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Impact of Socio-Economic Variables and Child Health Care on Under-Five Child Health Status in West Bengal, India

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A B S T R A C T

This study has made the analysis on socio-economic, health care and child health status in the various districts of West Bengal. All the information's are collected from NFHS 4. After these information's are composited with the help of Dimension Index (DI) to know the actual condition of the districts. There also put a ranking on the basis of their composite score. Now all these scores are divided into three equal classes. On the basis of the score of the districts they placed in low, medium or high level. In socio-economic, child health care and child health status majority of the districts has got from low and medium level. In case of child health & nutrition table majority of districts came under high and medium level. Finally in regression analysis between socio-economic variables and child health care have a negative relation with child health status with statistically significant relation.

Keywords: Socio-economic, Child Health Care, Child Health

1. Introduction

Twentieth-century is highly concentrated on child health conditions. Many literature surveys also suggested early age health makes an important impact on overall development and wellbeing (Victoria et al.2008; Behrman et al. 2009). Even MGDs (Millennium Development Goal's:2000) has taken the reduction of infant and child mortality rate as the fourth goal among the other eight important goals. Maternal literacy is a leading socio-economic element to make an influence on child nutrition outcomes. A study shows parents' education has a positive relationship with child height. The literacy level helped to get more wages, which tend to use on expenditure (Behrman et al. 1989). Proper child care can help to fight against child under nutritional condition. In a research work in Ghana, West Africa has seen that better quality care and proper health infrastructure helps to reduce child mortality rate in Ghana. More importantly the health status difference in rural and urban regions have reduces (Lavy et al.1996).

Child malnutrition is a serious problem in the developing and underdeveloped countries of Africa and Asia. The condition of undernutrition has measured by five social segments. The first segment has mentioned child malnutrition is rising in Sub-Saharan Africa. Findings suggested the declining status of women and per capita income results the under nutrition occurrences. Secondly, an interesting point has come forward; the child malnutrition rate in south Asia is higher than in Africa. The reasons consider as the low status of women, low national income, high rate of poverty, etc. Over the entire region, a large amount of malnutrition child has seen in South Asia. There also some regional influences that are there like, high density population, monsoon

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climatic condition, and nature of feeding. In the third segment role of food availability on malnutrition have discussed. The regions in Sub-Saharan Africa and South Asia persist higher food availability has better nutritional status. Fourthly role of women's education and its impact on child nutrition has discussed. The report suggests women's status is an important indicator of child nutrition, especially in developing nations. In the fifth segment role of political policy and income have discussed. There is a significant relation has seen between democracy and nutritional status. As democracy has a great impact on food availability of children and provide them healthy environment to grow. National income is another indicator of malnutrition. Increasing per capita income has resulted in reduction of child malnutrition occurrences almost in developing countries within 1970-95 (Smith et al.1999).An underweight child is a big problem for the society. The number of malnourished child is more in India compare with other developing countries. A study has made over 50,000 rural children. The study has made its effort to know the role of the mother's literacy on child nutrition. It seems like literate mothers have a great influence on undernourishment in India. Literate mothers can help to take her child to the health center and Anganwaries. The knowledge of mother saves the child from malnutrition (Borooah et al. 2004).

Objective of the study

The objective of the study is to get the impact of socio-economic variables and child health care practices on child health status in West Bengal, India.

Materials and methods

The entire work is based on secondary data. Pieces of information were collected from NHFS 4(National Family Health Survey-4, 2015-16) published by IIPS (International Institute of Population Studies). The information's have been analyzed with the help of SPSS version 22 software. For making this study some statistical and quantitative measures have used. Such as-

- **Composite Index after Iyengar& Sudarshan's Method:**

To find out the condition of socio-economic, child health care and nutritional condition of West Bengal composite index has taken to use. In 1982 Iyengar& Sudarshan put forwarded this method following the modified dimension index. Divided dataset summed up district wise and after that ranked that data set by descending order. This value range from 0 to 1, generally greater the value of compositing indicates higher development.

$$\text{Dimension Index} = \frac{\text{Xid} - \text{Xidmin}}{\text{Xidmax} - \text{Xidmin}}$$

- **Correlation Coefficent Technique:**

Correlation is one of the statistical techniques, which is generally used to get a relationship between two variables. It shows the intensity among the variables, whether its strong or weak. The mean of the score of correlation is called a Correlation Coefficient. The value ranges from -1 to + 1. The value close to +1 indicates a strongly positive relation and close to -1 indicates strongly negative relation.

- **Linear Regression Technique:**

The linear regression model is a useful tool to measure the relationship between two variables. Here two variables are there, dependent variable or predictor variable and independent or explanatory variable. In this technique, the dependent variable helps to estimate the independent variable. It shows a significant association among the variables. The calculation of this technique represents:

$$Y=a+bX$$

Where X is the explanatory variable, Y is the dependent variable, the slope of the line is b, and a is the intercept (the value of y when $x = 0$).

2. Result and discussion

Poor economic condition and education level of the parents have a significant impact on child nutritional status (Mdrano et AL.2008). Below socio-economic, health status of the children have discussed sequentially.

1)   Socio-economic condition of West Bengal in respect of all districts:

In table 1 the composite score of all socio-economic variables are composited with the help of Dimension Index. Variables like availability of electricity, safe drinking water, improve sanitation facility, use of clean fuel, health insurance coverage, women & male literacy rate and use of family planning methods are taken for compositing. After that all variables are standardized with Dimension Index (DI). Now all the value of Dimension Index (DI) is added to create composite score. The value of composite score helps to find out status of socioeconomic condition of 19th districts of West Bengal. The highest and lowest score is got 5.25 and 1.79. All the districts are given a ranking on the basis of their composite score value. Lower ranking indicates higher socioeconomic condition. Such as rank 1 is given to Hooghly as it has the highest composite value (5.25) and Purulia placed on 19th as is has the lowest (1.79) composite value.

2)   Child health care condition of West Bengal in respect of all districts:

In table 2 also composite score have made with the help of Dimension Index (DI). The compositing have made on the basis of child health care condition. Here variables like antenatal check-up in the first trimester, antenatal care, institutional births, status of fully immunization, and breast feeding within one hour have taken for compositing. Like the previous one DI is calculated of all the variables. Now this DI values are added to get composite value. Highest and lowest composite value has got In Nadia (4.19) while lowest value is in Uttar Dinajpur (0.44). One thing need to remember higher value indicated better child health care.

3)   Child health status of West Bengal in respect of all districts:

In Table 3 also composite score have made to get child health status of the districts of West Bengal. Here variables like prevalence of Diarrhea and acute respiratory infection, dominance of stunted, wasted and under weigh child etc. the same way their dimension index(DI) value have calculated and summarized to get the composite score value. In this table higher value indicates lower health and nutrition status of child. So lower ranking indicating bad health and nutrition condition of the districts. Highest score have come from Purulia (3.73) which is placed in rank 1 and rank 19th got by Nadia (0.25).

4)   Status of the socio-economic, child health care and nutrition status:

3. To know the overall status of the districts they are divided into three categories on the basis of their overall performance. The status of the socio-economic, child health care and nutrition status are divided into three intensity level low, medium and high. To find out their status values are divided into three different categories, low, medium and high. After these divisions it clear that there has a big problem in case of socio-economic as well as other conditions also. There are 6districts among 19th placed in low level among all socio-economic variables. The districts have seen in low status are, Jalpaigudi, Uttar Dinajpur, Malda, Barddhaman, Purulia, South 24 Paraganas etc. There also in case of child health care 6 districts places within low status level and medium level district also remains 7. Here also it clear many of the districts are Affected by poor child health care practices. In case of health status of children many of the children have placed in low and medium category. The main district have placed in low status are Jaipaiguri, Coachbehar, Uttar Dinajpur, Malda, Birbhum and Purulia.

5)   Socio-economic variables and child health status:

To know the association between the socio-economic variables and child health status, correlation coefficient and linear regression have made with the help of composite score value of socio-economic variable and child health status (Table 1 & 3).

Table 5 the correlation coefficient between socio-economic variable and health variables have made. The value of the correlation between these two variables is showing -.666. that means it has a moderately negative relation. In table 6 linear regression has made between socio-economic and nutritional status. The Beta value in the unstandardized Coefficient column is -.866, which means with an increase of one score value of socio-economic variable child under nutrition can reduce by .866. Even the regression is statistically significant. So overall, it can conclude that Socio-economic conditions have a direct impact on child health and nutrition outcomes.

Table 1 socio-economic condition of various districts of West Bengal

District name	1	DI	2	DI	3	DI	4	DI	5	DI	6	DI	7	DI	8	DI	Composite Score	Rank
Darjeeling	95.4	0.79	71	0	61	0.86	56.3	0.79	24.5	0.12	78	0.86	95	1	73.4	0.89	4.52	7
Jalpaigudi	89.9	0.52	85.2	0.5	49.2	0.65	27	0.32	25.3	0.15	64.2	0.46	74.5	0.31	49.1	0.3	2.7	17
Cochbehar	90	0.52	97.9	0.9	49.6	0.66	13.7	0.11	44.5	0.85	66.8	0.54	80.8	0.53	65.7	0.71	4.33	10
Uttar dinajpu	90	0.52	97.5	0.9	31.8	0.34	12.3	0.09	27.3	0.23	51.1	0.09	65.1	0	54.7	0.44	2.11	18
Dakshin Dinajpur	93.1	0.67	99.4	1	43.9	0.56	12.6	0.09	40.7	0.71	67.3	0.55	83.2	0.61	60.3	0.57	4.09	12
Malda	94.1	0.72	82.9	0.4	44	0.56	15.8	0.14	40.6	0.71	64.2	0.46	71.7	0.22	60.3	0.57	3.08	16
Murshidabad	92.5	0.64	97.5	0.9	50.6	0.68	19.2	0.2	40.9	0.72	66.1	0.52	85.1	0.67	72.8	0.88	4.58	6
Birbhum	96	0.81	97.4	0.9	28	0.28	15.5	0.14	40.9	0.72	62.1	0.4	86.2	0.71	77.1	0.98	4.15	11
Barddhaman	94.4	0.74	96.6	0.9	46.6	0.6	29.7	0.37	28.4	0.27	66.6	0.53	72.6	0.25	77.1	0.98	3.9	15
Nadia	95.6	0.8	95	0.8	68.5	0.99	28.2	0.34	38.5	0.63	73.7	0.74	79.7	0.49	74.3	0.91	4.94	4
North 24 paragans	97	0.86	92	0.7	69	1	50.7	0.7	35.9	0.54	82.9	1	80.9	0.53	36.5	0	4.5	8
Howrah	97.8	0.9	96.5	0.9	60	0.84	47.2	0.65	21.1	0	78.4	0.87	89	0.8	67.5	0.75	4.8	5
Hooghly	95.2	0.78	98.5	1	54.6	0.75	30.8	0.38	39.1	0.65	76.3	0.81	85.8	0.69	77.9	1	5.25	1
Bankura	89.4	0.49	96.4	0.9	29.5	0.3	16.3	0.15	48.6	1	65.2	0.49	83.7	0.62	76.3	0.96	4.42	9
Purulia	79.3	0	82.7	0.4	12.3	0	6.8	0	27.1	0.22	48.1	0	76.5	0.38	69	0.79	1.79	19
Kolkata	99.8	1	96.2	0.9	50.1	0.67	69.4	1	26.1	0.18	80.7	0.94	84.3	0.64	70	0.81	5.12	2
South 24 Paraganas	87.4	0.4	97.7	0.9	51.7	0.69	19.3	0.2	25.3	0.15	74.6	0.76	76.9	0.39	68.6	0.78	3.91	14
Paschim Mednipur	95.7	0.8	96.5	0.9	40.9	0.5	13.9	0.11	29.8	0.32	70.7	0.65	82.9	0.6	73.8	0.9	3.97	13
Purba Mednipur	97.5	0.89	98.9	1	66.9	0.96	10.9	0.07	33.8	0.46	76.1	0.8	89.3	0.81	75.3	0.94	5.02	3

Source: *NFHS 4*

DI = Dimension Index, 1 = Availability of Electricity, 2 =Availability of Safe Drinking Water, 3 = Improved sanitation Facility,   4 = Use of Clean Fuel, 5 = Health Insurance Coverage, 6 = Women Literacy Rate, 7 = Male Literacy Rate, 8= Use of Family Planning Method.

Table 2 child health care condition of various districts of West Bengal

District name	1	DI	2	DI	3	DI	4	DI	5	DI	Composite Score	RANK
Darjeeling	81.2	1	65.9	0.47	94.5	0.99	84.2	0.603	37.7	0.263	3.329489647	5
Jalpaigudi	57	0.454	80.7	0.775	84	0.77	81.7	0.52	48.3	0.553	3.076333122	9
Cochbehar	58	0.476	74.4	0.645	81.2	0.72	76.6	0.351	39.4	0.31	2.497722383	14
Uttar dinajpu	36.9	0	43.1	0	47	0	66	0	44.2	0.441	0.44109589	19
Dakshin Dinajpur	51.8	0.336	68.6	0.526	78.2	0.65	83.2	0.57	42.4	0.392	2.476153222	15
Malda	42.5	0.126	52.6	0.196	55	0.17	69.5	0.116	43.3	0.416	1.021983537	18
Murshidabad	49.1	0.275	72.1	0.598	63.8	0.35	78.9	0.427	45.5	0.477	2.12866226	17
Birbhum	50.8	0.314	78.1	0.722	86.3	0.82	91.4	0.841	54.6	0.726	3.424681968	4
Barddhaman	68	0.702	83	0.823	82.6	0.74	82.3	0.54	64.6	1	3.809216989	3
Nadia	68.3	0.709	91.6	1	93.1	0.96	93.2	0.901	50.8	0.622	4.195818818	1
North 24 paragans	52	0.341	79.3	0.746	86.9	0.83	88.7	0.752	33.3	0.142	2.816098956	13
Howrah	74.2	0.842	86.6	0.897	86.6	0.83	73.8	0.258	46.3	0.499	3.324253838	6
Hooghly	52.3	0.348	76.6	0.691	91.3	0.93	88.4	0.742	37.5	0.258	2.96438579	11
Bankura	65.8	0.652	89.5	0.957	85.6	0.81	96.2	1	54.1	0.712	4.128931382	2
Purulia	52.5	0.352	68.6	0.526	72.9	0.54	87.4	0.709	59.4	0.858	2.985902188	10
Kolkata	75.7	0.876	84.6	0.856	94.8	1	66.6	0.02	47.7	0.537	3.288370455	7
South 24 Paraganas	49.6	0.287	75.6	0.67	52.2	0.11	94.8	0.954	59.3	0.855	2.874008324	12
Paschim Mednipur	49.7	0.289	84	0.843	77.7	0.64	92.2	0.868	48.1	0.548	3.18999231	8
Purba Mednipur	41.9	0.113	79.3	0.746	74.1	0.57	92.6	0.881	28.1	0	2.306998878	16

Source: NFHS 4

DI= Dimension Index, 1 = Antenatal check-up in the first trimester, 2=   4 Antenatal care, 3= Institutional births, 4 = Fully Immunization,

Table 3 child health status of various districts of West Bengal

District name	1	DI	2	DI	3	DI	4	DI	5	DI	Composite Score	Rank
Darjeeling	4.4	0.253	2.9	0.365	29.1	0.261	11.3	0.025	25.7	0.185	1.089858945	17
Jalpaigudi	10.3	1	5.3	0.689	31.2	0.356	17.7	0.293	24.6	0.158	2.495826811	5
Cochbehar	5.3	0.367	7.6	1	32.9	0.432	20.1	0.393	29.3	0.276	2.468515702	6
Uttar dinajpu	7.9	0.696	6.3	0.824	40.4	0.77	14	0.138	34.7	0.411	2.839900009	2
Dakshin Dinajpur	8.4	0.759	4.9	0.635	32.9	0.432	12.1	0.059	28.1	0.246	2.131252679	10
Malda	5.6	0.405	4.3	0.554	37.8	0.653	22.8	0.506	37.2	0.474	2.59223086	4
Murshidabad	7	0.582	2.7	0.338	41.9	0.838	17.5	0.285	34.6	0.409	2.450994288	7
Birbhum	5.6	0.405	0.4	0.027	40.5	0.775	29.5	0.787	43.1	0.622	2.615029856	3
Barddhaman	2.4	0	1	0.108	32.5	0.414	25.8	0.632	33.7	0.386	1.540286598	15
Nadia	3.6	0.152	0.8	0.081	23.3	0	10.7	0	19.3	0.025	0.258042472	19
North 24 paragans	5.5	0.392	5.6	0.73	23.8	0.023	13.6	0.121	18.3	0	1.265996228	16
Howrah	4.5	0.266	7.1	0.932	34.6	0.509	14.6	0.163	28.4	0.253	2.123576975	11
Hooghly	7.4	0.633	2.8	0.351	30.1	0.306	18.5	0.326	28.7	0.261	1.877580512	13
Bankura	5.1	0.342	2.9	0.365	34	0.482	27	0.682	39.8	0.539	2.409474485	8
Purulia	6.3	0.494	2	0.243	45.5	1	34.6	1	58.2	1	3.736914129	1
Kolkata	6.1	0.468	0.2	0	24.2	0.041	17.4	0.28	19.6	0.033	0.821811153	18
South 24 Paraganas	5.9	0.443	3.2	0.405	27.3	0.18	20.1	0.393	27.8	0.238	1.660024238	14
Paschim Mednipur	5.3	0.367	1.6	0.189	29.4	0.275	28	0.724	40.3	0.551	2.10628039	12
Purba Mednipur	7.5	0.646	3.2	0.405	29.9	0.297	24.5	0.577	32.8	0.363	2.289086702	9

Source: NFHS 4

DI= Dimension Index, 1 = Prevalence of Diarrhea, 2= Acute Respiratory Infection, 3= Stunted, 4 = Wasted, 5 = Under Weight

Table 4 socio-economic, health care and child health status in of the various districts of West Bengal

Socioeconomic Condition		
Socio-economic Status	Number of Districts	Name of the Districts
Low	6	Jalpaigudi, Uttar Dunajpur, Malda, Barddhaman, Purulia, South 24 Paraganas
Medium	7	Darjeeling, Cochbehar, Dakshin Dinajpur, Birbhum, North 24 Paraganas, Bankura, Paschim Mednapur
High	6	Murshindabad, Nadia, Howrah, Hoohgly, Kolkata, Purba Medinapur
Child Health Care Status		
Health-care status	Number of Districts	Name of the Discricts
Low	6	Coachbehar, Uttar Dinajpur, Dakdhin Dinajpur, Malda, Murshidabad, Purba Medinapur
Medium	7	Jalpaigudi, North 24 Paraganas, Hooghly, Purulia, Kolkata, South 24 Paraganas, Paschim Medinipur
High	6	Darjeeling, Birbhum, Barddhaman, Nadia, Howah, Bankura
Child Health Status		
Child health status	Number of Districts	Name of the Districts
Low	6	Jaipaiguri, Coachbehar, Uttar Dinajpur, Malda, Birbhum, Purulia
Medium	7	Dakshin Dinajpur, Murshidabad, Howrah, Hooghly, Bankura, Purba Mednapur, Paschim Mednapur
High	6	Darjeeling, Barddhaman, Nadia, North 24 Paraganas, South 24 Paraganas, Kolkata

Table 5 correlation coefficient between socio-economic variable and child health status

X	Y	Correlation Coefficient (r)	Nature of Relationship	Significance (2-tailed)
Socioeconomic Variables	Health & Nutrition Variables	-0.666	Moderately Negative	0.002

Table 6 linear regression analysis between socio-economic variable and child health status

Model	Unstandardized Coefficients	Standardized Coefficients	t	Significance (P)	95.0% Confidence Interval for B	
	B	Beta			Lower Bound	Upper Bound
Socio economic(X)	-0.866	-0.666	-3.685	0.002	-1.361	-0.37
(Constant)	0.848		6.912	0	0.589	1.107

Dependant variable: Health & Nutrition(Y)

6)   Child Health Care and Child Nutrition Status:

Along with socio-economic variables, child health care practices also play a key role. Better child health care practices help to reduce under nutrition condition of the child in a significant manner. In table 2 and 3 composite score of child health care variables and child nutritional variables has already calculated. To know the role of child health care on child nutrition linear regression model has been run by SPSS 22 version between the composite score of child health care and child health status..

Table 7 correlation coefficient between child health care practices and child health status

X	Y	Correlation Coefficient (r)	Nature of Relationship	Significance (2-tailted)
Child Health Care Practices	Health & Nutrition Variables	-0.462	Weakly Negative	0.047

Method: Pearson Correlation

Table 8 linear regression analysis between child health care practices and child health status

Model	Unstandardized Coefficients	Standardized Coefficients	t	Significance	95.0% Confidence Interval for B	
	B	Beta		(P)	Lower Bound	Upper Bound
Child Healthcare variable (X)	-.395	-.462	-2.147	.047	-.783	-.007
(Constant)	.634		5.747	.000	.401	.866

Dependant variable: Health & Nutrition(Y)

To know the relation between child health care and nutritional condition in table 7 correlation coefficient (r) has calculated. The value of correlation coefficient (r) is -0.462, which is slightly negative in nature. That means with the increase of health care practices under nutrition occurrences have reduced. In linear regression analysis (Table 8) the Beta (B) value suggests a constant value is .634 and health care value is -.395. That suggests with an increase of one score value of health care results reduction of poor health and nutrition outcomes by .395. This analysis also got statistically significant association ($p<0.05$).

4. Conclusion

In this article socio-economic condition as well child health care and child health status of West Bengal has discussed in respect of all the districts. For knowing their status multiple variables have taken in case of socio-economic, child health care and child health and nutrition indicator. Their actual condition was calculated by Dimension Index, after that all DI values were added to know the composite value. All the districts were got their ranking on the basis of their composite score. Then all the districts were divided into three segments low, medium and high. Results seem as a matter of concern. As in case of socio-economic condition and child health care many of many of the districts came under low and medium category. And child health status also many districts got as poor health status for the children. Finally in the correlation section, relation between socio-economic condition and child health status seems a negative association. With increase of socio-economic condition results related under nutrition condition reduces. In relation with child health care and child health and nutrition also negative result have found. Even all the correlations appear as statistically significant.

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