Title Page

Address for correspondences:

Akanksha Srivastava Research Scholar International Institute for Population Sciences, Govandi Station road, Deonar, Mumbai-400088, India Email: akankshaleo@gmail.com

Title: Does the community SES modify the household-level effects on child malnutrition in the Empowered Action Group (EAG) states of India?

Name of Author: Akanksha Srivastava

Email Address: <u>akankshaleo@gmail.com</u>

Institutional Affiliation:

Research Scholar, International Institute for Population Sciences, Mumbai, India. Email: akankshaleo@gmail.com,

Does the community SES modify the household-level effects on child malnutrition in the Empowered Action Group (EAG) states of India?

Akanksha Srivastava

Abstract

Despite sustained economic growth, reduction in money metric poverty and introduction of innovative health programmes in last two decades, the reduction in child malnutrition has been sluggish in India. By 2005-06, about half of the children continued to be malnourished with large variation across states. Though empirical research has established the household wealth and maternal characteristics as significant predictors of child malnutrition, little is known about the role of community and parental attributes in explaining child malnutrition in India. The aim of this paper is to examine the role of community and household factors in explaining malnutrition among children under five in the Empowered Action Group (EAG) states of India. The eight EAG states constitute about half of India's population and lag behind in key demographic and socioeconomic indicators.

The unit data from National Family Health Survey (NFHS) 3 is used in the analyses. Bivariate analyses, concentration curves and multilevel models are used to understand the patterning and contextual effects of child malnutrition in the EAG states. The dependent variables, weight-for-age, height-for-age and weight-for-height are analysed with respect to three composite indices; community socioeconomic status (SES), household wealth and household social status. Results indicate that in EAG states half of children in poor communities and households were underweight, stunted and one fourth were wasted. The prevalence of underweight is higher among children belonging to poor households that are located in poor communities rather than those located in rich communities. The multilevel results indicate that controlling for individual characteristics community SES, household wealth and household social status were significant predictors in determining child malnutrition. The cross level interaction between community SES and household social status was significant in EAG states but not in the non EAG states. This implies that the community infrastructure and accessibility to basic health services can play a significant role in reducing child malnutrition in EAG states of India.

Introduction

Despite the concerted efforts by international donors, national and local government n last two decades, child malnutrition remains a massive unfinished agenda in developing countries. About half of the deaths to children under five years of age (3 million in 2013) in low and middle income countries is attributed to undernutrition. Under nutrition alone accounts for 45% of mortality among children less than 5 years; estimated at 3 million deaths in low and middle income countries annually (Black et al. 2013). Child malnutrition not only contributes significantly to child morbidity and mortality, but also leads to poor cognitive development and health outcomes in later ages. Under nutrition not only affects the individuals and households but also affects the economy and society. It has been estimated that under nutrition reduces the economic development by at least 8% through direct productivity loses, poor cognition and reduced schooling (Bhutta et al. 2013).

Under nutrition in children is the consequence of an array of factors; insufficient food intake, poor food quality and spells of infectious diseases (Schrimshaw et al 1968). The factors related to under nutrition operate at various levels such as community, household, parents and child (Pongou et al. 2006). The community factors like health related services, physical infrastructure and other services varies across space and children living in poor communities may have adverse nutrition outcomes. The household characteristics like economic status of households, parental education and occupation, mother's nutritional status and child characteristics like age, sex, birth order also influence child's nutrition status (Mosley and Chen1984; Kaute Defo 2005).

Child under nutrition remains a major public health challenge in India (Bawdekar and Ladusingh 2008; Kanjilal 2010; Pathak and Singh 2011; Kumar and Singh 2013). Large scale survey findings from National Family Health Survey (NFHS), India revealed that about 46%

of children under age five, are underweight, 38% stunted and 19% wasted (IIPS and Macro International 2007). The increased economic growth during the last decades and reduction in money metric poverty in the country has not been translated to reduction in under nutrition among children in India. Despite the increased political commitment and concerted efforts by the central and state governments to reduce child malnutrition in India, the decline has been sluggish. For example, proportion of children underweight in India declined from 52% to 46% among children less than three years of age in successive waves of NFHS (kanjilal et al 2010). Moreover, these averages mask the wider inequalities across the states and various socioeconomic groups. The decline in child undernutrition is not uniform across the states and the burden of undernutrition remains concentrated among poor children (Pathak and Singh 2011). It was found that the children from highest SES quintile posses 50 percent better nutritional status than those from the poorest quintile (Kanjilal et al. 2010). However, in order to address the issues of inequality in child health in a diverse setting like India, it is imperative to understand the inequalities between rich and poor, and also across poor performing and better off states. Though empirical research in last decade has established the household wealth and maternal characteristics as significant predictors of under-nutrition, the role of community and paternal attributes on child under nutrition in India has been less explored. Moreover, these studies have rather considered the independent effects of community, household and individual level indicators rather than constructing overall socioeconomic indexes for indicators that are more likely to be collinear (Fotso and Kaute-Defo 2005). Additionally, theses studies often ignore the hierarchical structure of the data and overestimate the influences of some of the explanatory variables (Shastry 1996; Fotso and Kaute-Defo 2005; Fotso and Kaute-Defo 2005).

Against this backdrop, the aim of this paper is to understand the role of community and household socioeconomic status (controlling for other maternal and child characteristics) in

explaining under-nutrition among children in Empowered Action Group (EAG) states of India. The paper also examines the influence of community SES on household SES in influencing child's nutrition status. The reduction in child malnutrition in India is largely contingent on the reduction of malnutrition in EAG states as these eight states together constitute about 50% of India's population but lag behind in many demographic and socio economic indicators. The eight EAG states are Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and Uttarakhand.

Data

The unit data from the third round of the National Family and Health Survey (NFHS) is used. The NFHS is the Indian version of Demographic and Health Surveys that aims at providing reliable estimates on demographic and health indicators in developing countries. Apart from various maternal and child health indicators, the NFHS-3 collected information on nutrition status of 43,737 children under 5 years, based on three anthropometric measures, weight for age (underweight), weight for height (wasting) and height for age (Stunting) using NCHS (National Centre for Health Statistics)/WHO (World health Organization) international reference population. The nutritional status indicators are expressed in standard deviation units (Z-scores) from the median of the reference population. The analysis is restricted to those children who were alive at the time of survey. Bivariate analyses and concentration curves were carried out for all the eight EAG states, however, for multilevel, the analysis was carried out on the combined sample of the 8 state (EAG states) and compared with the non EAG states.

Methods

The dependent variable, child malnutrition is measured using three anthropometric measures, weight for age (underweight), weight for height (wasting) and height for age (Stunting).

Stunting indicates chronic protein energy malnutrition among children, wasting refers to acute protein energy malnutrition and underweight is a combined index of both the two. Deviations of Z-scores less than -2SD (standard deviation) from the international WHO reference population were used to classify children stunted, wasted and underweight. The child under nutrition is analysed with respect to three indices, community socio economic status (SES), household wealth status and household social status. The community SES is measured using percentage of households having electricity, telephone, access to safe drinking water, flush toilets, land holding and living in non-slum. The household wealth status includes household possession and type of housing material, and household social status encompasses maternal and paternal education and occupation. The Principal component analysis was used to generate the three indices. The three continuous indices were mean centred. The control variables include religion, caste, mean number of members in the household, age of the mother, mother's exposure to mass media, bmi of mother, place of delivery, age of child, sex of child, birth order of child, mean duration of breast feeding, number of under five children in the household.

Bivariate analyses, concentration index and multilevel model were used in the analysis. The concentration index is calculated in order to examine the inequalities in child malnutrition by community and household socioeconomic status. The concentration curve plots the cumulative proportions of the population (beginning with the most disadvantaged) against the cumulative proportion of health outcome. The value of concentration index lies between -1 to +1. The closer the value to 0 less is the inequality and farther the value to 0 more is the inequality and the minus and plus sign indicates the relationship of the SES and health outcome (Gwatkin et al. 2007, Wagstaff & Watanabe 2001). All the analysis have been performed using STATA 10 and Mlwin 2.27 softwares.

Appendix 1 presents the variables used in the construction of the three indices. The three indices namely community SES index, household wealth index and household social index are generated using the Principal component analysis. The community SES index is obtained by combining the variables like proportion of household having electricity, telephone, access to safe drinking water, proportion of households having improved sanitation facilities and a composite variable for proportion of households owning land (in rural areas) and proportion of households living in non slum areas (in urban areas). While, electricity, water supply, sanitation facilities etc reflect the infrastructure of the community, owning land is an important indicator of economic status in rural India and living in non slum areas reflect the economic status in urban areas. The household wealth index has been generated by taking into account household possession like household having electricity, refrigerator, chair, bed, television etc, type of household structure, drinking water and toilet facilities (Mohanty 2009). To construct the household social status both mother's and father's education and occupation are used.

Result

Figure 1a shows the prevalence of malnutrition in India, EAG and non EAG states. In India the prevalence of underweight, wasting and stunting was 43%, 20% and 48% respectively during 2005-06. It can be inferred that the prevalence of all the three indicators of malnutrition i.e. underweight, stunting and wasting was higher in the EAG states compared to the non EAG states. For example about half of the children in the EAG states were underweight compared to 36% in the non EAG states. Similarly, more than half of children in the EAG states were stunted and about one fourth were wasted. On the other hand the prevalence of stunting and wasting in the non EAG states was 43 % and 17 % respectively.

Table 1 presents the prevalence of malnutrition by the community SES. The community SES scores were distributed into three equal parts known as tertiles. The first 33 represents the poor, next 33% the middle and the last tertile represents the high SES group. The prevalence of underweight among the low SES communities was 54% in the EAG states compared to 42% in the non EAG states. Similarly, the prevalence of stunting among the low SES communities was 56% in the EAG states and 49.8% in the non EAG states. The prevalence of wasting in the low SES communities was 26% in the EAG states as compared to 19 % in the non EAG states. Within the EAG states, the prevalence of underweight in the low SES communities ranges from 65% in Madhya Pradesh to 41% in Uttarakhand. Madhya Pradesh was the only EAG state where the prevalence of underweight was more than 50% even in the richest communities. With respect to wasting, the prevalence in the poor communities was again highest in Madhya Pradesh and lowest in Jharkhand. Similarly, stunting which is the indicator of chronic protein energy malnutrition was highest in the poor communities of Uttar Pradesh. More than 50% of children living in the poor communities of all the eight EAG states were stunted. On the other hand the prevalence of stunting in the rich communities was highest in Uttar Pradesh (48.9%) followed by Bihar (45.4%) and Madhya Pradesh (44.8%).

Table 2 describes the prevalence of child malnutrition by the household wealth status. Like community SES, the households have been divided into three tertiles according to their wealth status. The prevalence of child underweight was 57% in the poor households of the EAG states whereas it was 45% in the poor households of the non EAG states. On the other hand the prevalence of underweight was 32.2% in the rich households in the EAG states and 22.1% in the non EAG states. About 26.9% children in the poor households of the EAG states were wasted as compared to the 21% in the non EAG states. The prevalence of stunting was about 58.9% in the poor households of the EAG states and 55.7 % in the non EAG states. Within the EAG states the prevalence of underweight was highest in Madhya Pradesh (67%)

followed by Bihar (65.4%). The prevalence of underweight in all the EAG states was more than 50% in the poor households in all the EAG states. However, the prevalence of underweight is comparatively low in rich households in Orissa (17.6%). The prevalence of underweight in the rich households of Orissa is lower than that of the non EAG states. The prevalence of stunting was highest in Uttarakhand (67%) followed by Uttar Pradesh (64.3%). The prevalence of stunting in the rich households was highest in Uttar Pradesh and lowest in Orissa.

Table 3 reports the prevalence of malnutrition by the household social status that accounts for the parental education and occupation. The prevalence of underweight among the households that were socially poor was 58% in the EAG states and 47.8% in the non EAG states. On the other hand the prevalence of underweight was 31.8% in the rich households of the EAG states and 23% in the non EAG states. Similarly, the prevalence of wasting was 26.2% in the poor households of the EAG states and 20.3% in the non EAG states. The prevalence of stunting was reported to be 59.1% in the poor households of the EAG states and 53.4% in the non EAG states. Within the EAG states the prevalence of underweight ranged from 65.8% in Madhya Pradesh to 49.9% in Rajasthan. Similarly the prevalence of underweight in the rich households of EAG states ranged from 44.3% in Jharkhand to 21.4% in Rajasthan. The prevalence of wasting was highest in Madhya Pradesh both among socially poor households (37.3%) and rich households (29.8%). As concerns stunting, the prevalence was highest in the poor households of Bihar (64.7%) followed by Uttar Pradesh (64.3%).

Table 4 presents the prevalence of malnutrition among children by household wealth and household social status classified by community SES. Among low SES communities, the prevalence of underweight among children belonging to poor households was 60.7% compared to 39.4% in rich households, whereas in high SES communities, the prevalence of underweight was 51.1% among children belonging to poor households as compared to 43.2%

in rich households in the EAG states. While the differences in underweight rates were high among poor and rich households belonging to low community SES in the EAG states, it was not so for non EAG states. With respect to household social status, the prevalence of underweight was 58.9% among children residing in poor communities and belonging to low household social index, compared to 43.9% among those belonging to high household social index in the EAG states. However in rich communities a stark difference was observed as the prevalence of underweight among low household social index was 51% in poor households compared to 27.1% in rich households. A similar pattern was observed for the non EAG states. With respect to stunting, the prevalence among low socioeconomic communities ranges from 60.3% in economically poor households to 47.7% in economically rich households in EAG states. On the other hand, the prevalence of stunting in rich communities ranged from 57% in economically poor households to 29% in economically rich households in the EAG states. The prevalence of wasting in EAG states follows a similar pattern as that of underweight and stunting.

Figure 2 a-2 c plots the cumulative socioeconomic distribution of underweight children against the community SES. The cc for underweight children in the EAG states lie above the diagonal informing that underweight children are heavily concentrated in the low socioeconomic communities and households. Similarly, the cc for underweight children in India also lies above the diagonal. However, it is interesting to note that the cc for non EAG states lies on the line of equality, inferring that the inequalities in underweight is almost negligible in the non-EAG states. The pattern of cc for the community and household SES are similar. Figure 3a-3c presents the SES inequalities in childhood stunting for EAG and non EAG states. The cc for EAG states lies above the diagonal, indicating inequalities in childhood stunting in EAG states but the same does not hold true for India and the non EAG states. The cc plots for inequalities in childhood wasting for the EAG and non EAG states are

presented in figure 4a-4c. The cc for EAG states lies above the line of equality informing us that the there exist inequalities in childhood wasting in the EAG states at community as well as household level.

Table 5 presents the parameter estimates of contextual and socioeconomic effects on childhood malnutrition in the EAG states. The variance in child under nutrition at PSU level was explained more in the EAG states as compared to the non EAG states. The community wealth was a significant predictor for under nutrition among children in EAG states and there was an inverse relationship between prevalence of underweight and community SES. Similarly, the other two indices household wealth and household social status were also the significant predictors for determining the prevalence of underweight. This implies that with increase in the SES of community and households the probability of underweight decreases. The significance of the three indices remains even after the inclusion of control variables for child, mother and other household characteristics (Model 2). In model 3, we also examined the effects of interaction between community SES and household social and wealth status on child malnutrition. Therefore we introduced two interaction terms in the final model along with the controls for child, mothers and other household characteristics. We found that in the final model, though the interaction between community SES and household wealth did not came as a significant predictor but the interaction between community wealth and household social status had a significant effect on underweight EAG states but not in the non EAG states. With respect to wasting, the three SES indices were statistically significant but the place of residence did not play any significant role in the EAG states (model 1), while, in non EAGs states community SES didn't turned out to be a significant factor in determining childhood wasting. However, when the other controls were introduced in the model 2, the three SES indices remained significant even after the inclusion of controls in model 2 and interactions in model 3. The interaction between community SES and household social status remains a significant predictor in the EAG states. However, in the non EAG states, both community SES and household wealth loses its significance after the inclusion of controls and interaction terms. As concerns stunting, while household wealth and social status played a significant role in determining the stunting status of children in the EAG states it loses it significance with the inclusion of interaction terms in the model. However, the household social status remained a significant predictor for determining the child stunting in the EAG states even after the inclusion of the interaction terms in the full model.

Discussion and Conclusion

The aim of this study was to examine the effect of community SES, household wealth and household social status in explaining child malnutrition in the poor performing states of India. The study also attempts to examine the inequalities in malnutrition across three indices community SES, household wealth status and household social status. While the household SES broadly reflects the economic well being, the household social status was captured through parental education and occupation.

The paper has the following salient findings. Overall a clear socioeconomic gradient in the prevalence of malnutrition was found for all three SES indices in the EAG states. More than half of the children living in the poor households and communities in the EAG states were underweight, stunted and about one fourth were wasted. The prevalence of underweight is higher among children belonging to poor households that are located in poor communities rather than those located in rich communities. Within the EAG states, while the prevalence of underweight children in Madhya Pradesh was equally high among both rich and poor, Orissa exhibits stark differences among rich and poor as the prevalence of underweight in economically rich households was lower than that of non EAG states. The concentration curve for underweight children in the EAG states lie above the diagonal indicating that

underweight children are heavily concentrated in the low socioeconomic communities and households in the EAG states. The multilevel results confirms that controlling for individual characteristics community SES, household wealth and social status remain significant predictors of child malnutrition in the EAG states. The cross level interaction between community SES and household social status is a significant predictor in EAG states but not in the non EAG states. This implies that the community SES plays an important role in moderating (lessening or enlarging) the effect of household social status on child malnutrition in the EAG states.

Despite the concerted efforts to improve nutrition among children in India in last few decades, the inequalities in child malnutrition has widened during 1992-2006 (Pathak and Singh 2011). To further curb down the malnutrition rates in India it is very crucial to focus on the laggard states where the prevalence of malnutrition is high. Though the poor households and communities are burdened by the malnutrition in EAG states the rates are high among the rich as well. The utilisation of Integrated Child Development Schemes (ICDS) (world's largest early child development programme) in these states is low as compared to the other states in the country (Gragnolati et al. 2005). Also the budgetary allocation in the EAG states is relatively much lower than that of non EAG states. Though homogenous in many aspects, the EAG states exhibit large variations in policies regarding child nutrition, political efficiency and budgetary allocation. The findings of the study underscore the need to formulate state specific policies that target the poor in EAG states. The community infrastructure and accessibility to basic health services can play a significant role in reducing child malnutrition in the EAG states. Therefore, the study emphasises on increasing the utilisation of ICDS and nutrition schemes through improving the quality of services and providing cash incentives to the families.

References

- 1. Bawdekar and Ladusingh (2008) Contextual correlates of child malnutrition in Maharashtra. Journal of Biosocial Science.
 - DOI: http://dx.doi.org/10.1017/S0021932008002757
- 2. Black RE, Victora CG, Walker SP, and the Maternal and Child Nutrition Study Group. (2013) Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet http://dx.doi.org/10.1016/S0140-6736(13)60937-X
- 3. .Bhutta ZA, Das JK, Rizvi A, Gaffey, Walker N et al. (2013) Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? Lancet 2013; 382: 452–77 http://dx.doi.org/10.1016/S0140-6736(13)60996-4
- 4. Fotso and Kaute-Defo (2005) Socioeconomic inequalities in early childhood malnutrition and morbidity: modification of the household-level effects by the community SES Health & Place 11 (2005) 205–225
- 5. Fotso and Kaute-Defo (2005) Household and community socioeconomic influences on early childhood malnutrition in Africa. Journal of Biosocial Science, 38, pp 289313 doi:10.1017/S0021932005026143
- 6. Gragnolati, M., Shekar, M., Dasgupta, M., Bredenkamp, C., & Lee, Y. (2005). India's undernourished children: a call for reform and action. In. Health Nutrition, and Population (HNP) Discussion paper. Washington D.C: World Bank.
- 7. Gwatkin, D. R., Rutstein, S., Johnson, K., Suliman, E., Wagstaff, A., & Amouzou, A. (2007). Socio-economic differences in health, nutrition, and population. Washington DC, USA: World Bank.
- 8. International Institute for Population Sciences (IIPS) ORC Macro (2007). National Family Health Survey (NFHS 3), 2005e06: India, Vol. I. Mumbai: IIPS.
- 9. Kanjilal B, Mazumdar PG, Mukherji M, Rahman M H (2010) Nutritional status of children in India: household socio-economic condition as the contextual determinant. International Journal for Equity in Health 2010, 9:19 http://www.equityhealthj.com/content/9/1/19
- 10. Kumar A, Singh A (2013) Decomposing the Gap in Childhood Undernutrition between Poor and Non–Poor in Urban India, 2005–06. PLoS ONE 8(5):e64972. doi:10.1371/journal.pone.0064972
- 11. Mosley, W.H., Chen, L.C., (1984). An analytic framework for the study of child survival in developing countries. Population and Development Review 10 (suppl), 25–45.

- 12. Pathak and Singh (2011) Trends in malnutrition among children in India: Growing inequalities across different economic groups Social Science & Medicine 73 (2011) 576e585. doi:10.1016/j.socscimed.2011.06.024
- 13. Pongou R, Salomom JA, Ezzati M (2006) Health impacts of macroeconomic crises and policies: determinants of variation in childhood malnutrition trends in Cameroon. International Journal of Epidemiology 2006;35:648–656 doi:10.1093/ije/dyl016
- 14. Sastry, N., (1996). Community characteristics, individual and household attributes, and child survival in Brazil. Demography 33, 211–229.
- 15. Scrimshaw, N.S., Taylor, C.E., Gordon, A.J.E., (1968). Interactions of Nutrition and Infection. WHO Monograph Series No. 57. World Health Organization, Geneva, Switzerland.
- Wagstaff, A., & Watanabe, N. (2000). Socioeconomic inequalities in child malnutrition in developing world. In. Policy research working paper, Vol. 2434. WashingtonD.C: World Bank.

Figure 1: Prevalence of malnutrition in EAG and non EAG states in India, NFHS-2005-06

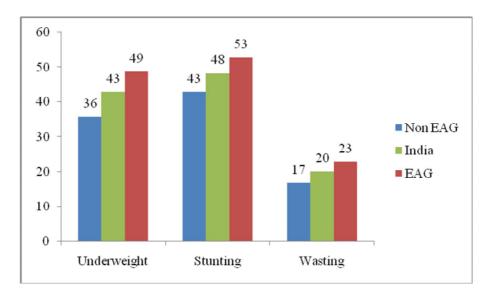


Table 1: Prevalence of malnutrition by community SES in EAG states of India, NFHS-2005- 06

Community SES		Underweig	ht		Wasting		Stunting			
	Low	Middle	High	Low	Middle	High	Low	Middle	High	
Bihar	58.2	57.0	46.6	28.9	26.9	24.3	57.5	56.7	45.4	
Chhattisgarh	51.3	50.3	32.1	21.3	18.0	19.1	57.0	56.8	40.0	
Jharkhand	62.1	59.0	38.4	35.6	31.4	25.7	52.8	55.6	34.2	
Madhya Pradesh	65.2	58.1	52.0	38.3	33.1	32.4	52.2	50.9	44.8	
Orissa	49.9	33.2	29.9	23.8	17.4	12.6	53.5	37.1	36.6	
Rajasthan	45.6	38.8	32.7	20.9	20.7	20.1	49.0	41.2	37.5	
Uttar Pradesh	48.8	41.5	33.8	15.8	15.3	13.6	61.7	55.9	48.9	
Uttarakhand	41.0	44.8	25.2	***	22.5	12.5	59.0	51.1	30.6	
All EAG states	54.3	46.3	37.3	25.5	21.4	19.8	55.9	52.0	42.6	
Non EAG states	41.6	34.0	26.8	19.0	15.9	14.4	49.8	42.6	34.4	

***sample size less than 30

Table 2: Prevalence of malnutrition by Household wealth status in EAG states of India, NFHS- 2005-06

Household										
wealth status		Underweigh	ıt		Wasting		Stunting			
	Low	Middle	High	Low	Middle	High	Low	Middle	High	
Bihar	65.4	54.8	39.4	29.5	27.8	22.6	63.8	57.0	35.9	
Chhattisgarh	53.5	48.4	25.5	22.4	19.8	13.5	58.0	55.9	35.5	
Jharkhand	63.9	53.9	36.0	36.5	31.7	21.4	54.5	48.9	33.4	
Madhya Pradesh	67.0	59.2	44.8	38.8	35.2	28.4	54.6	50.2	38.4	
Orissa	52.0	36.4	17.6	23.4	17.6	13.8	57.3	40.9	17.9	
Rajasthan	50.1	40.8	30.4	22.8	20.0	18.9	51.6	46.3	34.0	
Uttar Pradesh	51.9	42.8	29.5	17.3	15.4	11.5	64.3	58.5	43.1	
Uttarakhand	58.1	47.8	27.9	***	25.3	13.9	67.0	56.2	33.5	
All EAG states	57.0	46.2	32.2	26.9	22.2	17.0	58.9	53.8	36.7	
Non EAG states	45.0	33.7	22.1	21.0	17.4	13.0	55.7	46.7	30.9	

^{***}sample size less than 30

Table 3: Prevalence of malnutrition by household social status in EAG states of India, NFHS-2005-06

Household social										
status		Underweigh	ıt		Wasting		Stunting			
	Low	Middle	High	Low	Middle	High	Low	Middle	High	
Bihar	62.7	58.3	40.8	28.6	28.6	23.9	64.7	54.6	38.8	
Chhattisgarh	54.3	47.1	26.4	23.0	18.8	13.5	59.0	53.4	37.5	
Jharkhand	63.2	53.5	44.3	36.0	32.8	23.3	53.4	50.9	37.1	
Madhya Pradesh	65.8	59.5	43.6	37.3	36.0	29.8	55.7	48.2	35.3	
Orissa	51.3	38.3	26.5	23.0	20.5	13.2	59.2	38.4	30.8	
Rajasthan	49.9	35.4	21.4	23.1	19.0	16.3	51.7	39.8	28.2	
Uttar Pradesh	52.4	40.9	29.6	17.5	14.8	11.4	64.3	57.1	42.7	
Uttarakhand	52.4	41.2	25.5	23.4	21.6	13.9	58.4	48.3	33.2	
All EAG states	58.0	47.3	31.8	26.2	22.3	17.2	59.1	51.1	37.2	
Non EAG states	47.8	38.1	23.0	20.3	15.8	12.7	53.4	42.4	29.2	

Table 4: Prevalence of malnutrition among children under five by household wealth and household social status classified by community SES in EAG states of India, NFHS-2005-06

		J	Inderweig	ht		Wasting			Stunting				
		Community SES											
		Low	Middle	High	Low	Middle	High	Low	Middle	High			
	Household Wealth status												
	Low	60.7	56.1	51.1	28.0	23.5	24.1	60.3	60.3	57.0			
EAG	Middle	51.6	51.0	42.3	23.6	23.3	22.2	54.6	57.6	50.3			
	High	39.4	35.5	24.6	19.8	18.1	15.1	47.7	40.8	29.5			
Man	Low	51.4	46.4	43.2	19.6	18.6	18.5	59.8	54.9	51.1			
Non EAG	Middle	44.2	41.4	31.2	19.7	18.8	16.2	51.0	48.9	40.0			
Lito	High	38.3	28.2	20.8	18.8	14.0	12.6	41.9	34.9	26.9			
	Household social status												
	Low	58.9	55.6	51.3	26.5	24.3	25.2	59.6	60.9	59.0			
EAG	Middle	48.9	46.2	43.3	23.3	21.2	21.5	52.8	51.6	50.3			
	High	43.9	31.9	27.1	21.9	16.4	15.8	48.1	38.0	31.3			
3.7	Low	50.0	45.5	45.6	20.4	19.4	21.6	57.0	54.9	50.0			
Non EAG	Middle	43.7	36.6	32.1	19.7	16.2	15.5	49.5	43.4	40.3			
	High	33.9	26.4	21.1	14.8	14.7	12.5	42.0	32.4	28.2			

Fig 2a: Community SES inequalities: concentration index for underweight children classified by community SES

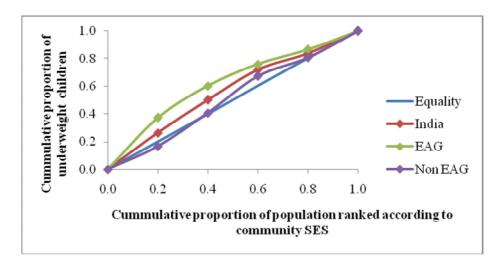


Fig 2 b: Household wealth inequalities: concentration index for underweight children classified by household wealth status

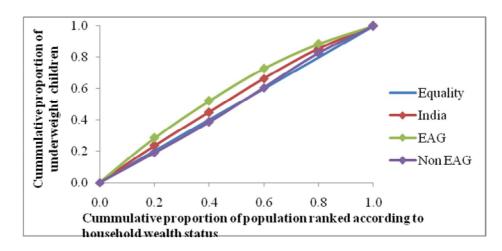


Fig 2C: Household social inequalities: concentration index for underweight children classified by household wealth status

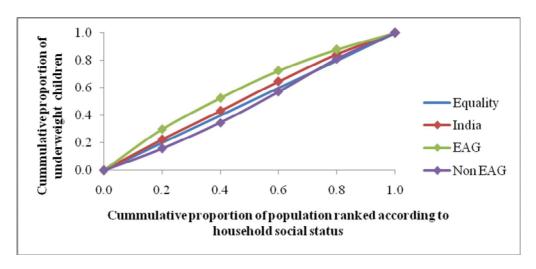


Fig 3a: Community SES inequalities: concentration index for stunted children classified by community SES

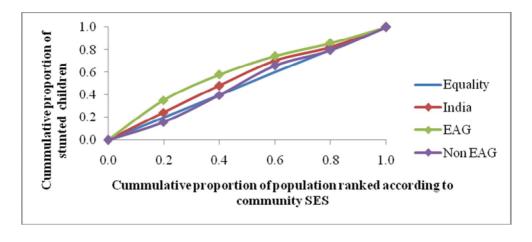


Fig 3 b Household wealth inequalities: concentration index for stunted children classified by household wealth status

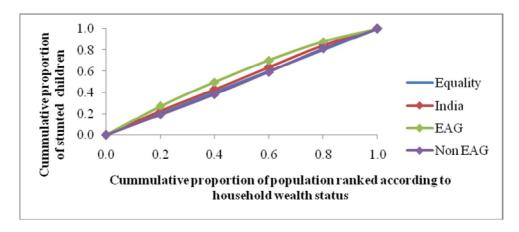


Fig 3c Household social inequalities: concentration index for stunted children classified by Household social status

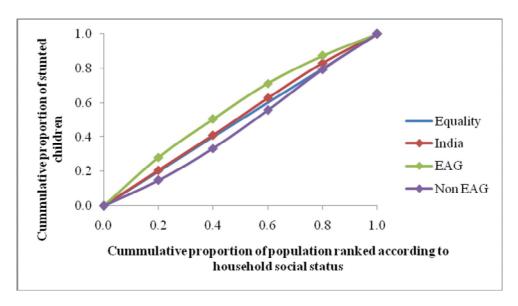


Fig 4a Community SES inequalities: concentration index for childhood wasting classified by community SES

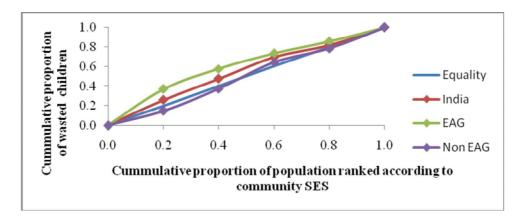


Fig 4 b: Household wealth inequalities: concentration index for childhood wasting classified by household wealth status

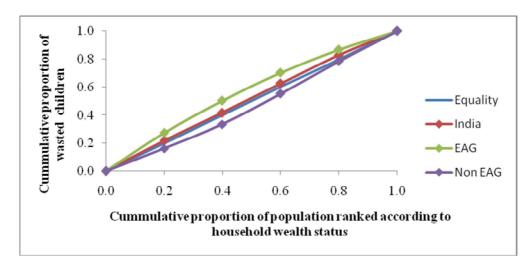


Fig 4c: Household social inequalities: concentration index for childhood wasting classified by household social status

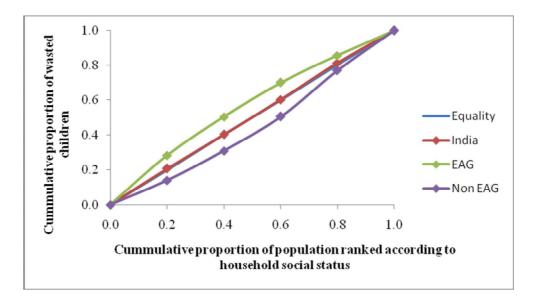


Table 5: Results from the multilevel logistic regression analysis for child malnutrition in EAG and non EAG states

	Underweight					Wa	sting		Stunting			
	EAG states		Non EAG states		EAG	EAG states		Non EAG states		EAG states		AG states
	Ехр β	Z	Ехр β	Z	Ехр β	Z	Ехр β	Z	Ехр β	Z	Ехр β	Z
Model 1												
Rural residence	1.267*	4.158	1.358*	6.800	0.982	-0.273	1.156*	2.589	1.349*	5.339	1.276*	5.674
Community score	0.933*	-4.059	0.969	-1.882	0.938*	-3.200	0.975	-1.190	0.992	-0.471	0.975	-1.563
HH wealth status	0.874*	-15.000	0.884*	-15.375	0.941*	-5.545	0.953*	-4.800	0.886*	-13.444	0.881*	-15.875
HH social status	0.890*	-9.667	0.871*	-12.545	0.956*	-3.214	0.935*	-4.786	0.886*	-10.083	0.869*	-12.727
Model 2												
Rural residence	1.189*	2.790	1.202*	3.755	0.886	-1.681	1.048	0.783	1.317	4.435	1.133	2.660
Community score	0.939*	-3.500	0.961*	-2.353	0.954*	-2.238	0.971	-1.381	0.986	-0.778	0.973	-1.588
HH wealth status	0.898*	-10.800	0.915*	-9.889	0.965*	-3.000	0.975*	-2.273	0.900*	-9.545	0.903*	-11.333
HH social status	0.931*	-5.071	0.911*	-7.750	0.960*	-2.563	0.943*	-3.933	0.927*	-5.429	0.907*	-8.167
Model 3												
Rural residence	1.137*	2.000	1.196*	3.653	0.845*	-2.240	1.045	0.721	1.220	3.062	1.134	2.681
Community score	0.932*	-3.684	0.961*	-2.222	0.952*	-2.130	0.971	-1.318	0.957	-2.200	0.964	-2.176
HH wealth status	0.899*	-9.636	0.915*	-8.900	0.964*	-2.846	0.975	-1.923	0.910	-8.545	0.916	-8.800
HH social status	0.931*	-5.071	0.911*	-7.750	0.960*	-2.563	0.943*	-3.933	0.927*	-5.429	0.907*	-8.167
Commhh wealth interact ¹	1.007	1.000	1.001	0.143	1.014	1.750	1.000	0.000	0.990	-1.429	0.982	-2.571
Comm hh social interact ²	0.978*	-2.444	0.995	-0.556	0.975*	-2.500	0.997	-0.273	0.973	-3.000	1.008	0.889
PSU level variation	0.	367	0.	174	0.4	149	0.2	247	0.	.318	0.	.171

Model1: without controls

Model 2: Controls for mother, chid and household characteristics

Model 3: Controls for mother, child, household characteristics, 1 interaction between community SES and household wealth

status, 2- interaction between community SES and household social status

Appendix 1: Variables used in construction of community SES index, household wealth index and household social status

Community SES index	Proportion of households having electricity Proportion of households having telephone Proportion of households having access to safe drinking water Proportion of households having access to improved sanitation facilities Proportion of households having land holdings in rural areas/proportion of households not living in slums
Household Wealth index	Household possessions Type of drinking water Toilet facilities Structure of household- Flooring, roof, wall
Household Social index	Father's education Illiterate Primary Secondary High school Mother's education Illiterate Primary Secondary High school Father's occupation Not working Informal sector Formal sector Mother's occupation Not working Informal sector Formal sector