IOSR Journal Of Humanities And Social Science (IOSR-JHSS)
Volume 21, Issue 1, Ver. I (Jan. 2016) PP 32-36
e-ISSN: 2279-0837, p-ISSN: 2279-0845.
www.iosrjournals.org

Nutritional Status of Under-Five Children by Anthropometric Indicators among Scheduled Caste and Scheduled Tribe in West Bengal, India

Dr. Uttam Kumar Sikder
Assistant Professor (Stage 3), Department of Economics & Politics, Visva-Bharat, Santiniketan, West Bengal, India

Abstract: *The present paper I want to examine the nutritional status of under-five children of Scheduled Caste and Scheduled Tribe children relative to general caste children by using anthropometric indicators that is, weight for height and weight for age in West Bengal, India. For this purpose I have chosen North 24 Parganas District of West Bengal as this district is one of Scheduled Castes – Scheduled Tribes (SCs – STs) concentrated districts in West Bengal. The Scheduled Casts and Scheduled tribe group of population is socioeconomically oppressed from historical era. It is rational behind the study of nutritional status of under-five children of SCs – STs. The results revealed that nutritional status of under-five children of SCs - STs is better than that of GEN.*
Keywords: *Nutritional Status, Under-Five Children, Scheduled Castes & Scheduled Castes, Anthropometric Indicators and Health Care.*

I. Introduction

The concept of social exclusion and discrimination are very closely associated with caste and creed. By definition, exclusion is known to be structured around the societal process that exclude, discriminate, isolate and deprive certain social characteristic to social structure (Thorat and Mahamallik, 2006). In Indian context, marginalized social groups primarily include the Scheduled Castes (SCs), the Scheduled Tribes(STs), the Other Backward Classes(OBCs), the Muslim, and some other minorities groups. The historical exclusion from access to economic, educational, civil, and cultural rights mirrors its claims in the incidences of present day marginality and deprivation among them. Interestingly, marginality and deprivation of the SCs is also exacerbated by their physical and social segregation. The caste and untouchability based exclusion of SCs has conceptualized as unfettering multiple exclusion of them. It has more or less been accepted that institutionalized nature of caste system hinders the progress of the SCs and is reflected in the incidence of sever economics disparities and poverty among them.

The STs constitute a social group, which is similar to the SCs in terms of degree of exclusion, deprivation, marginality and poverty. No rigorous study is available of the disparities at various levels among these social groups, especially in the discipline of health economics both at micro and macro. But there are a number of official and non-official reports to prove with statistics that nutritional deficiency are common among these social groups. Anaemia among children and nourishing mother is a matter of common observation in backward classes. In this paper I want to examine the nutritional status of under-five children of Scheduled Caste and Scheduled Tribe children relative to general caste children by using anthropometric indicators that is, weight for height and weight for age in West Bengal, India. For this purpose I have chosen North 24 Parganas District of West Bengal as this district is one of SCs – STs concentrated districts in West Bengal.

II. Objective of the Study

The main objective of this article is to examine the nutrition status of under-five children among social groups namely, Scheduled Caste (SC), Scheduled Tribe (ST) and General Caste (GEN) in the West Bengal by using Anthropometric indicators of health.

III. Data, Methodology and Econometric Model

This study is entirely based on primary data collected through field survey in the North 24 District of West Bengal in 2013-14.

Survey and Sample Design

I shall now describe the framework for selecting the community development blocks, villages and the ultimate sample household units in our study. To the end, two stage stratified sampling technique has been used. The selection procedure in the case of each is community development blocks taken up below.

Selection of Community Development Blocks

At stage I of the design of sampling and survey all 22 community development blocks are considered from the district of North 24 Parganas. Over all on the basis of census data it is formed that the district North 24 Parganas accounts for about 21% of total population belonging to the scheduled caste (SC) community and just a marginally above 2% of the Scheduled Tribes (STs) communities. In particular total population belonging to the SCs and STs Communities in North 24 Parganas is above 23% as against about 29% for the state of West Bengal as a whole. These observations strongly point to the need of some systematic method by which a coverage of SCs and STs Population as large as possible can be ensured in the context of our study. This is done by ranking the top most 10 blocks (Which comes to be more than 45% of the total number of Blocks) out the 22 on the basic of SCs-STs concentration in an ascending order using census data, 2001.

Since my primary objective includes a focus on health indicators and access to health relative to the levels of development, at stage II we have ranked the 10 initially selected blocks according to their human development index (HDI) profile once again in ascending order. For the purpose of HDI ranking we have utilized the date made available by the development and planning department, the government of West Bengal (District Human Development Report, North 24 Parganas, and February 2010).

Having the community development blocks so arranged, we have finally selected the top 3 and bottom 3 of the ranked blocks. Finally six selected community development blocks selected by us in the North Twenty Fore Parganas district of West Bengal are Bagdha community development block, Habra I community development block, Rajarhat community development block, Sandeshkhali I community development blocks, Sandeshkhali II community development block and Minakhan community development block.

Selection of Villages

Given the community Development Block wise distribution of villages in the selected blocks we have prepared an exhaustive list of villages having fifty percent or more of scheduled Caste population and 25 percent or more of Scheduled Tribe by 2001 census profile. Out of these we have chosen six village one each from the blocks. At the time of selection of villages a specific consideration was kept in mind to cover a certain section of general castes households which was possible only by choosing one of the already selected blocks in favour a general caste dominated village. This was done by randomly selecting the Sandeskhali II community development Block from where a general caste dominated village was selected purposively for the remaining selection of the villages, the villages having the SCs-STs concentration out of the village having more than 50 percent of SCs and 25 percent of STs population in each of the rest of the community development blocks, were chosen.

Selection of Households

In order to draw the ultimate sample from the universe of households constituted from the selected villages, a simple random sampling technique without replacement is found suitable. Since our main focus of the study is on SCs-STs community of household and general castes household are considered only for the purpose of creating a comparative bench mark, we have drawn the sample units in a 7:3 ratio to ensure that the majority of selected households belong to the socially weaker section.

The above weightage (70 percent in favour of SCs-STs and 30 percent favouring general caste households) amounts to drawing 25 percent households out of a population size of 2376 households from six villages. This comes to be a random sample size of 594 households. Among these 594 households I stratified under-five children of SC, ST and General Caste which will be used for Anthropometric measurement.

One way of studying social group of SCs and STs Disparities in health is to consider the performance of children below five years of age in each social category (Scheduled casts, Scheduled Tribes, General Caste) in terms of different anthropometric measures. In the present study we have considered the following anthropometric indicators.

(i) Weight (Kilograms) at age (Years) and (ii) Weight (Kilograms) at height (Centimetres)

Let W=Weight of children

A=Age of the children

H=Height of the children

α, β=Constant

γ, δ =Slope Coefficient

Given this we can postulate the following functional relationships.

$W = \alpha A^{\beta} e^{u}$ …….... (1)

And $W = \gamma H^{\delta} e^{v}$ …….. (2)

Where u and v are the multiplicative random error/disturbance term.

Now log linear regressions of the model can be written as

$\ln W = \ln \alpha + \beta \ln A + u$ and …….... (3)

$\ln W = \ln \gamma + \delta \ln H + v$ ……. (4)
Once the regression coefficients are estimated, the elasticity is easily calculated as follows.
$\epsilon_{WA} = d \ln W / d \ln A = \beta$..... (5)
and $\epsilon_{WH} = d \ln W / d \ln H = \delta$..... (6)

IV. Results and Discussion

Anthropometric Robust Regression Analysis (Field Survey Based) of Height for Weight and Height for Age among Social Groups

We have considered various anthropometric variables/indicators to study the performance of under five children in terms of such indicators as weight for age and weight for height across different social groups. Anthropometric indicators provide a good approximation of nutritional abilities and status of under-five children who should be treated as the members of most sensitive physical growth categories of the population.

To obtain the regression output based on standard models chosen for this analysis, we first consider the number of under-five children in each social category of households and then considered the same to constitute the required number of observation for running the regression model in each case.

The regression of weight for age taking all the social groups tougher provides quite a reasonable goodness-of-fit with the coefficient of determination being 62.40% for GEN children. However the children are found to be responding in quite a sluggish fashion to gain in weight as we move of upwardly of the age distribution this is confirmed from our estimated regression coefficient measuring the elasticity of weight with respect to age. This coefficient is found to be only 0.35 (approximately) for GEN which much below unity thus even though weight and age are positively related we can say that a one percent rise in the physical age of a child on an average leads to a less than one percent gain in body weight. The estimated coefficient also points to a very high level of statistical significance (1% level).

Going by different social groups we come approach an apparent social group's bias in the rates at which children belonging to different social categories gain in nutritional status. The weight-age regression model for SC-ST and General Categories conform to a goodness- of - fit varying from (0.4829) for the ST category to 0.6240 for the general category in terms of the value of R-squared. All the estimated coefficients (measuring age elasticity of weight) performed high satisfactorily indicating significance at 1% level.

It is interesting to note that the under five children in the SC category like ST faces the same level of deprivation than the children under ST category as for as weight age performance is concerned. While vale of weight elasticity for the SC children is found to be very same as the for ST category it is much lower than that observed for the ST children. Thus the age coefficient is estimated to be 0.4360 (approximately) for the GEN children while it comes to be only 0.4515 (approximately for SC children). Even if both these elasticity's lie below unity there is a clear indication of deprivation of the SC children. This also indicates a particular type of social group bias. We can say even within the broader group of the deprived and weaker section, the ST category is subject to an added discrimination.

Another note-worthy point is that the children in the GEN category are performing at a level even below the SCs category. This apparently puzzling observation does not seem to be very hard to explain. The existing differences in weight age performance of the under five children is indicative of the fact that the government programme to uplift child nutrition have not been able to remove the inter group disparities in any significant manner. Moreover, these differences may have direct or indirect relation with the prevailing differences in socio economic environment of the children, access to high protein and nutrition's food through secured incomes, effective government or possibility of collecting such food from the ethnic and biological characteristics of the social

The functional relation between weight and highest is another significant indicator of nutritional performance of children. In this our estimate show high levels of statistical significance of a positive relation between weight and highest for all the social groups considered by us. Within this the elasticity of weight with respect to height for STs and GEN categories remain very also being round 0.50. However the SCs category of children responds relatively weakly in terms of weight gain in response to changes in height. The weight – highest curves estimated y us are shown accordingly. In terms of goodness of fit the regression model perform with a value of R-Squared lying in general below 0.3. Groups. The supporting evidence of these analysis have presented with the help of following tables of 1, 2 and 3 in appendix.

V. Conclusions

From the regressions results I obtained some key observations. First of all the elasticity of weight with respect to height is relatively better for SCs and STs group of under-five children relative to GEN category of children. Secondly the results revealed that the elasticity with respect to age of SCs and STs Children is better than that of GEN category of children which implies nutritional status of under-five children of Dalit is better than that of GEN. In terms of goodness-of-fit the SCs and STs Category's children is in relatively better position than that of GEN category of children when we regress weight on height whereas it is better for GEN group of children relative to SCs and STs Children when we regress weight for age.

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Appendix

Table - 1. The Anthropometric Regression Model of Weight on Height and Weight on Age for Scheduled Caste Community

```
. reg  lnw lnh,robust

Linear regression                               Number of obs =      60
                                                F(  1,    58) =   15.22
                                                Prob > F      =  0.0003
                                                R-squared     =  0.2794
                                                Root MSE      =  .35145

------------------------------------------------------------------------------
             |               Robust
         lnw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lnh |   1.331219   .3412566     3.90   0.000     .6481193    2.014318
       _cons |  -2.032422   1.158722    -1.75   0.085    -4.351856    .2870121
------------------------------------------------------------------------------

. reg lnw lna,robust

Linear regression                               Number of obs =      60
                                                F(  1,    58) =   59.74
                                                Prob > F      =  0.0000
                                                R-squared     =  0.4829
                                                Root MSE      =  .29772

------------------------------------------------------------------------------
             |               Robust
         lnw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lna |   .4515518   .0584226     7.73   0.000     .3346064    .5684973
       _cons |   2.009589   .0611492    32.86   0.000     1.887186    2.131993
------------------------------------------------------------------------------
```

Table - 2. The Anthropometric Regression Model of Weight on Height and Weight on Age for Scheduled Tribe Community

```
. reg  lnw lnh,robust

Linear regression                               Number of obs =      30
                                                F(  1,    28) =    7.35
                                                Prob > F      =  0.0113
                                                R-squared     =  0.2794
                                                Root MSE      =  .35767

------------------------------------------------------------------------------
             |               Robust
         lnw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lnh |   1.331219   .4911521     2.71   0.011     .3251391    2.337298
       _cons |  -2.032422   1.667686    -1.22   0.233    -5.448521    1.383677
------------------------------------------------------------------------------

. reg  lnw lna,robust

Linear regression                               Number of obs =      30
                                                F(  1,    28) =   28.84
                                                Prob > F      =  0.0000
                                                R-squared     =  0.4829
                                                Root MSE      =  .30299

------------------------------------------------------------------------------
             |               Robust
         lnw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lna |   .4515518   .0840844     5.37   0.000     .2793127     .623791
       _cons |   2.009589   .0880088    22.83   0.000     1.829312    2.189867
------------------------------------------------------------------------------
```

.

Table - 3. The Anthropometric Regression Model of Weight on Height and Weight on Age for General Community

```
. reg  lnw lnh,robust

Linear regression                               Number of obs =      57
                                                F(  1,    55) =   15.20
                                                Prob > F      =  0.0003
                                                R-squared     =  0.2379
                                                Root MSE      =   .3327

------------------------------------------------------------------------------
             |               Robust
         lnw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lnh |   .5020722   .1287799     3.90   0.000     .2439916    .7601528
       _cons |   .2589916   .5459205     0.47   0.637    -.8350575    1.353041
------------------------------------------------------------------------------

. reg  lnw lna,robust

Linear regression                               Number of obs =      57
                                                F(  1,    55) =   75.24
                                                Prob > F      =  0.0000
                                                R-squared     =  0.6240
                                                Root MSE      =  .23369

------------------------------------------------------------------------------
             |               Robust
         lnw |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lna |   .3459952   .0398889     8.67   0.000      .266056    .4259344
       _cons |   2.082174   .0482672    43.14   0.000     1.985444    2.178904
------------------------------------------------------------------------------
```