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Women literacy and prevalence of anaemia for children : A district level analysis in West Bengal

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Abstract :The latest National Family Health Survey conducted in 2019-20 (NFHS-5) stated that incidence of anaemia to children age between 6 to 59 months is a serious challenging problem in India and it is a severe problem to the children of West Bengal due to a poor performance in children suffering from anaemia. In 2013, the Government of India initiated National Food Securities Act -2013 for betterment of nutritional status , specially women and targeted children. A comparison between the two national – level data percentage of children suffering from anaemia is marginally decreased as per NFHS-5 compare to previous survey i.e NFHS-4 in West Bengal but regional disparity has significantly declined . children in economically backward districts have benefited more than children in economically advanced districts in West Bengal From the benefit of NFSA. Children suffering from anaemia depends on the women's level of education and Children aged 9 to 35 months who have taken a vitamin A dose in the previous 6 months.

Keyword : Anaemia , NFSA -2013 , Vitamin A dose , Literacy rate.

Introduction

Anemia is a exceptional condition where there are either too few red blood cells or a lack of haemoglobin in blood cells (1). The World Health Organization defines anaemia in children under the age of five as having a threshold haemoglobin level below 11.0 g/dL. Anemia affects 41.7% of children under the age of five worldwide; in India, the prevalence was 58% in 2016(2). India is consider to have the greatest prevalence of anaemia among developing nations. Despite numerous government-led programmes like the National Iron Plus Initiative for Anemia Control and POSHAN Abhiyaan, childhood anaemia remains a serious nutritional condition and a public health concern in India. Children who have anaemia are more likely to have illnesses such behavioural issues, learning disabilities, low academic achievement, attention deficit disorder, lethargy, low immunity, higher mortality, and infection susceptibility. One of the most important states of India, West Bengal, also has a significant trend of anemia in children under 5 years. Because 54.2% and 69% children under five years who are anemic in West Bengal as Per NFHS-4 and NFHS-5 data .

So,The relative position of West Bengal is very worse in terms of prevalence of anaemia for children across the all States of India(NFHS report) and fiscal performance of West Bengal is worrying because debt burden is so high(rbi report) .

In 2013, the NFSA-2013 was initiated, granting legal protection to the country's food supply. In this scheme, the government promises to provide subsidised food for those who live below the poverty line in the majority of the country's regions. As per NFSA -2013, up to 75% of the population in the rural and up to 50% of the population in the urban region, or roughly two-thirds of the population, are entitled to receive subsidised food goods through the Targeted Public Distribution System (TPDS). The same benefits are given to West Bengal as to other Indian states. Since June 2015, West Bengal has started using the NFSA. The projects listed below fall under the purview of this programme: Mid-day meal programmes (MDM), the Integrated Child Development Services Scheme (ICDS), Special Nutrition Programs (SNP); Wheat Based Nutrition Programs (WNP); Applied Nutrition Programs (ANP).

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Thus the main objectives of this research paper were to (i) assess the prevalence of anaemia to the children of West Bengal across the different districts . (ii) explore the impact of NFSA-2013 on the incidence of anaemia to the children of different districts in West Bengal and (iii) establish the relation between prevalence of anaemia for children with women literacy , Children aged 9 to 35 months who have taken a vitamin A dose in the previous 6 months.

1. Literature review :

K.S Caroline (et al) (2019) have tried to explore the incidence of anemia to the children of santal Adivasi of Birbhum district in their research paper "Prevalence of Undernutrition and Anemia among Santal Adivasi Children, Birbhum District, West Bengal, India". This study's objectives were to evaluate the severity of childhood undernutrition (as measured by the conventional and composite index of anthropometric failure, or CIAF), the incidence of childhood anaemia and it does not dependent, nutrient-specific, and sensitive drivers, as well as the living conditions of the Santal Adivasis. In 2015, the study survey was carried out in 21 Santal villages in the Birbhum District of West Bengal. HemoCue Hb201+ was used to measure the haemoglobin (Hb) levels of 307 kids (aged 6-39 months) and their mothers (n = 288). Other anthropometric measurements included height/length, weight, and the circumference of the middle of the upper arm (MUAC). In addition, surveys of home sociodemographic variables were conducted.

D halder (et al) (2011) have found the children anemia in rural area of West Bengal in their research paper "A Study on the Role of Parental Involvement in Control of Nutritional Anemia among Children of Free Primary Schools in a Rural Area of West Bengal". An study was made among students of primary schools in rural sector in West Bengal to evaluate the effects of health and nutrition oriented education for behaviour of parents on incidence of anaemia of children. According to school policy, pupils who were clinically anaemic were divided into "groups of two" and given anthelmintic medication, a paediatric iron-folic acid (IFA) pill, and health-nutrition education from refocused teachers. Parents in the study group took part in behaviour management techniques.

S Bharati(et al) (2019) have focused on the incidence of anemia to children in India in their paper "Prevalence of anaemia among 6- to 59-month-old children in India: the latest picture through the NFHS-4". The study included 1,37,347 children. The dependent variable was the child's anaemia status. The study's objectives were to assess the distribution of anaemia prevalence by child age group, (ii) the prevalence of child anaemia by zone and state. The survey discovered that in India in 2015-16, 56% of 6- to 59-month-old children were anaemic, a decrease of only 13.5 percentage points from the NFHS-3 study in 2005-06. Iron supplementation is well established to be essential for child growth and brain development. According to the report, 56% of 6- to 59-month-old infants in India were anaemic in 2015-16, a decrease of only 13.5 percentage points since the NFHS-3 study in 2005-06. Iron supplementation is well established to be required for child growth and brain development. This study recommends that, in addition, the socioeconomic conditions of Indian households should be improved in order to prevent child anaemia. The high frequency of anaemia among children in India is also due to low weight at birth and poor condition of maternal nutrition.

2.Methods

2.1 Data source

The information of cross-sectional data collected from the two consecutive National Family Health Surveys (NFHS) IV and V. The West Bengal Food Department website (https://wbpds.wb.gov.in/) gives the information on the number of beneficiaries under the National Food Security Act-2013.

2.2 Variables

The dependent variable was anaemic Children age 6-59 months and it is a important indicator of nutritional status of children. The independent variable were Women literacy rate, Children who have taken vitamin A dose in the last six months(aged 9 to 35 months).

3. Data Analysis

As per Table 1 , percentage of anaemic children age between 6 to 59 months , percentage of female literacy rate and percentage of children who received Vitamin A dose in last six months have shown for 19 districts in West Bengal according to NFHS-4 and NFHS- 5 data . It is clear from the above table that the percentage of children with anaemia has increased in various districts of West Bengal as per NFHS-5 compare to NFHS-4 . But in the case of Kolkata and Jalpaiguri districts there has been an exception i.e. the percentage of children suffering from anemia has decreased. Female literacy rate plays a positive role in child health, nutrition and anemia . But in most of the districts of West Bengal the female literacy rate has increased at a marginal rate which has become a matter of great concern . But it is very important to increase the literacy rate of women at a sufficient rate because they should have enough knowledge about what kind of food should be given to children at what age and other healthy methods can be applied in nutrition so that children can improve in terms of health and nutrition. will and get rid of a disease like anemia . It is very important to take vitamin A for children because the lack of vitamin A causes children to suffer from various diseases . But the percentage of children age 9-35 months taking vitamin A dose has dropped significantly as per NFHS-5 compare to NFHS-4 . However, there is an exception in the case of Hoogly, Paschim Bardhaman ,Purba Mednipur districts. The NFSA-2013 introduced by the Government of India was originally intended to improve the nutrition and health of children and lactating

women, but even after the introduction of the law, the incidence of anemia in children increased instead of decreased, so the NFSA could not play a positive role in increasing the incidence of anemia in children.

Table 1

	Children age 6-59 months who are anaemic (<11.0g/dl) (%)		Female literacy rate (%)		Children who have taken vitamin A dose in the last six months (aged 9 to 35 months). (%)	
District	NFHS-4	NFHS-5	NFHS-4	NFHS-5	NFHS-4	NFHS-5
Bankura	47.3(14)	67.1(15)	65.2(14)	68.3(16)	86.9(1)	73.4(7)
Birbhum	59(7)	76.5(3)	66.6(12)	73.35(12)	66.2(16)	62.9(14)
Cooch Behar	58.2(8)	66.4(16)	62.1(17)	70.8(15)	78(11)	58.4(17)
Dakshin Dinajpur	66.7(4)	72.5(5)	66.8(11)	79.2(5)	83.9(3)	61.4(15)
Darjeeling	45.8(16)	68.1(10)	67.3(10)	74.3(10)	86.5(2)	67.2(12)
Hoogly	53.3(12)	67.9(11)	78(4)	77(7)	55.5(19)	76.2(4)
Howrah	56.8(9)	67.7(12)	76.3(5)	77.4(6)	78.3(10)	75(5)
Jalpaiguri	71(2)	67.4(14)	78.4(3)	80.5(4)	72.1(13)	70.1(8)
Kolkata	72.3(1)	70(9)	64.2(15)	73.6(11)	79(8)	65.5(13)
Malda	55.2(10)	71(7)	80.7(2)	87.6(1)	71.1(14)	58(18)
Murshidabad	46.7(15)	72.1(6)	64.2(15)	72.3(13)	69.4(15)	57.7(19)
Nadia	36.6(19)	63.6(18)	66.1(13)	67.6(17)	74.3(12)	67.7(10)
North 24 Parganas	53.5(11)	57.9(19)	73.7(8)	76.2(9)	78.9(9)	74(6)
Paschim Bardhaman	44.2(17)	73.1(4)	82.9(1)	85.5(3)	64(17)	78.1(3)
Paschim Mednipur	53(13)	66(17)	70.7(9)	70.9(14)	81.9(5)	78.3(2)
Purba Mednipur	42.5(18)	67.5(13)	76.1(6)	77(7)	82.1(4)	83.7(1)
Purulia	66.8(3)	77.9(1)	48.1(19)	61(19)	80.2(6)	68(9)
South 24 Parganas	65.2(5)	70.4(8)	74.6(7)	85.6(2)	80.2(6)	58.8(16)
Uttar Dinajpur	64.4(6)	77.2(2)	51.1(18)	65.4(18)	56.5(18)	67.4(11)

Source : NFHS-IV , NFHS-V and Author calculation.

As per table 2 , the percentage on NFSA beneficiaries in Murshidabad ,Darjeeling ,Jalpaiguri, Purulia, Birbhum, Uttar Dinajpur districts are high compare to other districts of West Bengal but percentage of anaemic children age between 6 to 59 months is comparatively high in these districts (Table1) . Therefore, there is considerable doubt that increasing the amount of subsidized food through the introduction of NFSA alone will reduce the incidence of anemia in children. This is because all the subsidized food items distributed through the public distribution system under this scheme are mainly carbohydrate foods, no protein or pulses being given.

Table 2 : percentage of NFSA recipients in each West Bengal district

District	**NFSA beneficiaries(%)**
Bankura	68.20(12)
Bardhaman	59.78(15)
Birbhum	72.84(5)
Cooch Behar	71.83(7)
Dakshin Dinajpur	69.79(10)
Darjeeling	74.69(2)
Hoogly	55.18(17)

Howrah	58.16(16)
Jalpaiguri	73.13(3)
Kolkata	29.77(19)
Malda	68.97(11)
Murshidabad	76.22(1)
Nadia	68.06(13)
North 24 Parganas	60.30(14)
Paschim Mednipur	52.35(18)
Purba Mednipur	70.90(8)
Purulia	73.02(4)
South 24 Parganas	69.84(9)
Uttar Dinajpur	72.14(6)

Source : (https://wbpds.wb.gov.in/) and Author calculation.

4.Result

As per Table 3 , t – Test reflect that mean value of incidence of anemia of children under 5 years has been increased from 55.71 to 69.48 as per NFHS-4 and NFHS-5 data . Thus it is clear that the incidence of anemia in children has increased substantially which is a matter of great concern towards the nutritional development of children. Whereas WHO has set a target to reduce anemia in children and in view of that, the Government of India has launched the NFSA-2013 to accelerate the nutritional development of children, but in reality it is seen that after the implementation of NFSA-2013 and the incidence of anemia in children is a matter of concern in the districts of West Bengal. But the disparity in the incidence of anemia among children in the districts of West Bengal showed a fairly positive decrease (from 104.28 to 23.55), i.e., the incidence of anemia increased in those districts where the incidence of anemia was higher, but it increased more rapidly in the districts where the incidence of anemia was relatively low. That is, even in those districts which were economically advanced and in terms of other social infrastructure, the incidence of anemia in children increased significantly, and the percentage of anemia in children among the districts of West Bengal became more and more equal. In this case , the calculated value of "t" is greater than "t critical value (6.31>2.1) [2]. So the comparison between NFHS-4 and NFHS-5 data is statistically significant .

Table : 3

	NFHS-4	*NFHS-5*
Mean	55.71052632	69.48947368
Variance	104.2865497	23.55766082
Observations	19	19
Pearson Correlation	0.378501993	
Hypothesized Mean Difference	0	
df	18	
t Stat	-6.319663994	
P(T<=t) one-tail	2.9476E-06	
t Critical one-tail	1.734063607	
P(T<=t) two-tail	5.8952E-06	
t Critical two-tail	2.10092204	

[2] There is a negative sign before calculated "t" value because the prevalence of anaemia to children under five years has been increased from NFHS-4 to NFHS-5 data .

Table :4

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.815510953				
R Square	0.665058115				
Adjusted R Square	0.623190379				
Standard Error	2.979388064				
Observations	19				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	282.0098429	141.0049	15.88474	0.0001584
Residual	16	142.0280518	8.876753		
Total	18	424.0378947			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	125.7805538	10.01458755	12.55973	1.06E-09	104.5505765
W[3]	-0.43576062	0.100623738	-4.33059	0.000517	-0.649073416
Z[4]	-0.345063367	0.090152291	-3.82756	0.001484	-0.536177686

There is no doubt that the National Food Security Act has not significantly helped to decrease the incidence of anemia of children under 5 years as per Table 1 , it appears that the benefits of the NFSA have not had any remarkable effect on the decrease in incidence of anemia of children in a few districts that have benefited relatively more. Percentage of NFSA beneficiaries is higher in Purulia,Uttar Dinajpur,Birbhum districts but percentage change in incidence of anemia of children under 5 years is comparatively higher than other districts . So, incidence of anemia of children depends on not only benefits of NFSA Act but also other socio demographic variables .

In my study , female literacy rate and children who received Vitamin A dose in last six months have been taken as a socio demographic variable . To show the association between the incidence of anemia of children under 5 years and above two mentioned variable , ANNOVA statistical method has been used . ANNOVA result shown in Table 4.

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where ,

Y stands for percentage of the incidence of anemia of children under 5 years

x_1 stands for percentage of female literacy rate.

x_2 stands for percentage of children received vitamin A dose .

α stands for co-efficient of intercept term and β_1, β_2 are the co-efficient of independent variable respectively.

As per table 4, the value of Adjusted R^2 is 0.62 , it reflects that model is significant i.e a strong correlation between the incidence of anemia of children and percentage of women who are literate , percentage of children received vitamin A dose is existing . It is very interesting to note that percentage of the incidence of anemia of children that are inversely related to the number of literate women . Hence , in ANNOVA result co-efficient value of respective variable is negative($p<0.05$) . Because literate women are conscious about their health and are well aware of what kind of food should be taken at what time . That is why children of Purulia,Uttar Dinajpur,Birbhum districts have higher percentage of the incidence of anemia despite the high percentage of beneficiaries covered by the NFSA scheme because the women literacy rate in these districts is very low.

[3] W stand for women literacy(%)

[4] Z stand for Children age 9-35 months who received a vitamin A dose in the last 6 months (%)

In this case , a negative relationship is seen between the percentage of the incidence of anemia of children and percentage of children received vitamin A dose. Since co-efficient value between the percentage of the incidence of anemia of children and percentage of children received vitamin A dose is negative($p<0.05$) as per ANNOVA analysis(Table 4) . That is, The incidence of anemia in children was lower in districts where children had higher intake of vitamin A dose.

5.Conclusion

The strong symptom of malnutrition in children is prevalence anaemia in those children . That is, the amount of haemoglobin in the blood of children decreases compared to the requirement. Due to the decrease in the amount of haemoglobin in the blood, the supply of oxygen is reduced to a considerable extent, which in turn affects the intellectual and cognitive development of children. Through the National Food Security Act, the Government of India had set a target to reduce the incidence of anemia among children, but in practice, the number of children suffering from this anemia in various districts of West Bengal has increased rather than decreased significantly. Two social factors are taken to explain why the incidence of anemia in children is now increasing . One is female literacy rate and another is percentage of children received vitamin A dose . In most districts it has been observed that districts with low female literacy rate are more likely to have anemia in children. Children in districts with low intake of vitamin A also had more anemia . Therefore through the NFSA, only subsidized food provided through the public food distribution system should ensure the quality of food and provide protein-rich food. In addition to this, Social and geographical factor's change is very necessary. West Bengal currently does not have the financial capacity to invest the required amount of investment in such social infrastructural development, so the government and non-governmental organizations must work together to provide that amount of financial resources. So the government needs to extend its thinking to expose children anemia disease in the state through public private partnership model.

Reference

1. World Health Organization. Anaemia. Accessed April 13, 2021. https://www.who.int/health-topics/anaemia

2. World Health Organization. Global health observatory data repository/world health statistics. Accessed April 25, 2021. https://data.worldbank.org/indicator/SH.ANM.CHLD.ZS.

3. Ramachandran P, Kalaivani K. Time trends in incidence of anemia in pregnancy. Indian J Med Res. 2018;147(3):268-277.

4. Kapil U, Kapil R, Gupta A. National iron plus initiative: current status & future strategy. Indian J Med Res. 2019;150(3): 239-247.

5. Kapil U, Kapil R, Gupta A. Prevention and control of anemia amongst children and adolescents: theory and practice in India. Indian J Pediatr. 2019;86(6):523-531.

6. Stiller, C. K., Golembiewski, S. K. E., Golembiewski, M., Mondal, S., Biesalski, H. K., & Scherbaum, V. (2020). Prevalence of undernutrition and anemia among santal adivasi children, Birbhum District, West Bengal, India. *International Journal of Environmental Research and Public Health*, *17*(1), 342.

7. Haldar, D., Chatterjee, T., Sarkar, A. P., Das, S. K., & Mallik, S. (2011). A study on the role of parental involvement in control of nutritional anemia among children of free primary schools in a rural area of West Bengal.

8. Bharati, S., Pal, M., & Bharati, P. (2020). Prevalence of anaemia among 6-to 59-month-old children in India: the latest picture through the NFHS-4. *Journal of Biosocial Science*, *52*(1), 97-107.

9. IIPS (2017) National Family Health Survey (NFHS-4), 2015–16. IIPS. Mumbai, India

10. IIPS (2019) National Family Health Survey (NFHS-5), 2019–20. IIPS. Mumbai, India