

Understanding the Dynamics of Child Malnutrition and Health Outcomes in Rural West Bengal

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According to NFHS-3, 48 per cent of children under the age of five are stunted due to chronic under nutrition, with 70 per cent being anaemic. This dismal nutrition situation of children is very much a matter of gender discrimination as practiced all over India. In the above context the present study focuses on the nutritional entitlements of the 465 primary school going children of 300 women from three districts of rural West Bengal by applying Clinical Nutrition Survey Chart; 24-hr recall method and Food Frequency Questionnaire, health and immunization records. In this SPSS-17 was used for the descriptive statistics, χ^2 for association and linear regression analysis. It was seen gender outlook of the mothers were detrimental to the health outcome of the children at 0.05% level of significance. Also factors like birth order, age at weaning and mothers age at marriage were detrimental to the malnourishment status of the child.

[Key Words: Gender, Nutrition, Health, Malnutrition, Caste, West Bengal]

India's dismal performance in areas of provision of adequate nutrition (both macro and micro) is reflected in the statistics¹ which show prevalence of low birth weight babies is 22.5%, while 48% of children under age five years are stunted and 19.8% of the children under the age of five years in the country are wasted. Fact that is really bothersome is female children experience higher mortality and morbidities rate than male in almost all major states. Over 50% of preschool children and 30% adults are undernourished as judged by anthropometric indices and over 70% of women and children suffer from anaemia. Added to this the Census of India 2011², reveals that the child sex ratio (number of girls per 1,000 boys among children in the age group 0-6 years old) is at its lowest since when India gained her independence. One of the most alarming trends in India is that of sex discrimination, which manifests as neglect through lack of medical care, improper nutrition and even death through infanticide and sex selective abortions. Sen (1992, 2003) first recognized that millions of women in India and China are missing because of widespread neglect in nutrition, health care, and prenatal care. India and China are the only

countries in the world in which female infant mortality rates are higher than that of males (United Nations, 2011).

This situation of malnourishment is like a double edged sword as it has both direct as well as indirect consequences. Pregnant women who are undernourished are more likely to have malnourished children with low physical and mental capabilities than its normal counterpart. Further, the direct consequence of malnourishment is reflected in the higher mortalities and morbidity rates of the undernourished child. The situation gets aggravated when more girls are undernourished than boys as women differ from men in specific nutritional needs during adolescence, pregnancy and lactation. Further, girls today are women tomorrow which leads to an intergenerational cycle of malnourishment where the under nourished mother gives birth to a malnourished child. Also, in the Indian context, women (mothers) are mostly responsible for the upkeep and care of the child in its formative years so her gender attitudes are consequential to the nutritional and health entitlements of the child.

Review of Literature

A number of studies show intra household resource allocation focus on differences in entitlements of either women or children. Awasti (1999, 2003) has shown the poor status of children as regards to nutrition. It also reveals the gender aspect where girls are fare worse than boys. Studies of Kapil U (1999), Preja N (2014) focussed on the primary school going children and looked into the nutritional attainment of the same and found the girls intake to be significantly lower than that of the boys regarding micro nutrients. A similar study by Garg (1997) focussed on the nutritional intake of slum children. Pande (2003, 2006, and 2007) has shown that the neglect of children was directly correlated to their gender and their order of birth and their likelihood of being immunised against disease or their likelihood of receiving a nutritious diet increased for boys than girls. Behram (1988) studied the Indian households and how boys were favoured to girls through differential attitudes of the parents. Tisdell (2000) in his study on rural Bengal on the intra household resource allocation reveal disparity in resource allocation as regards to gender. However the santhal families seem to perform well in comparison to the general population. Another study by Choudhary (2007) dealt with the issue of work allocation within the family and looked into the role of gender. Studies by Falkner (1999) have shown the impact of malnutrition on the health of the children in form of stunting and wasting. Chattopadhyay (2016) looked into the impact of mother's self-esteem on the health and educational attainments of the tribal and non-tribal children of West Bengal. In a study on the nutritional condition of under five children from two villages in West Bengal, Sen and Sengupta (1983) found that a village with a better over-all nutritional record had much sharper sex discrimination.

In this regard the present study primarily concentrated on the gender attitudes of the mothers belonging to lower as well as higher caste population

and probed into the possible consequence of the same on variables like food intake, vaccination coverage, and access to formal health care facilities of the children belonging to them. The study further tries to look into the possible role of the variables like birth order, age of weaning, age of mothers at marriage, type of family and birth order of the child in determining the health status of the child. Lastly, it tries to predict the child health outcomes by drawing a linear regression analysis.

Objectives

- To look into the gender attitudes of rural mothers.
- To look into the differences in the nutrition and health entitlements of the boys and the girls.
- To look into the factors influencing the health of the child.

Sampling

The target population of this study was all the rural mothers in the age group 20 to 40 years having primary school going children under the purview of ICDS midday meal scheme in West Bengal. The sample was drawn randomly by two stage sampling technique. 100 households from 3 villages of three districts- North 24 Parganas, East Midnapore and South 24 Parganas were selected with mothers in the age group 20 to 35 years. From these households 512 primary school going children were interviewed, among them 252 were boys and 260 were girls. The tools used in the study were self-constructed gender attitude scales, having 15 questions which can be answered in yes and no, to measure the gender attitude of the mothers. The questions were validated through a pilot study. The internal consistency for gender attitude range from 0.76 to 0.89. Test-retest reliability for it range from 0.86 to 0.89 and the criterion for validity is 0.59. To assess the nutritional health status of the children 24-hr recall method, Food frequency questionnaire was used. In 24-hr recall method, the actual food and drink consumed in the immediate past 24 hours is recorded. Sometimes, a longer period may be used. The recorded food consumed in the last 24 hours is then converted to the nutrients available in each food item used in preparing it and then compared with the RDA³. Food Frequency Questionnaire was interviewer administered. A detailed questionnaire includes the list of foods and the subject answers as to how often and in what quantity each food is eaten per day, per week and per month. The collected information of the food consumed is then checked with the RDA. It gave an estimate of the amount and frequency of the various nutrients consumed by the individual. Further, follow-up's and cross checking were done with each household from which the child was coming. Anthropometric measures of children were collected regarding height and weight. Immunization records were verified and crosschecked from the mother who in most of the cases was the primary care giver.

In this study, the method of two stage random sampling was used in collecting the data. The three villages were randomly selected from three

districts of West Bengal. From each village, 50 households with mothers in the age group of 20 to 40 years having at-least one primary school going child were selected randomly. Socio economic background was controlled for the sample as all the children belonged to lower to middle economic strata. The exclusion principle was carried out with regards to below poverty line (BPL) families which were left out of the survey so as to get a clear picture on gender disparity as regards to nutritional and health outcomes if any of the afore mentioned sample due to factors other than money income. Also those mothers having children in the age higher or lower age group were excluded from the survey. Further the mothers of the children who were the primary care givers were comprehensively interviewed to look into their perceived gender outlook.

Analysis and Discussion

The demographic characteristics of the sample reveal that the mean age of the sample is 24.65years with s.d ± 3.76years. The sample consisted of 72% Hindu women and 28% Muslim women. 46% women belonged to the backward classes and 54% women were from the upper caste. The mean house hold income was 12076.85±472.32. Further, the mean ages of the girls were 9.35±2.3years and that of boys were 10.41± 3.8years.

Table 1: Gender Attitudes of rural mothers

	Mean Scores	S.D	t _{cal}	t _{tab}	Conclusion
Low Caste	26.8	1.2	1.34	1.6552*	t _{cal} < t _{tab}
Upper Caste	23.5	1.8			

*p=0.05

From the above Table 1 it can be seen that there is no significant difference in the gender attitudes of the rural mothers. In fact, irrespective of the caste background the scores reveal negative gender attitudes of the mothers. These rural mothers were mostly considered boy child as superior to the girl child.

Table -2 T test for differences in nutrient intake of boys and girls from different caste background.

Nutrients Groups	RDA	t test for mean difference between boys and girls at 5% level of significance (low caste)		t test for difference in means between boys and girls at 5%level of significance(higher-caste)	
		t-value	Significance	t-value	Significance
Protein(g/day)	41	2.07*	S(t _{cal} > t _{tab})	2.89*	S(t _{cal} > t _{tab})
Fat	25	1.16*	NS	1.05*	NS
Carbohydrates	390	0.87*	NS	0.88*	NS
Energy	1950	1.09*	NS	1.01*	NS
Calcium	400	2.23* S(t _{ca} > t _{tab})	NS	3.08*	S(t _{cal} > t _{tab})
Iron	26	1.17*	NS	1.06*	NS

*p=0.05, NS=Nonsignificant, S= Significant

From the above Table 2 it can be seen that with regard to the difference between the nutrient intakes in most of the cases there is no significant difference

between each nutrient groups for both boys and girls, for both higher caste and lower caste. However for both castes, we can see that there lies a significant difference between boys and girls for protein and calcium intake. Reported discrimination was evident when particular foods like fish, meat or milk were considered. The care givers were directly practicing discrimination regards to certain food groups. Also, it should be noted that in the above sample no child reported of hunger as such especially carbohydrate intake was sufficient for all the children due to the provision of food in the schools through midday meal scheme. Only are the mothers practising discriminatory behaviour but also they consider it to be justifiable. Thus, a mere increase in income is not ensuring the well-being for a group of children. It most of the families from either caste background the mother supplement the boys meal by providing milk or protein rich items like fish or poultry.

To look more specifically into the cultural practices that influence the nutrition and health entitlement of the child we segregate the data as normal children and children who are either stunted, wasted or both and look into the probable factors which has an impact on their health status. Here, it should be mentioned that as stunting and wasting are good indicators of malnourishment or micronutrient deficiencies, thereby they can act as an indicator of the direct consequence of undernourishment in form of measurable health outcome.

Table 3: Non-parametric test for testing association with malnourishment

Variables	Boys (Normal; Stunted /wasted)	Girls (Normal; Stunted /wasted)
1. Mothers education (high low)	$\chi^2=1.95^*$; NS	$\chi^2=2.03^*$; NS
2. Mothers age at marriage (below 18; above 18)	$\chi^2=3.99^*$; S($\chi^2_{cal}> \chi^2_{tab}$)	$\chi^2=4.01^*$; S($\chi^2_{cal}> \chi^2_{tab}$)
3. Mothers gender attitude (positive; negative)	$\chi^2=1.07^*$, NS	$\chi^2=3.96^*$; S($\chi^2_{cal}> \chi^2_{tab}$)
4. Birth order (1 st 2 nd ; 3 rd or more)	$\chi^2=5.06^*$; S($\chi^2_{cal}> \chi^2_{tab}$)	$\chi^2=6.63^*$; S($\chi^2_{cal}> \chi^2_{tab}$)
5. Type of family (nuclear; joint)	$\chi^2= 1.01^*$; NS	$\chi^2= 2.01^*$; NS
6. Age at weaning (below 6 months; above 6 months)	$\chi^2= 3.97^*$; S($\chi^2_{cal}> \chi^2_{tab}$)	$\chi^2= 5.23^*$; S($\chi^2_{cal}> \chi^2_{tab}$)

*p=0.05, NS=Non significant, S= Significant

Looking into the possible association of other factors like mother's education, her age at marriage, her gender attitude and factors like the birth order of the child, the type of family and the age of the child at weaning on the health outcomes of the child we classify the entire sample according to gender and the health outcomes. As can be seen from the above Table 3 mother's education or the type of family to which the child belongs to does not have a

significant association with the health outcome of the child. Interestingly, the education parameter of most the lower caste women (mean years of education 10.2 ± 2.3 years) were worse than their higher caste (13.8 ± 3.1 years) counterpart. However this was not influencing the gender attitudes of these women which are thus supposedly embedded in their cultural practices and their psychological makeup. Gender attitudes of the mother are significantly related to the health outcome of the girl child at 0.05 level of significance and degrees of freedom one (1). Further, the birth order and the age at weaning are found to be positively associated with the health outcome of the child. The findings show that the children at the low end of the birth order are found to be lesser endowed with respect to health. Also, the weaning age is crucial to the future health comes of the child in question. To look more specifically into the impact of this gender attitude of the rural mothers we looked into the immunization records of the child which acts a proxy variable for health care.

Table 4 Odd Ratio calculation for both sexes for immunization coverage at 95% level of significance {Vaccination Coverage (0-6months)}

Gender	Low caste	Upper caste
Boys	0.35*	0.30*
Girls	0.58*	0.38*

*p=0.05

In case of odd ratio calculation for vaccination coverage for 0 to 2 years we can see that both for low caste and Upper caste families the probability of getting vaccinated is high for both groups irrespective of gender.

Table 5 Odd Ratio calculation for both sexes for immunization coverage at 95% level of significance {Vaccination Coverage (Above 2 years and booster dosage)}

Gender	Low caste	Upper caste
Boys	0.92*	0.96*
Girls	1.86*	0.98*

*p=0.05

In case of odd ratio calculation for follow-up vaccination and booster dosage we can see that for lower caste the probability of getting vaccinated is low however the plight of girls is comparatively worse off. Similarly for children belonging to upper caste families the probability of getting vaccinated increases if the child is a boy rather than a girl. Thus, the above study shows that there are certainly some attitudinal differences of the rural mothers towards their primary school going children regarding the whether the child is girl or a boy.

In the last section of the study we draw a linear regression of the child health determined by some explanatory variables. In the study, child health (CH) was calculated as a composite index of haemoglobin count and morbidity rates of the child. It is considered as the dependent variable. The explanatory variable of the study were Household Per Capita Monthly Income (HPI) which

has been taken as the variable representing the economic factor. The variable is expected to influence positively child health. Hence, its coefficient is expected to have a positive sign. Educational level of the mother or the number of years of formal education of the mother's (ME) has been taken as the variable representing this factor. The factor is expected to influence positively maternal health. Hence, its coefficient is expected to have a positive sign. The birth orders of the child (BO) were considered to have negative impact on the child health thus a negative sign is expected. Child health may be affected by the caste (CAS) of the child. Higher caste child were assigned dummy '1' and lower caste child with dummy '0'. Similarly for gender (G) '1' for girl and '0' for boys.

Next the regression model is constructed keeping in view the above variables in consideration. The regression model takes the following form:

$$CH = b_0 + b_1 \text{HPI} + b_2 \text{ME} + b_3 \text{BO} + b_4 \text{CAS} + b_5 \text{G} + e$$

Where 'e' is the random disturbance term which is assumed to satisfy classical least square assumptions.

Table -6 Model summary

Criteria	R	R square	Adjusted R square	Standard Error of the Estimate
Maternal Health	0.868(a)	0.69	0.87	0.709

a. Predictors: (Constant), HPI, ME, BO, CAS, G.

Table-7 ANOVA^b

Model	Sum of squares	Degrees of freedom	Mean square	F	Significance
Regression	407.08	4	107.83	211.83	0.000(a)
Residual	10.07	20	.52	-	
Total	417.15	24	-	-	

a. Predictors: (Constant, HPI, ME, BO, CAS, and G) b. Dependent Variable: CH
The results presented in the Table 5 & 6 tell us that the model has a very high R^2 value and it has a high Adjusted R^2 too which shows that the model is good fit. The R^2 value of 0.87 implies that 87% of the variation in child health is explained by the independent variables jointly.

Table-8 Coefficients (a)

Variables	Unstandardized Coefficients		Standardized Coefficients		
	b_i	SE	Beta	t	Significance
Constant(b_0)	0.657	4.03	0.176	3.72	0.000
HPI	0.451	0.03	0.558	0.284	0.058
ME	0.003	0.005	0.763	0.182	0.032
BO	-1.56	0.421	0.098	0.984	0.003
CAS	0.006	-	0.112	0.23	0.002
G	0.607	-	0.001	0.312	.004

$i=0, 1, 2, 3, 4$

From Table 8, it is clear that among the explanatory variables, economic variable (HPI), (BO) and (G) are most significant. It may be noted that the low value of the HPI accrues to the fact that the socio-economic class were controlled for the study. Variables like (ME) and (CAS) come out as insignificant. This again shows that the positive impact of education is negated by strong traditionally embedded practices. A possible explanation of the caste variable (CAS) coming out insignificant can be again due to the control variable i.e. socio-economic class. Table 7 shows that regarding the F value it is significant at both 1% and 5 % level. Thus, the Null hypothesis are rejected and the alternative hypothesis accepted as there is significant influence of variables like the income, birth order and gender of the child on the child health.

Conclusion

The study showed that women or more specifically mothers are the primary care takers of children in the household irrespective of belonging to the higher or lower caste in rural area of West Bengal. There is no significant difference in gender attitudes of mothers from higher caste or lowers caste. Due to gendered inequity and exclusion, nutrition of generations to come gets jeopardized and thus their children especially girls become more vulnerable than boys. Irrespective of the caste background, micro-nutrient in-take significantly varies from boys to girls, where the latter is always less provided for. The likelihood of being vaccinated or taken proper care of in case of a diseases or illness increases if the child is a boy for both higher caste or lowers caste groups. Further looking into specific factors affecting the health outcome (stunting and wasting) of the child, be it a boy or a girl, irrespective of their caste background, it is the age of mothers at the time of marriage that comes out to be significant. Similarly, the age of weaning of the child decides the health outcome of the child notwithstanding any other variable. Lastly, it is the birth order of the child which decides the quality of the health outcome of the child, i.e. health outcome of a child is inversely associated to their order of birth. In the study, when regression analysis is done, it reveals that the child health is a multidimensional concept requiring us to look beyond the economic variables (household income), towards variables like the birth order or gender of the child as they have significant causality in deciding upon the health outcomes of a child. It is noteworthy that seemingly positive variable like mothers education become statistically insignificant as they are crosswise countered by culturally embedded practices.

While devising policies to tackle malnutrition, the outlook and attitudes of the people in question should be taken into account. For example, as the present study has brought out that caste (taken in a bipolar amalgamated way) statistically does not affect nutrition and health outcomes significantly in contemporary West Bengal but that does not mean it will hold true for other states where caste segregation is much more acute. However, devising policies to tackle malnutrition or to increase intake of micro nutrient rich food, target

oriented intervention at the level of State, as is the case with primary vaccination, will be able to successfully counter balance gendered skewness. Similarly for specific micro nutrient intervention in the diet of the primary school goer may have significant positive impact on the health of the child, and will reduce the gendered negativity, as practiced within the households.

Notes:

¹ UNDP report 2012

² Census 2011

³ Recommended Daily Allowances (RDA) as per ICMR guidelines, 2010

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