurity. This is mainly due to the poor agricultural technology, limited rural infrastructure; shrink in land size, non-availability of off-farm employment and other factors. Food insecurity incorporates low food intake, variable access to food, and vulnerability (Devereux, 2000).

The prevalence of undernutrition in Ethiopia is the highest in sub-Saharan Africa (Bradley and Mishra, 2008). EDHS (2000) report shows that over 30 % of women were found to be chronically undernourished (BMI<18.5). Five years later the prevalence of malnutrition fell to 27 %. The prevalence of overweight for 2005 was only 4 %. This shows that underweight appears to be a more serious concern than overweight or obesity among Ethiopian women (CSA and ORC Macro, 2001, 2006; Macro International Inc., 2008). The highest level of women's malnutrition/undernutrition was in the Somali Region (44 %) while the lowest level was in Addis Ababa (16 %). According to the two DHS reports, rural women, very young women (15-19) and women with no or little education are much more affected by CED compared to their counterparts. Moreover, household economic status, employment status of women and decision-making autonomy on their income, age and marital status are important predictors of women's nutritional status (Girma and Timotiows, 2002).

1.2 Objectives

The main objective of this research is to explore the relationship between women's empowerment and their nutritional status in Ethiopia. The research tries to answer three core questions: is women's autonomy an important determinant of women's nutritional status in Ethiopia; what has domestic violence to do with the nutritional status of women; and what are the pathways through which women's decision-making autonomy functions to influence their nutritional status?

2. Methodology

2.1 Description of the sample

The source of data for this study was the Ethiopia Demographic and Health Survey 2005, the second national representative survey following the 2000 EDHS. In the EDHS 2005, a total of 14,717 eligible women were identified from the households and interviews were completed for

14,070 women with a response rate of about 96%. The size of the then currently married, non-pregnant and non-lactating women totals 3159, of which only 1627 had anthropometric measurements, and were thus considered in this study. The details of the methodology are mentioned in DHS 2005 report.

2.2 Variable identification

2.3 Dependent variable

The dependent variable in this study is women's nutritional status which was measured in terms of Body Mass Index (BMI). In this study the dependent variable (CED) was dichotomized with 1 being less than 18.5 and 0 being 18.5 or above. Besides, only non-pregnant and non-lactating women were included in the study.

2.4 Independent variables

The principal independent variables of interest are those reflecting women's involvement (final says) in decisions regarding four domains of household life: making large household purchases, making day-to-day household purchases, deciding on respondent's own health care and visits to family/relatives. In addition, another indirect measure of women's empowerment (autonomy), women's attitude towards wife beating was also used. Besides, a few proxy measures were included in the analyses and type of residence was taken as a control variable to capture differences in women's life styles and living standards.

The 2005 EDHS collected information on direct measures of women's autonomy. In particular, questions were asked on women's participation in specific household decisions and in their attitudes towards wife beating. For each question in the survey, five options were presented as replies: 1) respondent alone, 2) respondent and husband/partner jointly, 3) respondent and other person in the household, 4) husband alone, 5) someone else. For statistical purposes, the response "respondent alone" has been renamed as "female autonomy" to show her exclusive autonomy; the responses "respondent and husband" and "respondent and other person" were categorized as "joint decision" and the responses husband alone and someone else[3] are categorized as "husband's decision". Furthermore, an index was developed on women's decision-making autonomy. In doing so,

- women who have full/independent autonomy in at least two of the above four specified decision-making areas were assumed to have "high" decision-making power;

[3] From the frequency distribution, the value for the response "someone else" was nil and that is why husband's decision was used as a third category.

- women having the full autonomy in having their final say in only one of the four or those who make joint decision-making in all of the four decision-making areas were assumed to have "medium" decision-making power; and
- the remaining were assumed to have "low" decision-making power.

Women's educational attainment, employment[4], and household property possession were included as the proxy measures of women's autonomy. Household property possession was based on information related to household ownership of a number of consumer items (radio, television, refrigerator, bicycle, motor cycle and car). Based on the ownership of these six items, an index was developed to ease the statistical analysis and interpretation of results. For possession of one of these household items, a respondent received one point, otherwise zero points. The index took values between zero and five. Hence,

- those women who reported that they have none of these items were assumed to have "very low" household property possession;
- those who have only one of these items were assumed to have "low status" and
- those women who reported that they have at least two of the above items were considered to have "medium or high" household property possession.

2.5 Statistical analyses

To measure the impact of women's decision-making autonomy on nutritional status, bivariate analyses and multivariate logistic regression models were employed, using SPSS (version 15.0) software[5].

A series of three different models were fitted to investigate factors predicting the occurrence of women's undernutrition among the then currently married non-lactating and non-pregnant women of reproductive age groups. The first model was fitted to see the effects of women's characteristics and decision-making autonomy on women's malnutrition without partner factors. The second model was fitted to see the effects of partner's factors and women's decision-making autonomy as determinants of women's malnutrition. The last model was fitted to see the effects of socio-demographic variables on women's malnutrition.

2.6 Ethical issue

Since the analyses of this paper were confined to secondary data, primary ethical approval is not required.

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[4] In line with the DHS data, employment status in this study reflects occupational status.

[5] In this study only married, non-pregnant and non-lactating mothers were included to avoid the impact of weight gain during pregnancy on the interpretation of the statistical values.

3. Results

3.1 Background characteristics and differentials of women's nutritional status

A total of 1627 currently married non-pregnant and non-breastfeeding women of age groups 15-49 were considered in this study. About 21 % of the respondents are found within the age group of 15-24, 25.2 % within 25-34 and the majority (53.7%) within the age group of 35-49. The mean and median ages were 34 and 35 years respectively with a standard deviation of 9.6 years. As to the regional distribution of respondents, most of the respondents (79.8%) represent three regions: Oromiya (33.0%), Amhara (28.2%) and SNNP (18.5%); while the remaining 20.2 % represent the rest of the regions (6) and the two administrative councils (cities). Most of the respondents were illiterate (76.4%), 17.0 % attended their primary education and 6.6 % attended secondary and higher educations. More than 82 % of the respondents reside in the rural part of Ethiopia. Occupationally, the majority of the respondents (61.8%) were unemployed during the time of data collection and among those working, more than half (57.6%) were engaged in agricultural activities. The study population was predominantly Orthodox Christian (49.5%) followed by Muslims (32.6%) and Protestants (14.6%). Respondents from other religions represent 3.3 % of the study population.

Ethiopian women are more affected by undernutrition than over nutrition. In this study, which included only currently married non-lactating and non-pregnant women, more than 28 % of them were undernourished and about six % were overweight (Overweight=4.8% (BMI=25.00-29.99 kg/m^2) & obesity=1.6% (BMI>=30 kg/m^2)). Among the undernourished ones, 3.5% were severely undernourished (BMI<16.00kg/m^2), 4.6% moderately undernourished (BMI=16.00-16.99 kg/m^2) and the remaining 20.1% (BMI=17.00-18.49 kg/m^2) were mild undernourished.

Household property possession seems to have an inverse relation with women's CED. The proportion of women with CED is substantially high among those with very low household property possession (32.4%) and very low among those with medium or high household property possession (8.5%). Household size has positive relation with CED. Women having a household size of 1-4 were the least affected by undernutrition (21.6%) compared to those with household size of 5-8 (31.8%) and 9+ household sizes (35.4%), (Table 1).

Based on their level of participation in decision-making, women have been identified under three decision-making categories: those who have high decision-making power, medium decision-making power and those having low decision-making power. Many of the women were found to have medium decision-making power (56.3%) and comparable proportions of them have high (23.7%) and low (20.0%) decision-making power. As the result indicates, in all household level decision-making autonomy levels, women's decision-making autonomy has negative association with undernutrition. For this particular case, lowest magnitudes or prevalences of CED (20.8%) were observed when women are autonomous. In other words, highest prevalences of CED

(38.9%) were observed when women are indecision. Tests of association (chi-square) indicate statistically significant association between women's autonomy and their BMI values at p-value<0.001.

Table 1: **Mean BMI of Respondents by Socio-demographic Characteristics**

Characteristics	*Body Mass Index*			*No. of*	*Chi-square*
	Mean	<18.5	>= 18.5	*cases*	*Value*
Age groups					
15-19	19.6	28.8	71.2	145	6.9
20-24	20.1	23.6	76.4	180	
25-29	20.5	25.9	74.1	249	
30-34	21.1	24.7	75.3	212	
35-39	20.1	27.5	72.5	259	
40-44	20.3	31.5	68.5	278	
45-49	20.2	31.9	68.1	304	
Religion					
Orthodox	20.6	25.5	74.5	744	15.7*
Protestant	20.3	22.8	77.2	210	
Muslim	19.9	34.3	65.7	626	
Others	20.3	35.4	64.6	47	
Educational Attainment					
No Education	19.8	32.6	67.4	1124	52.1**
Primary Education	21.1	18.7	81.3	321	
Secondary +	24.5	3.1	96.9	182	
Place of Residence					
Urban	23.1	10.2	89.8	487	97.9**
Rural	19.7	32.1	67.9	1140	
Employment status					
Unemployed	20.1	31.7	68.3	1000	32.0**
Professional/Non-manual	22.2	12.5	87.5	287	
Agricultural	20.2	30.0	70.0	269	
Manual (skilled/unskilled)	20.8	16.00	84.00	64	
HH property possession					
Very low	19.7	32.4	67.6	797	33.2**
Low	20.8	26.2	73.8	507	
Medium/high	24.2	8.5	91.5	296	
Household size					
1-4	20.9	21.6	78.4	634	20.6**
5-8	20.2	31.8	68.2	841	
9+	19.9	35.4	64.6	152	
Decision-making autonomy					
High	21.3	20.8	79.2	505	
Medium	20.6	26.6	73.4	798	32.6**
Low	19.7	38.9	61.1	316	
Wife beating					
Not justified	21.6	22.3	77.7	356	4.9**
Justified	20.2	29.6	70.4	1207	
Total	**20.8**	**28.3**	**71.7**	**1626**	

Source: EDHS 2005, *p-value<0.01 and **p-value<0.001; No symbol refers to no significant association

Figure 1 was designed to further explore the relationship between decision-making autonomy and CED. When women report that they have their final say in none of the decisions, they are more likely to have CED as compared to when they have final say in one or more of the specified decisions. The highest proportion (35.7%) of women with CED is observed when women reported that their partners have final say in all of the decisions but lowest proportion of

women with CED (6.6%) is observed when women reported that they have final say in all of the decisions. The results suggest that women who have the highest level of autonomy are better-off in their nutritional status compared with women who have joint decisions and those who have no final say in any of the decisions. But there is a different scenario when women participate in joint decision-makings i.e., surprisingly, the proportion of undernourished women shows a progressive increment with an increase in the number of joint decisions up to a certain extent. Then it shows a rapid decline when women make joint decisions in most of the cases. This can be a good evidence to show the importance of DMA in Ethiopian women's nutritional status.

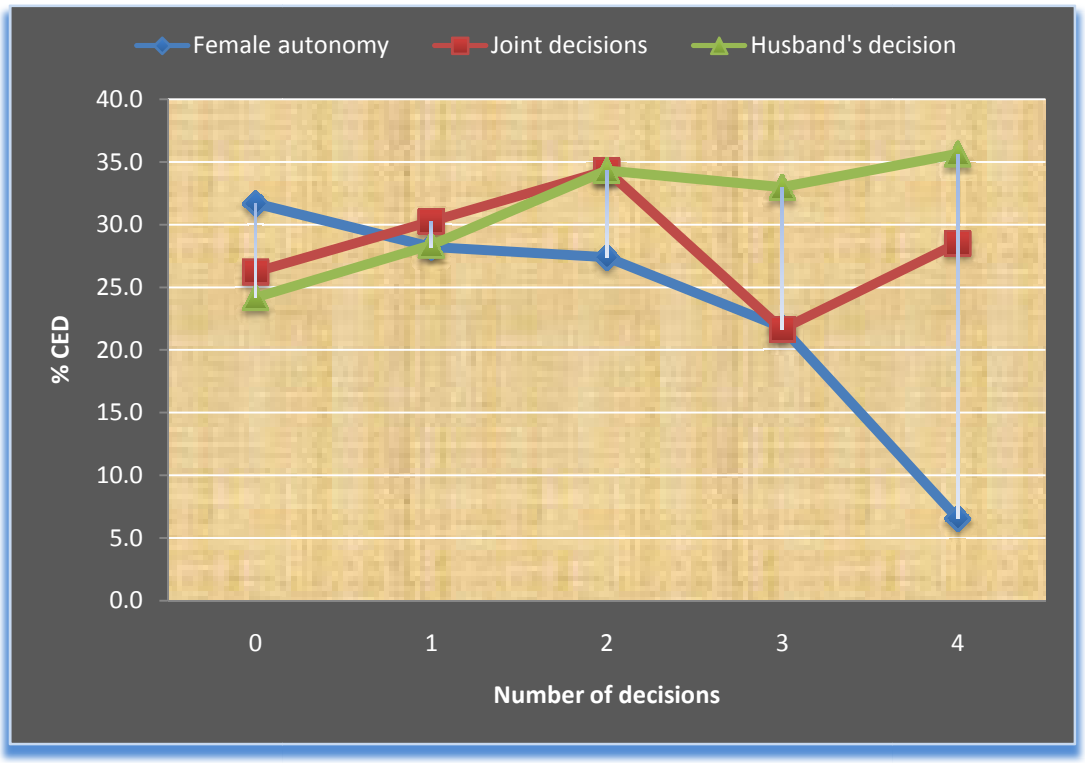

Fig. 1: Percentage of Women with CED BY the Number of Decisions made by Respondent, by Husband and Jointly
Source: EDHS 2005, Own calculation

In this study, partner's educational attainment and occupational status are the other variables analyzed against women's undernutrition. The findings depict that women whose partner's were illiterate were the most affected by CED (32.9%) among others. On the other hand, those women whose partner's attained secondary or higher education were less affected (11.5%) than those with primary education (27.3%)(Chi-square p-value <0.001).

With regards to husband's occupation[6] and wife's CED, similar trends are seen like that of CED and women's occupation (employment status). Women who reported that their husbands were

[6] The frequency of partners by their occupational status indicates that only 1.7 % of them were not working during the time of data collection. This might lead to misinterpretation of results.

engaged in agricultural activities at the time of data collection were the most affected by CED (32.5%) among others, followed by those whose husband's were not working (26.9%). On the other hand, women who reported that their husbands were engaged in manual (skilled and unskilled) activities were the least affected by CED (11.1%). In general the descriptive analyses show that most of the socio-economic and demographic variables have statistically significant association with women's nutritional status. The most important determinants will be identified in the multivariate analyses.

3.2 Predictors of CED from multivariate models

In the previous section, we have seen the bivariate analysis and the presence of statistically significant association between the independent and dependent variables. As per the descriptive analysis of women's malnutrition and its differentials by socioeconomic variables, most of the covariates are interrelated. In this analysis technique, statistical associations are interpreted without controlling the effects of one variable over the other variable. To see the strength of correlation between the independent variables and the dependent variables, a multivariate analysis[7] was applied and the findings are as follows.

3.3 Women's characteristics as determinants of their nutritional status: Model-I

Table 2 depicts a multivariate analysis of women's characteristics and women's CED. Here, initially the relationship between the number of decisions women made on the four household level decision-making areas and women's undernutrition was explored by fitting univariate and multivariate regression models.

The full model includes women's characteristics along with their decision-making autonomy. In this model, female autonomy maintained its effect on women's undernutrition with more %ages than the univariate model when other variables are controlled. Clearly, women who have full decision-making autonomy in 2, 3 and 4 of the decision-making areas are less likely to be undernourished by about 34% (OR=0.66, CI=0.44, 0.97), 60% (OR=0.40, CI=0.22, 0.73) and 48% (OR=0.52, CI=0.28, 0.95) respectively than those with no full decision-making autonomy, and women who made joint decisions in 4 of the areas are less likely to be undernourished (OR=0.56, 95 CI=0.37, 0.84). But, female autonomy in only 1 of the decisions and women's joint decision-making in 1, 2 and 3 of the decisions showed no significant association on their nutritional status.

Household economic status, women's educational attainment and their employment status were also important factors affecting maternal undernutrition (Table 2). Women with medium or high household economic status are less likely to have CED (OR=0.39, 95% CI=0.23, 0.66). Compared to those with very low household economic status, women with low household

[7] The main objective of the multivariate analysis is to examine the relationship of each variable with women's malnutrition when the effects of other variables are held constant.

economic status are less affected by undernutrition (OR=0.73; CI=0.56, 0.94). Educational attainment is also negatively associated with women's CED. Those women with secondary or above educational levels (OR=0.38) and with primary education (OR=0.68; CI=0.48, 0.96) are less likely to be undernourished than those with no education. On the other hand, women engaged in professional or non-manual activities are less likely to be undernourished by about 35% (OR=0.65; CI=0.43, 0.97) than the unemployed, but engagements in agricultural and manual activities showed no significant association with CED.

Table 2: Model-I Logistic Regression of Women's Autonomy and their Characteristics Associated with Women's Undernutrition (odds ratio)

Variables	B	S.E.	Exp(B)	*95.0% C.I. for EXP(B)* Lower	Upper
Univariate model					
Female autonomy					
0 (comparison)					
1	-0.37	0.16	0.69	0.51	0.95
2	-0.82	0.19	0.44**	0.30	0.64
3	-1.44	0.30	0.24**	0.13	0.42
4	-1.07	0.29	0.34**	0.19	0.61
Joint decision					
0(comparison)					
1	-0.05	0.18	0.95	0.66	1.36
2	-0.18	0.18	0.84	0.59	1.20
3	-0.74	0.21	0.48**	0.32	0.72
4	-0.88	0.20	0.42**	0.28	0.62
Constant	-1.38	0.09	0.25		
Full Model I					
Female autonomy					
0(comparison)					
1	-0.20	0.16	0.82	0.59	1.13
2	-0.42	0.20	0.66*	0.44	0.97
3	-0.92	0.31	0.40**	0.22	0.73
4	-0.66	0.31	0.52*	0.28	0.95
Joint decisions					
0(comparison)					
1	0.00	0.19	1.00	0.69	1.44
2	-0.01	0.19	0.99	0.69	1.43
3	-0.33	0.22	0.72	0.47	1.10
4	-0.58	0.21	0.56*	0.37	0.84
Household economic status					
Very low (comparison)					
Low	-0.32	0.13	0.73*	0.56	0.94
Medium/high	-0.94	0.27	0.39**	0.23	0.66
Educational attainment					
No Education (comparison)					
Primary Education	-0.38	0.18	0.68*	0.48	0.96
Secondary +	-0.97	0.37	0.38*	0.18	0.78
Employment status					
Unemployed (comparison)					
Professional/Non-manual	-0.44	0.21	0.65*	0.43	0.97
Agricultural	0.15	0.15	1.17	0.87	1.57
Manual	-0.14	0.35	0.87	0.44	1.70
Constant	-1.82	0.15	0.16		

Source: EDHS 2005, Own calculation- *P-value<0.05, **p-value<0.001

3.4 Women's characteristics and partner's characteristics as determinant factors for nutritional status: Model-II

Similar to Model-I, in Table 3, a multivariate regression model was fitted to explore the relationship between the three indices of women autonomy and undernutrition. The indices are based on the number of decisions a woman participated on the specified decision-making areas. Two categories were created for each of the four decision-making questions with five categories each. If the respondent says she has the final say, the response is coded as female autonomy (1 if woman has final say, 0 otherwise) and if decision is made by the husband alone, response is coded as husband's decision (1 if husband has final say, 0 other wise). The scores for each of the indices range between 0 and 4.

The full Model-II (Table 3) depicts the effects of women's characteristics and partner's characteristics on women's undernutrition. In this model, husband's decision retained a strong positive association showing a higher odds of undernutrition when husbands have the final say in 3 (OR=1.63; CI=1.05, 2.53) and 4 (OR=1.57; CI=1.02, 2.42) of the decisions. Household economic status and women educational attainment were also important determinants of maternal undernutrition. Women with medium/high household economic status are less likely to have CED than those with very low household economic status (OR=0.55, CI=0.31, 0.99). Women with secondary or higher educational attainment are less likely to have CED than women with no education (OR=0.41, CI=0.19, 0.91), but no association was observed with women's employment status and other partner's characteristics.

Table 3: Model-II Logistic Regression of Women's Characteristics and Husband's Characteristics Associated with women's CED (odds ratio)

Variables				*95.0% C.I. for EXP(B)*	
	B	**S.E.**	**Exp(B)**	**Lower**	**Upper**
Univariate model					
Female autonomy					
0 (comparison)					
1	-0.21	0.15	0.81	0.61	1.08
2	-0.34	0.18	0.71	0.50	1.01
3	-0.76	0.29	0.47*	0.26	0.82
4	-0.20	0.28	0.82	0.47	1.43
Husband's decision					
0 (comparison)					
1	0.46	0.16	1.58**	1.16	2.16
2	0.69	0.17	1.99**	1.43	2.76
3	0.80	0.22	2.23**	1.46	3.40
4	0.76	0.21	2.14**	1.41	3.24
Constant	-0.91	0.10	0.40		
Full model II					
Female autonomy					
0 (comparison)					
1	0.00	0.16	1.00	0.74	1.36
2	-0.03	0.19	0.97	0.67	1.41
3	-0.49	0.31	0.61	0.34	1.11
4	-0.08	0.30	0.92	0.51	1.66

Husband's decision					
0 (comparison)					
1	0.11	0.17	1.11	0.80	1.55
2	0.28	0.18	1.32	0.93	1.88
3	0.49	0.23	1.63*	1.05	2.53
4	0.45	0.22	1.57*	1.02	2.42
Household economic status					
Very low (comparison)					
Low	-0.23	0.14	0.80	0.61	1.05
Medium/high	-0.60	0.30	0.55*	0.31	0.99
Educational attainment					
No Education (comparison)					
Primary Education	-0.37	0.20	0.69	0.47	1.02
Secondary +	-0.88	0.40	0.41*	0.19	0.91
Employment status					
Unemployed (comparison)					
Professional/Non-manual	-0.35	0.21	0.71	0.47	1.07
Agricultural	0.11	0.15	1.12	0.83	1.51
Manual	0.06	0.36	1.06	0.53	2.13
Husband's education					
No Education (comparison)					
Primary Education	-0.07	0.16	0.93	0.68	1.28
Secondary +	0.10	0.25	1.10	0.68	1.79
Husband's Employment status					
Unemployed (comparison)					
Professional/Non-manual	-0.35	0.52	0.70	0.26	1.93
Agricultural	0.19	0.49	1.21	0.46	3.17
Manual	-0.31	0.54	0.73	0.25	2.13
Constant	-1.55	0.20	0.21		

Source: EDHS 2005, *P-value<0.05, **p-value<0.001, own calculation

3.5 Socioeconomic determinants of women's nutritional status: Model-III

As can be seen in table 4 (Model-III), the logistic regression selected region, household size, educational attainment and decision-making autonomy as risk factors for maternal undernutrition (CED) among the predictor variables. On the other hand, women's age; household economic status, place of residence, women's employment status, husband's employment and educational attainment seem to have no statistically significant effect on women's malnutrition.

Women from Gambela region are 1.82 times more likely to be affected by CED compared to women from Tigray region. In other words, women residing in Gambela region have the odds of being undernourished by about 82% (OR=1.82; CI=1.02, 3.25) than women from Tigray region. There seems no association between the other regions and CED among the currently married non-lactating and non-pregnant women in Ethiopia.

Although the overall level of literacy among the respondents is low with more than 76% of them with no primary or secondary education (Table 1), still there seems to be some difference in the nutritional status of the illiterate and the relatively educated respondents. The decreased likelihood of being undernourished was observed for women with secondary and higher

education. These women are less likely to be affected by CED by 44% (OR=0.44, CI=0.19, 0.99) as compared to the reference category. This might indicate that women with better education take care of their health and nutritional status or dietary intake than the less/uneducated ones.

After controlling the effects of other predictor variables, women's decision-making autonomy was found to be one of the most important determinant factors to explain women's nutritional status. The odds of undernutrition among respondents with low decision-making autonomy is 54% (OR=1.54; CI=1.07, 2.21) more than those with high decision-making autonomy. In other words, women who have no or minimal autonomy to have their final says on their own health care, on large household purchases, daily household needs purchases and the freedom to visit their families or relatives are at a higher risk of being chronically malnourished (1.54 times) than those with better final says on the specified decision-making areas. The other risk factor for women's undernutrition is the size of households. Women living in a household size of 5-8 persons are 1.34 times (OR=1.34; CI=1.02, 1.77) at higher risk of being affected by CED than women with lower household size (1-4).

Household economic status which showed significant association with women's undernutrition in models I and II didn't maintain its effect on undernutrition when other socio-demographic variables are added in the model. Many of the variables in the model: age of women, type of place of residence, domestic violence/attitude of women towards wife beating, household economic status and husband's characteristics show no significant association with women's undernutrition and this might be due to unidentified different factors like the effect of an uncontrolled third variable.

Table 4: Model-III Logistic Regression of Variables Associated with Women's CED (odds ratio)

Variables				*95.0% C.I. for EXP(B)*		
	B	S.E.	Exp(B)	Lower	Upper	N
Socio-demographic characteristics						
Region						
Tigray (Comparison)						
Afar	-0.10	0.30	0.90	0.50	1.64	129
Amhara	-0.33	0.26	0.72	0.43	1.19	136
Oromiya	-0.09	0.26	0.92	0.55	1.53	229
Somali	-0.29	0.32	0.75	0.40	1.40	220
Ben-Gumuz	0.12	0.29	1.13	0.64	1.99	104
SNNP	-0.02	0.27	0.98	0.58	1.68	113
Gambella	0.60	0.30	1.82*	1.02	3.25	189
Harari	0.17	0.36	1.19	0.59	2.41	109
Addis Ababa	-0.08	0.42	0.92	0.40	2.11	114
Dire Dawa	0.25	0.36	1.29	0.64	2.60	169
Household property possession						
Very low (Comparison)						797
Low	-0.15	0.14	0.86	0.65	1.14	507
Medium/high	-0.41	0.33	0.67	0.35	1.27	296
Household size						
1-4 (Comparison)						634
5-8	0.30	0.14	1.34*	1.02	1.77	841

9+	0.09	0.24	1.09	0.68	1.74	152
Place of residence						
Urban (Comparison)						487
Rural	0.50	0.28	1.65	0.94	2.88	1140
Women's characteristics						
Educational attainment						
No Education (Comparison)						1124
Primary Education	-0.40	0.21	0.67	0.45	1.01	321
Secondary +	-0.83	0.42	0.44*	0.19	0.99	182
Employment status						
Unemployed (Comparison)						1000
Professional/Non-manual	-0.33	0.22	0.72	0.47	1.10	287
Agricultural	0.16	0.17	1.18	0.85	1.63	269
Manual	0.12	0.37	1.13	0.55	2.31	64
Women's Autonomy in Decision-making/women status						
Decision-making autonomy						
High (Comparison)						505
Medium	0.16	0.15	1.18	0.87	1.59	798
Low	0.43	0.18	1.54*	1.07	2.21	316
Wife beating						
Not justified (Comparison)						356
Justified	0.07	0.18	1.08	0.76	1.52	1207
Husband's characteristics						
Educational attainment						
No education (Comparison)						906
Primary education	-0.17	0.17	0.84	0.60	1.18	329
Secondary and above	0.00	0.26	1.00	0.60	1.65	384
Employment status						
Unemployed (Comparison)						27
Professional/Non-manual	-0.44	0.53	0.64	0.23	1.83	375
Agricultural	-0.16	0.51	0.85	0.31	2.31	1044
Manual	-0.29	0.56	0.75	0.25	2.25	165
Intercept	-1.52	0.20	0.22			

Source: EDHS 2005, author's calculation *p-value<0.05

4. Discussion

Anthropometric, socioeconomic and demographic data from 1627 women living in Ethiopia has provided the opportunity to analyze the distribution of CED in a relatively recent year (2005), and within a wide range of regional states and city administrations. Nationwide probabilistic samples, large sample sizes, highly standardized data collection procedures, and appropriate multivariate analyses - all favor the internal and external validity of study findings. The present study tried to answer the stated research questions by examining whether women's autonomy is an important determinant of their nutritional status; if domestic violence in the context of women's attitude towards wife beating determines undernutrition; and the possible pathways through which these variables influence women's nutritional status.

Women from Benishangul Gumuz and Gambela regions were affected by CED more than any other region in Ethiopia, followed by Afar and Tigray regions. Though the decision-making power of the women in Benishangul Gumuz and Gambella was not the lowest, women of these

regions have experienced the highest prevalence of undernutrition. These findings are in line with Girma and Timotiwos (2002) reports, in which they indicated that Gambela has the highest percentage of undernourished women similar to Somali, Afar and Benishangul Gumuz regions (CSA and ORC Macro, 2006). The possible reasons for these variations could be many including socioeconomic, demographic, cultural and environmental factors. Difference in the proportion of educated women and lack of access to health services might be among the fundamental ones. Even in the presence of good health service coverage, among less educated population there can be less health care utilization rate. Recent trends in population growth in these two regions might have some effect on the food supply or food security of the inhabitants. According to the 2007 Ethiopian Population and Housing Census statistical report, highest population growth rates were recorded for these two regions.

The difference in ecological zones of each region can also be considered here. The regions with the higher proportion of women with undernutrition are the lowlands. These areas are more vulnerable to communicable diseases/vector borne diseases like malaria which are immediate determinants of nutritional status. The agricultural system, breaking down of land into small pieces with increase in population size, types of crops produced and their dietary styles may also matter. Study findings by Tsegaye et al. (2003) indicated that women living in lowlands are more malnourished than the highlanders. The lower BMI levels in Amhara and Tigray regions may be because of low productivity of arable lands, following land degradation in need of large yields from smaller areas which in turn are attributed to high population density in the highlands. The final says of women on agricultural products, unlike their active participation in the productivity, also matters in their access to resources. Further studies can bring more scientific evidences on disparities between women's nutritional status and socio-cultural and demographic variables.

Regarding women's attitude towards justification of wife beating by a husband, a very high proportion (82.0%) of them reported that a husband is justified to beat his wife in at least one of the five reasons. This is much higher than a similar study finding from Zimbabwe where only 53% believed that wife beating was justified in at least one of the five situations (Hindin, 2003). This result indicates that the status of women in the society is much lower as compared to the status of men. Nevertheless, there seems no association in the multivariate analysis between women's nutritional status and their attitude towards wife beating unlike the bivariate result. An uncontrolled third variable might be confounding these results or there might not be any true association between attitude of women towards wife beating and their nutritional status.

As to women's DMA, in the bivariate analysis, women have more autonomy on daily household needs purchases than on their health care, large household purchases or visits to family/relatives. This is an indication that women are not involved in big and important decisions and hence certain dimensions of women's autonomy may be more important to nutritional outcomes than others. For example, in the multivariate part, women who are fully autonomous and those who

make joint decisions showed a negative association with women's undernutrition. These findings accentuate the importance of examining the different dimensions of women's autonomy separately in order to understand which factors most affect the nutritional status of women.

As to the DMA-nutritional status nexus, women who have no final says on the specified situations are more affected by CED as compared to those who have the autonomy or who participate in joint decision-making practices. Based on the autonomy index, women's undernutrition was found to be inversely associated with decision-making autonomy. Women with high decision-making autonomy were the least affected and those with low decision-making autonomy were the most affected by CED.

The relationship between educational status and maternal undernutrition, regardless of socio-demographic characteristics like, place of region, age, religion, and place of residence, suggests that women with secondary or higher education are less affected by CED than the relatively less-educated women in both the bivariate and the multivariate analyses. A comparative study on maternal malnutrition in ten sub-Saharan African countries and a study in the SNNPR of Ethiopia support this finding: the higher the level of education the lower the proportion of women with CED (Edilberto, 1997; Teller and Yimer, 2000; Tsegaye et al., 2003). A similar study finding in rural Bangladesh indicates that women with at least primary education have more probability of becoming nourished compared to women with no education (Rahman and Nasrin, 2009). This might be because education may enable women to make independent decisions and to have greater access to household resources or income control and health care that are important to maternal nutrition. Therefore, education plays a significant role by influencing health-seeking behaviors, attitudes and practices towards appropriate feeding and care.

Women's employment status was also found to have an important influence on women's undernutrition. The bivariate analysis shows that unemployed women (31.7%) and those engaged in agriculture sector (30.0%) are the most malnourished. When agricultural products are sold in the market place, the income earned may be used to purchase goods and services that contribute to nutritional changes. The lower the income from selling agricultural products is the lower it is to purchase goods and services.

In actual terms, malnutrition is not simply caused by a lack of food overall, but by a lack of high-quality foods such as whole grains, fiber, fruits, and vegetables (IFPRI, 2004). The multivariate part identified that women engaged in professional and/or non-manual economic activities are less affected by undernutrition. The women engaged in professional/non-manual activities are mainly educated ones which can take care of their health and nutrition with better decision-making autonomy.

5. Conclusion and Policy Implications

Understanding the relative importance of the various determinants of malnutrition among Ethiopian women is the key to designing evidence-based effective programs to address women's malnutrition. The proportion of malnourished women vary by place of region, type of place of residence, household size, partner's educational attainment and employment status with statistically significant chi-square values in the bivariate analysis. Rural women, women with high household size, women from the lowlands of Ethiopia, women whose partners were relatively less educated or with no education and those whose partners are unemployed and engaged in agricultural activities were at high risk of being undernourished than the other counterparts.

The multivariate analysis adds to our knowledge on issues related to disparities of women's empowerment in malnutrition among women in Ethiopia. The magnitude of the gap described in this study gives baseline information that will help programmers, researchers and policymakers in the management of malnutrition among underpowered women. On average, the nutritional status of women with very low household economic status, with relatively lower educational attainment and with lower decision-making autonomy is poorer than those with better economic status, educational attainment and empowerment. The present study is important in that it documented women's empowerment as an important determinant of women's undernutrition, a major research question that was theoretically stated prior to these findings. In line with this the research has identified that women's educational attainment, employment status, and household economic status are the most important proxy measures of women's undernutrition. In other words, these are the major pathways through which the decision-making autonomy of women affects their nutritional status or BMI levels.

Unless the obstacles that prevent women from practicing their potential are removed including through rural development, it will be difficult if not impossible to avoid malnutrition and achieve intended national development goals. Improvements in women's nutritional status can only be seen when the needy are not exposed to the risks of CED. On the basis of the findings, the following recommendations are forwarded.

Ensuring women's decision-making role at household levels should be an important part of the national nutrition strategy. The findings also show that individual characteristics are important predictors of women's empowerment. But since empowerment is a multi-dimensional phenomenon, with women relatively empowered in some spheres but not in others, further research might play a major role in identifying whether community or individual characteristics are better predicators of women's empowerment in their surroundings.

Design and implement programs addressing the nutritional needs of women especially those in the most affected regions and those with lower household economic status. The interventions could be continuous nutritional health promotion and education as part of maternal health care programs. Education on nutrition and health can stimulate demand for more or different

foodstuffs, health services, or disease-prevention measures. Not to limit the effect of education or to see outcomes, there should be the means and opportunities to act on that knowledge as well.

To curb the negative effect of large household size on women's nutritional status, one of the critical priorities should be the continuation of the intensive national family planning program.

Finally, further research is suggested to investigate the effects of agro-ecological variations or climatic variations, domestic violence against women and other socio-cultural factors on women's malnutrition.

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