Interaction of Household Wealth and Women's Working Status on Child Malnutrition: Evidence from PDHS-2013

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Abstract

Theoretically, it is supposed that women's working status and household wealth independently contribute towards the children's dietary status. The working women of the inferior socio-economic class are generally engaged in the informal sector or low paid work. It may be argued that such kinds of service cannot contribute to the nutritious prestige in children. To solve this puzzle whether woman's working status in all socio-economic setups is contributing to children's nutritional status or not? This is the main focus of the research. A sample data of 1169 households from PDHS (2012-13) are used to explore the influencing factors of child malnutrition. The study employed the binary logistic regression which observes the likelihood of malnutrition in the children. Malnutrition is measured through CIAF. The interaction terms of the woman's working status and five quintiles of wealth index have been created. The results disclose that working women belonging to the household of the first two quintiles of the wealth index and the fourth quintile of the wealth index are not contributing to the nutritious prestige of the children. Furthermore, in the third quintiles, the working status of women contributes to the nutritional prestige of children. It may be inferred that the socioeconomic status of the household is important for the nutritional welfare of the children, not the woman's employment. However, it may be concluded that women's employment should be of the level that can support the socio-economic status of the household.

<u>Keywords</u>: Composite Index of Anthropometric Failure (CIAF), Pakistan Demographic and Health Survey (PDHS), Women's employment, Household wealth index, Child malnutrition, Child health.

Introduction

The nutritious prestige of under five-year child in age is an important indicator of socio-economic development of an economy. In most of the developing countries, the women play dual roles, providing care to their

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children and earn incomes for their family. Men are primarily involved in earning income, and mostly they have less involvement in childcare, especially when the child is under five. The mothers' primary work is providing care to their children, but when they participate in labor force. they are unable to spare sufficient time for childcare. The working women have to rely on other household members to attend the children in their absence from home. Consequently, the quality and quantity of care provided to the children might be insufficient. Therefore, the women, who choose to participate in labor force, have tolerated an opportunity cost in the form of their children's less care. The impact of increase in household income by employed women may overweigh the impact of providing insufficient time for childcare.¹ In low income nations, children are in danger to under-nourishment since of short nutritional consumptions, infectious diseases, deficiency in proper care, as well as unbalanced supply of diet inside the household. According to Khan & Raza (2014)² those children who have easy access to adequate food supply without getting continual illness and have reached to their potential growth are considered as well-nourished.

In many studies, researchers analyzed the impact of household wealth and women employment separately, but the key aim of the current study is to analyze the combined impact of women's employment and their household wealth position on dietary prestige of children under five years in case of Pakistan. Second, to include the most nutritional prestige; potential determinants of child children age, birth order number. etc.). maternal characteristics (sex. characteristics (mother's age, education level, BMI, asset ownership, involvement in decision-making, receiving tetanus toxoid, employment status, etc.), household characteristics (wealth index, place of residence, in a household number of children of under five years, etc.) and disease factors (diarrhea, intake of vitamin A, iron rich food, and children immunization).

¹ Peter Glick, *Women's Employment and its Relation to Children's Health and Schooling in Developing Countries: Conceptual Links, Empirical Evidence, and Policies*', Working Paper 131 (Cornell: Food and Nutrition Policy Program, 2002).

² Ejaz Ali Khan and Muhammad Ali Raza, 'Nutritional Status of Children in Bangladesh: Measuring Composite Index of Anthropometric Failure (CIAF) and its Determinants', *Pakistan Journal of Commerce and Social Science*, 8:1 (2014), 11-23.

In Pakistan, information on nutritional prestige of children was collected by PDHS (2013),³ computing the weight and height of all under-5-year age children from selected households. Three indices were calculated as: height for age (accumulative growth deficit stunting and linear growth obstruction), weight for height (body mass association with length wasting or height), and weight for age (composite index of first two indices under-weight). According to PDHS (2013)⁴ around 45% children of under five years are stunted, 30% are underweight and 11% are wasted.

Theoretically, I follow the framework of health services utilization of Andersen and Newman who have described three determinants of an entity's access to and use services of health:

- a. *Predisposing factors*: These include social structure (social interactions, education, ethnicity, occupation, culture and social networks), health beliefs (awareness of health care system, attitudes and values), and demographic characteristic (gender and age).
- b. *Enabling factors:* These include individual/family characteristics (information about health services, health insurance, income, quality of social relationships, a regular source of care, travel and extent), community characteristics (facilities and availability of health personnel and waiting time) and possible additions (psychological characteristics and genetic factors).
- c. *Need factors:* These comprise perceived need (people's perception regarding functional state and own health, own health awareness about illness symptoms, pain, worries and health priority to seek professional help or not) and in the last evaluated need (people's judgment regarding need for medical care and own health status).⁵

Methodology and model specifications

The selection of explanatory variables based on Anderson and Newman model which can be classified into child's individual characteristics, maternal characteristics, household characteristics, and diseases factors. Our focus is to estimate the nutritional status with reference to combined

³ National Institute of Population Studies Islamabad, (hereafter NIPS), *Pakistan Demographic and Health Survey* (hereafter PDHS), MEASURE DHS ICF International Calverton, Maryland, USA. <u>https://www.nips.org.pk/abstract_files/PDHS%20Final%20Report%20as%20of%20Jan%202</u> 2-2014.pdf. (accessed 06 December 2020).

⁴ NIPS, PDHS 2012-13.

⁵ Ronald Andersen & John F. Newman, 'Societal and Individual Determinants of Medical Care Utilization in the United States, '*The Milbank Memorial Fund Quarterly*, 51:1 (1973), 95-124.

effect of women's employment and their household wealth status. I have used an interaction term of women employment and wealth index. Women's employment status is in binary form, working or not working, while wealth index is categorized into quintiles by PDHS. I have ten combination categories of women employment status and wealth index.

Wealth Index is constructed on the basis of assets of household (assets comprise consumer stuffs ranging from television to car), house characteristics, containing drinking water, facilities for sanitation and flooring materials. Wealth index is an important indicator which shows the strength and situation of wealth, it is reliable with income measures and expenditure.⁶

Model specification

I employed binary logistics modeling in our study, because our dependent variable Composite index of anthropometric failure (CIAF) is binary in nature. Our proposed model specification is given in equation 1 below:

	β 2 AGESQij +	β4MEDUij
$CIAFij = \beta 0 CGENij + \beta 1 CAGEij +$	β 3MAGEFj +	+
	β 8MAUTOMij+	
β 5MEMPij + β 6MBMIij + β 7MASSETij +	β9TTVij+	β 10RESij+
β 11WINDij + β 15IRONij		
β 13DIARRij + β 14VITAMIN-Aij +		
β 16CHILDIMMij + β 17WI*MEMPij + \mathcal{E} ij		(1)

In equation 1, the β 's are the coefficients explaining degree of association with depending variable (CIAF). While \mathcal{E} is the error term in model. The proper definition and descriptions are given below in Table 1.

Table 1: Effective Descriptions of the Study	Variables in the given
Econometrics Model	

Variables' names	Variables' Operational Definitions
Dependent Variable:	
-	1 if child is malnourished, 0
CIAF(Composite index of anthropometric	otherwise
failure)	
Explanatory Variables	
Child characteristics	
Gender of child (CGEN)	1 if male, 0 if female
Age of children in months (CAGE)	Measured as continuous variable
-	

Square of children age (AGESQ) Birth order number (BORD)	Measured as continuous variable Measured as count variable
Maternal characteristics	
Mother's age (MAGE)	Measured as continuous variable
	0== Illiterate, 1==Primary, 2==
Mother's education level (MEDU)	Middle, 3== Matric,
	4 ==Intermediate,
	5 == Degree/Master
	1 if BMI > 18.5kg/m ² , 0 if BMI \leq
Mother's Body Mass Index (MBMI)	18.5kg/m ²
Mother's employment status (MEMP)	1 if working, 0 if not working
Mother's assets (MASSEI)	1 if yes, 0 if no
	1 if women involved in decision to
Mother's autonomy (MAUTOM)	spend money, 0 otherwise
Tetering tensistencing (TTV)	1 :f
Tetanus toxoid vaccination (TTV)	1 11 yes, 0 11 no
Household characteristics	
Type of place of residence (RES)	1 if urban, 0 if rural
Number of children under Five in a	Measured as a continuous variable
household (NCHILD),	
	1=Poorest, 2=Poorer, 3=Middle,
Wealth Index (WIND)	4=Richer, 5=Richest
Disease factors	
Had diarrhea recently (DIARR)	1 if yes, 0 if no
	1 if vitamin A rich food given to
Vitamin A (VITAMIN-A)	child, 0 otherwise
	1 if Iron rich-rich food given to
Iron (IRONF)	child, 0 otherwise
	Not immunized $= 0$, partially
Child immunization	immunized =1,
	fully immunized = 2

Data description and sources

For the study, data of 2227 under-five children from PDH Survey-2013 collected by National Institute of Population Studies (NIPS) Islamabad, Pakistan is utilized. The children's nutritious prestige is estimated through CIAF by using the following components stunting, wasting, and underweight which are measured according to growth standards setup by WHO (2006).⁷

⁷ World Health Organization, WHO Child Growth Standards: Length/Heightfor-age, Weight-for-age, Weight-for length, Height-for-height, and Body Mass Index-for-age: Methods and Development, World Health Organization (2006).

Results and discussion

The regression results indicate that child malnutrition is positively correlated with the gender of child, child age (in month), birth order, and number of children under-five in a household, and diarrhea incidence. While there is negative effect of squared age of child, mother's age, education of mother (middle level), body mass index of mother, autonomy of mother, tetanus toxoid vaccination and interaction term of wealth index and mother's employment status. By analyzing the given data for each variable, the percentage of occurrence of CIAF in a child according to different characteristics is given in Table 2:

Each Variable				
CIAF Percentage of CIAF in a child				
Child Characteristics				
Gender of child				
Female	53.66			
Male	58.48			
Child age (in months)				
\leq 6 months	48.28			
7-11	49.67			
12-17	57.51			
18-23	59.38			
24-35	59.56			
36-47	55.77			
48-59	56.38			
Maternal				
Characteristics				

Table 2: Child Malnutrit	on (CIAF) Estimation by Percentage of
	Each Variable

Age of Mother at her First Birth of Child (in years)

≤ 20	59.71	
21-24	53.85	
25-29	46.48	
30-34	41.94	
≥ 35	00.00	
Mother's Education Level		
Illiterate	63.39	
Primary	57.01	
Middle	46.30	
Secondary	38.85	
Intermediate	50.36	

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Degree/Master	30.61
Mother's Employment	
Not Working	55.01
Working	59.80
Mother's BMI	
Below 18.5kg/m ²	70.21
Above 18.5kg/m ²	54.14
Mother's Assets	
No	56.98
Yes	51.24
Mother's Autonomy	
No	61.52
Yes	51.69
Tetanus Toxoid	
Vaccination	
No	64.62
Yes	52.92
Household Characteristics	
Residence Type	
Living in Rural	59.29
Living in Urban	51.35
Number of Children under five in Househ	old
0	44.44
1	56.80
2	54.24
3	60.37
>3	56.11
Wealth Index	
Poorest	69.07
Poorer	62.24
Middle	57.07
Richer	48.59
Richest	36.51
Disease Factors	
Diarrhea incidence	
No	55.70

Vitamin A intake	
No	56.09
Yes	51.02
Iron intake	
No	57.57
Yes	41.06
Child immunization	
Not immunized	65.10
Partially immunized	59.19
Fully immunized	50.43

Table 3: Binary Logit Regression Results CIAF

CIAF		Coefficient	Standard Error	p-value
Gender of	child (Female-reference	e)		
Male			0.1279	0.003*
Child age	in months (Continuous	variable)		
		0.4735	0.1626	0.004*
Child age	square in months (Conti	nuous variable	2)	
		-0.0399	0.0196	0.041**
Age of mo	other (As Continuous Fa	ctor)		
		-0.1947	0.0925	0.035**
Education	of mother (No educatio	n- as reference	category)	
Primary		0.4504	0.2217	0.042**
Middle		-0.1623	0.2612	0.534
Matric		-0.4421	0.2367	0.062**
Intermedi	ate	-0.1313	0.3109	0.673
Degree/ M	laster	-1.1669	0.4191	0.005*
Mother's	employment status (Not	working-refere	ence)	
		1.5639	0.7216	0.030**
Mother's	BMI (Below 18.5 kg/m ²)	-reference)		
≥18.5kg/n	n^2	-0.5953	0.1958	0.002*
Mother's assets (No-reference)				
Yes		-0.0172	0.1914	0.928
Mother's autonomy (Not involved-reference)				
Involved i	in decision-making	-0.2515	0.1359	0.064**
Tetanus to	oxoid vaccination (No-re	ference)		
Yes		-0.2615	0.1789	0.144

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CIAF	Coefficient	Standard error p-val		p-value
Residence type (Rural- As reference category)				
Urban		0.1302	0.1551	0.401
Wealth sta	atus (Poorest- As referen	ice category)		
Poorer		-0.2687	0.2228	0.228
Middle		-0.3815	0.2377	0.109
Richer		-0.6133	0.2681	0.022**
Richest		-0.9079	0.3008	0.003*
Number o	f children under-five (C	ontinuous vari	able)	
		0.04827	0.0638	0.449
Incidence of diarrhea (No-reference)				
Yes		0.2219	0.1597	0.165
Vitamin A (No intake-reference)				
		-0.5284	0.2036	0.009*
Iron (No i	ntake-reference)			
		-0.5115	0.2000	0.011**
Child immunization (Not immunized-reference)				
Partially in	mmunized	-0.2113	0.1979	0.286
Fully imm	unized	-0.4013	0.2262	0.076***
Interaction of Wealth Index and Mother's Employment (Poorest-				
unemployed-reference catagory)				

Poorest- employed	0.3622	0.2192	0.098***		
Poorer- unemployed	-0.1131	0.1628	0.487		
Poorer- employed	-0.0973	0.2634	0.712		
Middle-unemployed	-0.3070	0.1734	0.077***		
Middle-employed	-0.2056	0.3208	0.522		
Richer- unemployed	-0.5338	0.1847	0.004*		
Richer- employed	-0.7389	0.3140	0.019**		
Richest- unemployed	-0.9287	0.2073	0.000*		
Richest- employed	-0.8742	0.3885	0.024**		
Overall significance of					
the model					
No. of observations = 2227 Prob. > Chi ² = 0.0000					

LR Chi² (24) = 203.97 Pseudo $R^2 = 0.0670$

Note: *, *, *** shows level of association at 1%, 5% and 10% correspondingly.

Gender of child

Generally, male children are favored more by households, so their probability to be malnourished is expected to be less than that of the girls. However, the empirical results are opposite in our analysis. The results show that the child with gender male has higher probability to malnourishment compared with their female counterpart. There has been evidence of a better nutritional status of female children compared to males in several studies (El–Sayed *et al.*, 2001; Marcoux, 2002; Babatunde *et al.*, 2011).^{8,9},¹⁰

Child's age

Food and care requirements of a child vary with the child's age. Results of the study illustrates that as age of child increases, the chances of malnutrition also increase. However, it might not have a linear relation. Child malnutrition increases up to a certain age then it decreases. The variable of child age squared show negative association with CIAF, indicating that child malnutrition decreases after a certain age. The results reflect that a child has more contact with unhygienic objects like floor and toys during the age of teething and crawling, i.e., the age between 5-12 months. That's why the child is more malnourished during that age. However, after that age, a child has better nutritional status because of having less contact with floor when the it starts walking. The result can also be justified as a child is more sensitive to germs at the earlier age. Our results are consistent with Rahman and Chowdhury (2007, for Bangladesh);¹¹ Hien & Hoa (2009, for Vietnam);¹² Das & Rahman (2011, for Bangladesh);¹³ and Badake *et al.*, (2014, for Kenya)¹⁴

⁸ Nawal El-Sayed, Ashry Gad Mohamed, Leila Nofal, Ahmed Mahfouz & Hamdy Abou Zeid, 'Malnutrition among Pre-School Children in Alexandria, Egypt', *Journal of Health, Population and Nutrition*, 19:4 (2001), 275-280.

⁹ Alain Marcoux, 'Sex Differentials in Undernutrition: A Look at Survey Evidence', *Population and Development Review*, 28:2 (2002), 403-414. doi.10.1111/j.1728-4457.2002.00275.

¹⁰ Raphael Olanrewaju Babatunde, Funke Iyabo Olagunju, Segun Bamidele Fakayode & Foluke Eunice Sola-Ojo, 'Prevalence and Determinants of Malnutrition among Under-5 Five Children of Farming Households in Kwara State, Nigeria', *Journal of Agriculture Science*, 3:3 (2011), 173-181. doi. <u>10.1111/ppe.12222</u>

¹¹ Azizur Rahman & Soma Chowdhury, 'Determinants of Chronic Malnutrition among Pre-school Children in Bangladesh', *Journal of Biosocial Sciences*, 39:2 (2007), 161-173. doi. 10.1017/S0021932006001295

¹² Nguyen Ngoc Hoa & Nguyen Ngoc Hien, 'Nutritional Status and Determinants of Malnutrition in Children under Three Years of Age in Nghean, Vietnam', *Pakistan Journal of Nutrition*, 8:7 (2009), 958-964. doi.<u>10.3923/pjn.2009.958.964</u>

¹³ Sumonkanti Das & Rajwanur M. Rahman, 'Application of Ordinal Logistic Regression Analysisin Determining Risk Factors of Child Malnutrition in Bangladesh', *Nutritional Journal*, 10:124 (2011), 1-11.

Birth order of child

The regression results portray that child birth order associated positively with threat of being malnourished in Pakistan. The study results are consistent with Ukwuani, *et al.* (2003, for Sub-saharan Africa).¹⁵ The result depicts that more children a woman bears, the higher will be the chances of child malnutrition.

Age of mother

Mother's age has negative impact on children malnutrition in study results. It shows that a mother with a higher age has more awareness about child-care. She knows better about the importance of providing her child with proper food and medication in case of any disease.

Mother's Body Mass Index

The nutritional prestige of woman has significant implications on her own health as well as for children. A mother with deprived nutritious standing, as directed by short BMI gives birth to a low birth-weight baby with huge malnutrition probability in infancy. The regression results of this study show that BMI of mother negatively impacts on risk of being malnourished. These results are consistent with Das & Rahman, 2011;¹⁶ Babatunde *et al.*, 2011¹⁷ and Reyhan *et al.*, 2006.¹⁸

Mother's education level

Our regression results indicate that the mothers with secondary level education have negative association with risk of malnutrition. It shows as the decrease in mother's education takes place the risk of malnutrition will increase, while other education level is statistically insignificant.

¹⁴ Q.D. Badake, I. Maina, M.A. Mboganie, G. Muchemi, E.M. Kihoro, E. Chelimo & K. Mutea, 'Nutritional status of Children under Five Years and Associated Factors in Mbeere South District, Keynea', *African Crop Science Journal*, 22:4 (2015), 799-806.

¹⁵ Festus A. Ukwuani & Chirayath M. Suchindran, 'Implications of Women's Work for Child Nutritional Status in Sub-Saharan Africa: A Case Study of Nigeria', *Social Science and Medicine*, 56:10 (2003), 2109-2121.

¹⁶ Sumonkanti Das & M. Rahman Rajwanur, 'Application of Ordinal Logistic Regression Analysisin Determining Risk Factors of Child Malnutrition in Bangladesh', *Nutritional Journal*, 10:124 (2011), 1-11.

¹⁷ Babatunde et al., 'Prevalence and determinants of malnutrition among under-5 five children, 3.

¹⁸ M. Israt Rayhan & M. Sekander Hayat Khan, 'Factors Causing Malnutrition among Under Five Children in Bangladesh', *Pakistan Journal of Nutrition*, 5:6 (2006), 558-562. doi. <u>10.3923/pjn.2006.558.562</u>

The primary education level has special focus for policymakers especially in adult literacy, but our findings indicate that secondary education reduces the risk of child malnutrition. Therefore, on the behalf of our finding I suggest policymakers should make compulsory secondary education for females to tackle the problem of child malnutrition. The female education provides them awareness and ability to participate in paid economic activity which contributes to their household income. These activities are supposed to be positively related with child health. Highly educated mothers have significant share in household income and they also have basic information about health of child, especially, their feeding practices significantly reduce the child's malnutrition risk. The following studies support this finding (Kudane et al., 2015;19 Rabbi & Karmaker, 2014;20 Babatunde et al., 2011;21 Mukherjee et al., 2008;²² Reyhan et al., 2006²³). The women with high education maintain reasonable child interval and fewer children's, because of this, they can take better care of child health-care and medical consultation.

Autonomy of mother

The investigation shows negative relation of mother's autonomy on CIAF of children. It reveals that child malnutrition will be tackled if the woman has empowerment, as then she would be spending more freely on her child's food, medication, and other requirements.

¹⁹ Ranjeet Kudave, Waleed Salih Rasheed, Angeline Jeyakumar & Anita Kar, 'A Survey of the Nutritional Status of Children Aged between 12 to 23 Months Registered at Anganwaadi Centres in Pune District, Maharashtra, India, '*Journal of Innovations in Pharmaceuticals and Biological Sciences*, 2:1 (2015), 24-33.

²⁰ Ahbab Mohammad Fazle Rabbi & Shamal Chandra Karmaker, 'Determinants of Child Malnutrition in Bangladesh a Multivariate Approach, Asian Journal of Medical Sciences, 6:2 (2015), 85-90. doi. 10.3126/ajms.v6i2.10404

²¹ Babatunde *et al.* 'Prevalence and Determinants of Malnutrition among Under five Children, 3.

²² Maj R. Mukherjee, Lt Col S. Chaturvedi, Col R. Bhalwar, 'Determinants of Nutritional Status of School Children, *Medical Journal of Armed Forces India*, 64:3 (2008), 227-231. doi. 10.1016/S0377-1237(08)80099-8.

²³ M Israt Rayhan & M. Sekander Hayat Khan, 'Factors causing malnutrition', 558-562.

Prenatal care

The analysis shows that a woman having tetanus vaccination will bear a child with better health status. The child having such type of vaccination before birth has more immunity for diseases than those not having it.

Place of residence

The positive results for urban residence show that a child living in urban area has more probability of being malnourished. Our result coincides with Arif *et al.*, $(2012)^{24}$ for Pakistan; and contradicts with Amosu *et al.* $(2011)^{25}$ for Nigeria. The justification of this result is that there is more population burden on urban areas as related to the rural areas. As a result, employment opportunities for urban population shrink increasingly. Another reason is pollution factor in urban areas.

Number of children

The finding depicts that a child living in a household with more number of children (under five years) is more likely to be malnourished. It reflects that a lower birth interval exists in a household with more number of children of under-five age. It reduces the per capita food availability as well as the care for the children.

Woman employment and household wealth

The results of interaction term reveals that working women belonging to the household of the first three quintiles of the wealth index are not contributing in nutritious position of children. while, in the last two highest quintiles of wealth index the employment of women has no importance as in these two quintiles the employment in addition to unemployment status of women contributes in nutritional status of children because household is rich and richest in wealth status. It may be inferred that socioeconomic status of household is important for the nutritious standing of the child rather than a women's employment.

²⁴ Ghulam Muhammad Arif, Saman Nazir, Maryam Naeem Satti & Shujaat Farooq, 'Child Malnutrition in Pakistan: Trends and Determinants', Working Paper id:5060 *Pakistan Development Review* (Islamabad: Pakistan Institute of Development Economics, 2012).

²⁵ A. M. Amosu, A.M. Degun, N.O.S. Atulomah & M.F. Olanrewju, 'A Study of the Nutritional Status of under-5 Children of Low-income Earners in a South-Western Nigerian Community', *Current Research Journal of Biological Sciences*, 3:6 (2011), 578-585.

Conclusion

Logistic regression results of the study indicate that gender of child, child age, child age square, age of mother, education of mother, body mass index of mother, employment status of mother, autonomy of mother, wealth status, vitamin A deficiency, iron deficiency, and child immunization are the major determinants of child malnutrition in Pakistan.

The findings of interaction term conclude that employment and unemployment status of women contribute in children's nutritional status, but household wealth status has much and greater impact on child nutritional status rather than women working. So, it is inferred that household socio-economic status is important for the nutritious prestige of the children instead of women's employment. Study suggests that women employment should be of such a level that can give support to her household as well as maintain the socio-economic status of the family.