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Dynamic Role of Mother Empowerment in reducing malnutrition among children: Evidence from Sub-Saharan Africa

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ABSTRACT

In Sub-Saharan Africa, two out of five children are malnourished and malnutrition causes almost half of the child deaths (45%). Mothers are the primary caretaker of children's health, but unfortunately, most of the mothers, are not empowered in Sub-Saharan Africa. This study examined the role of mother's empowerment in the reduction of malnutrition (stunting, wasting, and underweight) among children under five years of age in twenty-two Sub-Saharan African countries. Cross-sectional data from the most recent Demographic Health Survey (2011-2016) of twenty-two countries are used to analyze the relationship between mother's empowerment and child malnutrition through the binary logistic regression analysis. Results show that the countries with low empowerment, the prevalence of malnutrition is high. Mother empowerment is found to be a statistically significant predictor in reducing malnutrition. Mother's education, body mass index, and age at first birth proved to be a strong predictor for reducing malnutrition. Household wealth index and household locality also have a statistically significant impact on the reduction of malnutrition. At the household level, malnutrition of children can be minimized by empowering boosting their self-esteem, self-confidence, economic resources, social resources, awareness and decision making.

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1. Introduction

The malnutrition and child survival is influenced by the interaction of parents behaviour at the household level; this interaction affects children under five years more because they do not go to school and stays at home (Badake et al., 2014). Women (mothers) as the primary caregiver to family and children are maybe responsible for the illness of their children. Globally the burden of malnutrition has declined from 32.5 percent to 21.9 percent, and the number of children affected has fallen from 198.2 million to 149.0 million(WHO, 2018). This decline did not meet the SDG-21 . Malnutrition among

1 Sustainable Development Goals 2nd "End hunger, achieve food security and improved nutrition and promote sustainable agriculture."

children under five years of age is the result of insufficient food intake, repeated attacks of infectious disease, low education of parents, unhygienic environment, and inadequate childcare(Suara & Aryee, 2018; Yalew, 2014). Given this background, women empowerment plays a very crucial role in determining the nutrition status of children under-five years (Bose, 2011).

Mother's reproductive health and child health outcomes are significant correlates of women's disempowerment (Dimbuene et al., 2018; Hotchkiss, Godha, Gage, & Cappa, 2016). The utilization of child health services depends on women's empowerment. Children of empowered mothers have full access to health services and have an awareness of how to save their children from unhealthy food and environment (Amare, Ahmed, & Meharie, 2019).

1.2 The rationale of the Study

An improvement has been seen in reducing malnutrition in the understudy countries, but still, these countries are far from the global target of reducing malnutrition at the end of 2025. In literature, several studies were conducted, for (Nigeria, Burkin Faso, Zimbabwe, Ethiopia, Tanzania, and Ghana) in the context of mother empowerment and child health. The present study explores the role of mother empowerment, at the household level, in reducing malnutrition in twenty-two countries. The role of mother's empowerment in reducing malnutrition was not previously studied in these twenty-two countries. Therefore, this study is an attempt to fill this gap. Another contribution of this study is to utilize the quantitative measurement of women's empowerment while following the Kabeer (1999) conceptual framework of resource-agency-outcome. Following are the objectives of the study

- To highlight the status of women empowerment across the countries in Sub-Sahara Africa.
- To find out the role of mother empowerment in reducing malnutrition in Sub-Sahara African countries.

1.3 Limitation of the Study

The current study faces some limitations in the following areas;

- Only the ever-married women of 15-49 years having children under five years of age at the time of the survey are selected for this study.
- Only those countries are selected for whom complete information about the indicators of women empowerment (work status, awareness, decision making, self-esteem, and self-confidence) and the indicators of malnutrition (stunting, wasting and underweight) are available.

2. Literature Review

2.1 Women Empowerment (Measurement)

There are different measures and frameworks to define women empowerment in previous literature. Kabeer (1999) defined women empowerment as a process and conceptualize empowerment in terms of resource, agency, and achievement. Beteta (2006) flourish the concept of women empowerment through the Gender Empowerment Enabling Environment (GEEE). The GEEE included questions covers the gender aspects from the World Value Survey and collect data from the women's organizations in a country and raise the voice for women right and no tolerance of government against gender discrimination.

Charmes and Wieringa (2003) hypothesize the women's empowerment matrix in six dimensions and included the physical, socio-cultural, religious, economic, political, and legal aspects. Moreover, measure this matrix at individual, community, household, state, region and globally. Desai

(2010) has highlighted that the challenge to measure women empowerment is the lack of gender base data for most of the dimensions and levels. Beteta (2006), also agrees with this lack of data measurement at the household level, Desai (2010) believes that most of the data was available for the aggregate or household level. Data at the community, state, and region levels was available only for very few countries. At the same time, Desai (2010) pointed out that women empowerment was measured with the use of universal indicators. Wherase the dimensions of women empowerment had different values in different regions and countries. (Mosedale, 2005; Odutolu, Adedimeji, Odutolu, Baruwa, & Olatidoye, 2003).

In India, women are educated but lacks the decision power, (Jejeebhoy, 2000), in Bangladesh women have better decision power as compared to India but with low education levels (Jejeebhoy & Sathar, 2001) in Nepal women are deprived of the right of the land ownership (Allendorf, 2007). In Pakistan's women have lack of freedom of mobility (Ahmad & Sultan, 2004), in Sub-Saharan Africa they suffering from health issues (Heggdal, 2016) and affecting gender-based violence in Zambia (Hof & Ritchers, 1995). Given the context and background of the countries, a comprehensive index of women empowerment has been constructed through five dimensions and with the help of nineteen indicators.

2.1 Women Empowerment and Malnutrition in Child in under Five years of age

Ndaimani, Mhlanga, and Dube-Mawerewere (2018) measured women empowerment by the decision making and access to assets, in Zimbabwe by using the Demographic Health Survey and found a decisive role of mother empowerment in the treatment of diarrhea and uptake of child vaccination in children under five years of age. Amare et al. (2019) studied the nutritional status of children under five years of age and the determinants of child nutritional status and found that the mother's role had primary importance in the improvement of child nutritional status. For child well-being, women's decision making autonomy appeared to be the most significant determinant. In India and Nepal, older women with less than two children have more independence in decision making as compared to young mothers. Mother's with more autonomy in decision making seems to be a good for their children(Ibrahim, Tripathi, & Kumar, 2015).

Cunningham, Ruel, Ferguson, and Uauy (2015) explained the link between mother empowerment, childcare, and child nutrition in the rural Nepal. For this study, Women Empowerment in Agriculture Index (WEAI) and five sub-domains of empowerment has been constructed to investigate the relationship between mother empowerment and child's nutritional status. Findings proved that mother's empowerment has a strong influence on child care and his/her nutritional status. Mother's empowerment at home correlates with child health and wellbeing. Empowerment of women and mothers are the prime factors for achieving the targets of social actions and health promotion movements. Mothers in all cultures and regions are the first ones who provide care to their children more than anyone else. The involvement of women in social actions and health promotion programs ensures the success of these efforts. For the social and economic development, the participation of women stands necessary along with giving them empowerment and an unbiased gender environment (Bennett, 2002; Cherayi & Jose, 2016; Kar, Pascual, & Chickering, 1999).

Parasar (2004) examined the link between mother empowerment and child nutrition and immunizations in India. Different dimensions of women empowerment have been evaluated for capturing their effects on children's health and survival. Decision making and education have a more significant impact on child immunizations and nutrition. Children of more empowered mothers have proper vaccinations and nutrition on time as compared to less empowered mothers(Bhandari & Chhetri, 2013; Chipili, Msuya, Pacific, & Majili, 2018; Lamontagne, Engle, & Zeitlin, 1998). In Pakistan

decision making in the purchase of food, purchase of clothing, in medical treatment and travel have more influence on child health care practices along with the wealth of households. Empowerment is revealed as the prime factor in the promotion of health care practices in children, even women of wealthy families with no empowerment seems to fail to provide child care in an appropriate way (Khan, 2018).

3. Methodology

For analysis, data has been extracted from the most recent Demographic Health surveys (2011-2016) for analyses. DHS surveys present a wide range of evidence on the target sample of the population comparable across the countries. DHS data is national-level data and collected by cluster sampling method by multi-stages. Women between 15 to 49 years of age are appropriate to participate and men from 15 to 65 years are also applicable to participate2.

3.1 Countries selection criteria for Analysis

Only countries with the DHS datasets (2011-2016) and with comprehensive indicators of anthropometric measures of children under five-year of age and indicators selected for women empowerment were included in the study. Following the criteria, only 22 Sub-Sharan African countries out of 49 were included. Missing values are not included in the analysis.

3.2 Conceptual Framework for model

Malnutrition is a globally addressed issue. The most common forms of malnutrition are stunting, wasting, and underweight. It is the outcome of insufficient food intakes, irregular eating habits dietary and repeated infectious diseases(WHO, 2018). Inadequate food intake and improper eating habits linked with psychological and family factors. Moreover, inadequate sanitation-related with the environmental condition of households.

A household is a multi-person unit where a family or group of persons lives together. In homes, mothers are the primary caregiver of children. Children's health and nutritional status grew up under the observation of mothers. For this study, we start from the household which maximizes a preference function

$$U=U(Yi....Yn) \quad \text{.....Equation (1)}$$

Subject to the resource allocation

$$\sum PiYi=I=W+V \quad \text{.....Equation (2)}$$

Household is unit assumed to produce and consume vector of commodities (Yi), constituted by Becker (1965) and Strauss and Thomas (1995) in their theories of time allocation and revised theories of choice forming the household's utility function. Yi are the market commodities purchased, and pi is the market price, I is money income, W is wage and V is income from other sources (Aguiar, Botelho, Lago, Maças, & Sampaio, 2012; Aguiar & Hurst, 2007; Juster & Stafford, 1985). Households usually will be maximizing their utility by combining the time and market good to produce more necessary public goods (healthy children) which have a direct effect on the human capital accumulations for the household as well as for nations. The new utility function of household's is now represented as;

$$U=f(Yi,Ni,Li) \quad \text{.....Equation (3)}$$

2 Details related to data collection and sampling methodology used for DHS surveys are present on the website (Measure DHS, 2019).

The household is then assumed to produce a vector of commodities Ni. These commodities are associated with different types of activities related to nurturing and rearing children to enhance their nutritional status (Becker, 1965; Becker, Fonseca-Becker, & Schenck-Yglesias, 2006; Grossman, 1972; Willis, 1973). The good nutritional status is estimated by standardizing anthropometric measures (Stunting, Wasting, and underweight). The household utility function is therefore maximized subject to different constraints including the time-specific nutrition and income. Following the work of Grossman (1972) general health production function, the reduced form of production function of health (nutritional status) of a child in a household can be derived as (Garcia, Alderman, & Sathar, 1989; Jamal, 2018; Khan & Raza, 2014, 2016)

$$Hi=f(WEmp, Mi, Ci, Fi, Hi, Ci)\ i=1,2,3 \ldots \ldots \text{Equation (5)}$$

Hi is health (malnutrition) which depended on the vector of health inputs; women/mother's empowerment (WEmp), mother's characteristics (Mi), Child (Ci), father characteristics (Fi), household's characteristic (Hi)and country characteristics. In this study, the focus is on the development of the relationship between health (malnutrition) and empowerment, along with parent's and households' characteristics. The production function of health Eq(5) presents the economics of non-market activities which plays the more important role of the vector of inputs for the production of market goods (Becker, 1974, 1981; Becker & Lewis, 1973; Cummins et al., 1991). Investing time in the health of a child results in human capital formation which in turn becomes the life cycle earnings and productivity (Browning et al., 2014).

3.3 Indicators of Malnutrition

The three most common anthropometric indicators used to measure malnutrition in children of under five years age are stunting (low height-for-age), wasting (low weight-for-height), and underweight (low weight-for-age) calculating Z score below than −2 standard deviations (SD) (Jamal, 2017; Khan & Raza, 2014).

Table 1 Measurement Scale for Malnutrition (Dependent Variable)

Measure	Description	Measurement Scale in DHS Data
Stunting	Height-for-Age	If a child is stunting 1, otherwise 0
Wasting	Weight-for Height	If a child is wasting 1, otherwise 0
Underweight	Weight-for Age	If a child is underweight 1, otherwise 0
CIAF	Composite Index of Anthropometric Failure	If a Child is undernourished 1, otherwise 0

(Khan & Raza, 2014, 2016)

3.4 Conceptual Framework for Women Empowerment

The concept of empowerment previously defined in the term of power, autonomy, control, self-efficacy, and as a goal. The power is someone's ability to make choices and express the concept of empowerment as a process by which people who have been denied to get the ability to make choices, become able to make choices (Kabeer, 1999, 2001). It is challenging to define empowerment in a single dimension because it is a multidimensional process. Change does not occur in one step or sudden; it takes time, strategies and planning. If a person who denied to make choices suddenly asked her/him to make choices, they cannot make the right choices. Kabeer (1999) explained the ability to exercise choices in terms of three interrelated dimensions resource, agency, and achievement. Resources are not only economic but also included human and social, serves to enhance the ability to make choices.

Change in resources, change the ability to make choices because resources are measured as potential rather than actualized choices. Agency is the ability to recognize one's goal and acts upon it. In the scenario of Kabeer (1999), resource-agency-achievement framework, the present study explained empowerment as a process that can be attained in terms of five interrelated dimensions- work status, awareness, decision making, self-esteem, and self-confidence.

Table 2 Women Empowerment Index: A Representation of Kabeer's Framework (1999)

Main Concept	Kabeer's Dimensions	Sub-Dimensions	Indicators
Women Empowerment Index	Resource	Work status	• Respondent is currently Working • Respondent 's Employment Status
		Awareness	• Respondent Watching TV • Respondent reading Newspaper or Magazines • Respondent listening to the radio • Heard about family planning on the radio • Heard about family planning on TV • Heard about family planning from newspapers
	Agency	Decision-Making	• The decision to spends about women's Husband earnings • The decision to women's Health • The decision about large household purchases • The decision about visits to family or relatives
	Achievement	Self-Esteem	• Beating justified if wife argues with husband • Beating justified if the wife neglects children • Beating justified if Without telling husband • Beating justified if the wife refuses to • For sex • for have sex with the husband • Beating justified if wife burns food
		Self-Confidence	• Getting medical help for self: not want to go alone • Getting medical help for self: Getting • Money for treatment

Source: DHS Data

3.5 Statistical Analysis

Descriptive statistics and cross-tabulation have used to describe the current situation of women's empowerment and malnutrition within the countries of Sub-Saharan. SPSS 22.0 version has used to analyze the data. The Mother Empowerment Index is calculated through the Factor Analysis. These underlying factors are inferred from the correlations among the p variables. Each factor is estimated as a weighted sum of the p variables. The ith factor is thus

$$Fi=Wi1S1+ Wi2S2+ Wi3S3+...+ WipSp \quad Eq1$$

Wip is the weight for mth principal component and Pth variables. S variables used in factor analysis. (Antony & Rao, 2007; Gupta & Yesudian, 2006; Hightower, 1978). These factor scores have accumulated the mother empowerment index in the range of 01-4.4. This mother empowerment is then further divided into three groups low, medium and high as followed by (Brajesh & Shekhar, 2015; Jeckoniah, Nombo, & Mdoe, 2012).

4. Results and Discussion

According to Table 3 within the Sub-Saharan African countries, it is found that Congo Democratic, Chad, and Sierra Leon are the countries where malnutrition is at extremely alarming followed by stunting (44.1%,42.9%,37.7%), wasting (23.2%,32.5%,16.0%) and underweight (7.9%,14.2%,9.4%). These are the same countries where high mother empowerment is at its lowest (3.4%,1.3%,3.4%). Gabon, Kenya, Nambia, and Uganda are the countries where malnutrition is comparatively low followed by stunting (22.9%,27.1%,23.0%,30.3%), wasting (8.3%,13.2%,13.8%,13.1%) and underweight (4.1%,5.5%,8.0%,5.3%). These are the countries where mother empowerment is comparable to other countries is high (17.6%,36.5%,44.6%,26.6%). The same trend and inverse relationship between mother empowerment and malnutrition have been found in the remaining Sub-Saharan African countries.

Table 3 Current Situation of Women Empowerment and Malnutrition Evidence from DHS

Sr#	Countries	Years	Mother Empowerment			Malnutrition		
			Low	Medium	High	Stunting z score<-2	Wasting z score<-2	Underweight z score<-2
1	Burkina Faso	2014	7.6%	82.0%	10.4%	34.2%	24.9%	15.3%
2	Ethiopia	2016	23.4%	65.1%	11.5%	35.9%	25.2%	11.9%
3	Gabon	2012	8.0%	74.4%	17.6%	22.9%	8.3%	4.1%
4	Gambia	2013	7.6%	82.5%	10.0%	25.8%	17.9%	11.7%
5	Comoros	2012	7.9%	77.3%	14.8%	27.7%	14.5%	11.6%
6	Congo Democratic	2014	20.9%	75.8%	3.4%	44.1%	23.2%	7.9
7	Cote d'Ivoire	2012	16.0%	76.8%	7.2%	29.8%	14.6%	7.1%
8	Cameroon	2014	10.0%	77.6%	12.4%	31.6%	13.7%	5.7%
9	Chad	2015	38.9%	59.8%	1.3%	42.9%	32.5%	14.2%
10	Kenya	2014	5.2%	58.2%	36.5%	27.1%	13.2%	5.5%
11	Liberia	2013	1.5%	81.0%	17.5	30.9%	15.3%	6.6%
12	Mali	2013	1.9%	79.2%	18.9%	37.7%	25.2%	12.6%
13	Malawi	2016	1.8%	77.0%	21.2%	35.2%	25.2%	12.6%
14	Mozambique	2011	2.5%	75.6%	22.0%	39.3%	11.9%	3.2%
15	Namibia	2013	4.1%	51.3%	44.6%	23.0%	13.8%	8.0%
16	Nigeria	2015	12.9%	68.2%	18.9%	36.1%	26.9%	16.6%
17	Sierra Leon	2013	19.1%	77.5%	3.4%	37.7%	16.0%	9.4%
18	Tanzania	2016	8.5%	72.3%	19.2%	33.4%	13.7%	4.8%
19	Tonga	2014	5.9%	83.4%	10.6%	28.3%	16.8%	7.3%
20	Uganda	2011	4.1%	69.3%	26.6%	30.3%	13.1%	5.3%
21	Zimbabwe	2011	1.9%	83.0%	15.1%	30.7%	9.7%	5.3%
22	Zambia	2013	2.1%	82.0%	15.9%	38.2%	14.4%	6.1%

Source DHS

Table 4 depicts the results of binary logistic regression and explains the relationship between mother empowerment and malnutrition among children under five years. Composite women empowerment has a significant impact on all the indicators of malnutrition. Women with high and medium composite empowerment index negatively affect the stunting, wasting, underweight with odds ratios less than one. Mother empowerment is assessed through working status, awareness, decision making, self-esteem, and self-confidence. All these dimensions of empowerment make a mother secure

and take better care of her child rather than disempowered women (Haroon, 2018; Ndaimani et al., 2018; Siddhanta & Chattopadhyay, 2017)

Table 4 Results of Binary Logistic Regression

	Stunting (Height for age) <-2SD		Wasting (Weight for height) <-2SD		Underweight (Weight for age) <-2SD	
Independent Variables		Std. Err.	Logistic Ratio	Std. Err.	Odd Ratio	Std. Err.
Composite Women Empowerment Index(Low as reference category)						
Medium	0.817***	0.055	0.875**	0.066	0.769**	0.088
High	0.909***	0.031	0.923**	0.039	0.806***	0.053
Mother Body Mass Index (less than 18.5 kg/m2 is reference category)						
More than 18.5 kg/m2	0 .974**	0.012	0 .979	0.014	0.910***	0.020
Mother's Education (No Education is reference category)						
Primary	0.911***	0.016	0.734***	0.019	0.689***	0.026
Secondary	0.861***	0.018	0.731***	0.022	0.766***	0.030
Higher	0.798***	0.033	0.732***	0.040	0.829***	0.053
Mother's age on her first birth (Age below 19 years old is reference category)						
20-25	0.891***	0.015	0.958**	0.018	0.954*	0.025
Above than 25	0.851***	0.034	0.890***	0.043	0.941	0.056
Child Age in months	1.001**	.001	1.001	.001	0.998	.001
Child Gender (Male child as reference category)						
Female Child	0.980*	.037	1.041**	.024	1.043*	0.038
Father's Education (No Education is reference category)						
Primary	0.900***	0.017	0.757***	0.020	0.740***	0.027
Secondary	0.946***	0.020	0.821***	0.024	0.781***	0.032
Higher	0.975	0.031	0.962*	0.037	0.939	0.049
Father's employment status (Father did not work is reference category)						
Father did work	0 .898***	0.016	0 .949***	0.019	0 .956*	0.0 27
Household's Wealth status (Poorest is reference category)						
Poorer	0.942***	0.022	0.883***	0.027	0.882***	0.041
Middle	0.999	0.021	0.959	0.026	0.980	0.042
Richer	0.959**	0.020	0.914***	0.025	0.932**	0.046
Richest	0.951***	0.018	0.899***	0.023	0.933**	0.056
Type of Residence (Rural areas are reference category)						
Urban Areas	0.974***	0.026	0.962***	0.027	0.923***	0.026
<=5	0 .992	0.018	0.944***	0.022	0 .873***	0.028
<=4	0 .963**	0.018	1.042*	0.022	1.078**	0.029
Constant	1.519**	0.154	1.276	0.184	0.533**	0.273
Cox & Snell R Square	.005		.013		.008	
Nagelkerke R Square	.007		.020		.018	

Mother's body mass index, mother education, and maternal age on her first birth, and each have its different effect on malnutrition. Regression results proved that body mass index 18.5Kg/m2,

education, and age at first birth above 20 years have a significant role in reducing malnutrition. Mother's health, education, and age at first birth interlinked with the health and care of her child (Amare et al., 2019; Scantlan & Previdelli, 2013).

Malnutrition increased with the increase in child age because chances to increase in malnutrition among children under five years have more probability if they do not take the proper and sufficient food intake (Khan, Mann, Zafar, Hashmi, & Akhtar, 2010; Khan & Raza, 2014) In the female child there are fewer chances to be stunting and wasting but have more chances to be underweight as compared to male children. The total number of children ever born has its significant effect in reducing the stunning, wasting and underweight (Amare et al., 2019; Nosheen & Chaudhry, 2018)

Father education and father employment status and have a different impact on stunting, wasting and underweight. According to the results of table 7, binary logistic regression results proved that father education and employment status have a negative and significant effect on stunting, wasting and underweight. Household characteristics were measured by three different characteristics of household wealth status, total household members, type of residence, and each component have a significant effect on stunting, wasting and underweight. The binary logistic regression results proved that household richest wealth status, total household member equal to or less than four and locality in urban have a negative and significant effect on stunting, wasting, underweight. Household wealth and locality (urban) provide support to provide sufficient, proper and healthy food to children in urban areas provision of hospital, vaccination and awareness more significant than the rural areas (Kumar, Mittal, & Sharma, 2010; Kyu et al., 2016; Njau et al., 2006).

5. Conclusion

In this study, an association of mother's empowerment index with the indicators of malnutrition was found to be statistically significant. However, all three indicators of malnutrition were significantly associated with the sociodemographic characteristics of mother, father, children and household. There is a need for policymakers to strengthen the change in the social behavior of family strategies, as this will be likely to increase uptake of child health services. Policymakers in low-income countries can consider promoting gender equality in health, education and in decision making to improve children's health care.

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