



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research
Vol. 15, Issue, 01, pp.23378-23381, January, 2023
DOI: <https://doi.org/10.24941/ijcr.44674.01.2023>

**INTERNATIONAL JOURNAL
OF CURRENT RESEARCH**

RESEARCH ARTICLE

NUTRITIONAL STATUS OF UNDER-5 YEAR AND LOW BIRTH WEIGHT CHILDREN IN BIRBHUM DISTRICT, WEST BENGAL

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ARTICLE INFO

Article History:

Received 10th October, 2022
Received in revised form
5th November, 2022
Accepted 13th December, 2022
Published online 30th January, 2023

Key words:

Malnutrition, Undernutrition,
Socioeconomic Status, NFHS, LBW

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Citation: Saikat Majumdar. 2023. "Nutritional Status of Under-5 Year and Low Birth Weight Children in Birbhum District, West Bengal". *International Journal of Current Research*, 15, (01), 23378-23381.

ABSTRACT

Nutritional status of children is one of the major components of economic development of the country. According to 2011 censuses, there are 472 million children of 0–18 years, comprising 39% of the country's population and there is a huge burden of under nutrition among children. The imbalance between the nutrients the body needs and the nutrients it receives is known as malnutrition, which may take the form of either undernutrition or obesity. Health and physical consequences of prolonged states of malnourishment among children include delays in their physical growth and motor development, lower intelligence quotient (IQ) scores, greater behavioral problems and social skill deficiencies, susceptibility to contracting diseases, and others. During this crucial period, many factors like low birth weight baby, inappropriate feeding practices, morbidity factors (diarrhea and ARIs), low socioeconomic status and others lead to malnutrition. The study tried to find out the nutritional status of under 5 year children and low birth weight (LBW) baby including the child morbidity in Birbhum district, West Bengal using the secondary datasheet for NFHS-4 & NFHS-5.

INTRODUCTION

The causes of malnutrition include inadequate dietary intake, infectious disease, or a combination of both (UNICEF, 2015). Also, United Nations Children's Fund (UNICEF) identified inappropriate feeding practice as one of the root causes of child malnutrition (UNICEF, 1990). There are various risk factors that showed an association with under-nutrition among under-five children. West Bengal study found that significantly higher proportion of malnutrition among girls compared to the boys, and those belonging to families with lower per capita income (Dey&Chaudhuri, 2008). If, for instance, a pregnant woman is undernourished, the infant in her womb is similarly not fed properly. Newborns who do not get the desired amount of nutrition may likely not survive. Most recent available estimates show that in some developing countries, including India, nearly half of children under five years of age die each year due to poor nutrition (UNICEF, 2017). India continues to bear significant burden of child nutrition in spite of gradual improvement in food security and public policy intervention, including that of supplementary nutritional support (SNP) under integrated child development scheme (ICDS) since 1970s. Mothers opt for AWCs primarily because they want some PSE (Pre School Education) for their children, while others do not send their children mainly under the perception of bad quality of education. Several studies show that micronutrient supplementation starting in pregnancy can correct important maternal nutrient deficiencies, but effects on child health outcomes are disappointing.

Other interventions to improve diet during pregnancy have had little effect on maternal and newborn health outcomes. Nutritional status of the children is the important public health indicator which helps to assess the general health condition of the population. Nutritional condition of the children does not only serve as a health indicator, but it is also vital for the children's susceptibility to many diseases. Nutrition is also a determinant factor for physical and mental development in childhood. If a child is not supplied sufficient food it adjusts its physical state according to the supply of food. As a result, inadequate physical growth, children's poor health etc. It is known that place of residence, household wealth, birth weight, age of child, awareness regarding diarrheal disease and acute respiratory tract infection control, maternal education, number of under 5 years children and source of drinking water were strong predictors of child nutritional status in developing countries. (Mittal A, Singh J, Ahluwalia SK, 2007). The need of the hour is to examine the burden of under-nutrition and obesity, study its determining factors and assess the effectiveness of the various approaches to combat malnutrition among under-five children. The present review article discusses the issues and strategies for strengthening service delivery to under-five malnourished and LBW children in Birbhum District, West Bengal.

Objective: To find out the nutritional status of under-5 years & Low Birth Weight children in selected villages of Birbhum district in West Bengal.

METHODOLOGY

This is a theoretical research paper, where secondary information produced by different authors and researchers has been used. This study used data of child growth failure indices from district level fact sheets of West Bengal state published by the National Family Health Survey (NFHS), India. This study was carried out based upon two-time frames of the NFHS (NFHS-4, 2015–2016 & NFHS-5, 2019–2020) series. The fact sheets are publicly available on the respective website (<http://rchiips.org/nfhs/>) and one can access the data set without any prior request. The main outcomes of interest for the present study are children's growth failure indices, classified as stunting, wasting and underweight status of Under-5 children. The corresponding score, i.e., height-for-age Z-score (HAZ), weight-for-height Z-score (WHZ) and weight-for-age Zscore (WAZ) were measured from children's height/length, weight and age data which has been given in the respective NFHS dataset. NFHS permit their surveyor to collect anthropometric information about children's height and weight measurement and also give permission to the statistical evaluation team for estimating (Z-score) the current nutritional status of under-5 children, India. Low birth weight was a term used to describe who were born weighing less than 2500 grams (up to and including 2499 gm) as per the World Health Organization.

Variables

Inclusion: In the study 1564 data have been taken in lieu of 1609, 45 data has been omitted for not de jure resident respondents because these data not indicate proper information of the area. In the study drinking water has been divided into protected and unprotected groups. For simplicity, piped into dwelling, piped into yard/plot, public tap and tube well has been included as protected and unprotected well, community plant & other has been included as unprotected. Houses made from mud, thatch, or other low-quality materials are called *kuccha* houses, houses that use partly low-quality and partly high quality materials are called *semi-pukka* houses, and houses made with high quality materials throughout, including the floor, roof, and exterior walls, are called *pukka* houses. Again, in the study, toilet facility has been divided into hygienic and unhygienic. Pit latrine without slab, open defecation and unimproved facility have been included at unhygienic and sanitary latrine with flush water and pit latrine with slab included in hygienic process. In the formation of wealth index, three groups have been created in lieu of five, poorer & poorest has been included at poor and richer & richest has been represented as rich. The birth indicator is generated as a binary variable by categorizing the original question (size of child at birth) such as low birth weight as 0 (LBW) and birth weight 2500 gm or more as 1 (Normal). In study, the number of children at birth were 249 among them

Ethical statement: The study is based on a secondary data set from the recent NFHS-5 survey with no identifiable information on the survey participants. NFHS-5 obtained the consent before and during the survey. This dataset is available in the public domain for research use and, hence, no ethical approval was needed specifically for the present study. The data can be freely accessed from the NFHS website at <http://rchiips.org/nfhs/>

Review of Literature: In developing countries, it is serious public health problem and most important risk factor for the burden of disease causing about 300,000 deaths per year directly or indirectly responsible for more than half of all deaths in children. (1). Tribal population are particularly vulnerable to undernutrition, because of their geographical isolation, socio-economic disadvantage and inadequate health facilities (2). Malnutrition is associated with more than half of all child deaths worldwide. Malnourished children are more likely to die from common childhood ailments, and those who survive, have recurring sicknesses and faltering growth. Three-quarters of the children who die from causes related to malnutrition are only mildly or moderately malnourished.

Lartey (2015) writes: "There is increasing agreement among the nutrition community about the use of length/height-for-age as the indicator to monitor the long-term impact of chronic nutritional deficiencies". FM (Dual forms of malnutrition) is defined as a household in which one person is overweight while another is underweight, which reflects the dual burden of over nutrition and undernutrition within a single household (Doak CM, Adair LS, Bentley M et al). Children's nutritional status is also more sensitive to factors such as feeding/weaning practices, care, and exposure to infection at specific ages. A cumulative indicator of growth retardation (height-for-age) in children is positively associated with age (Anderson, 1995). Local and regional studies in Ethiopia have also shown an increase in malnutrition with increase in age of the child (Yiner, 2000, Genebo et al, 1999; Samson and Lakech, 2000). Khan, et. al. (2011) have evaluated the impact of prenatal food and micronutrients supplementation on nutritional status (stunting) of children (up to 54 months) in Bangladesh. They found that food supplementation reduce the occurrence of stunting in boys only, however, prenatal micronutrients supplementation increases the proportion of stunting also in boys only.

Srinivasan, et. al. (2013) have estimated the rural-urban disparity in nutrition in Bangladeshi and Nepali children using DHS data of both countries. The study concluded that differences in maternal education, spouse education and wealth index contribute a major share of rural-urban disparity in the lowest quantile of child's nutritional status measured as height-for-age z-score. The three main indicators used to define under nutrition, i.e., underweight, stunting, and wasting, represent different histories of nutritional insult to the child. Occurring primarily in the first 2-3 years of life, linear growth retardation (stunting) is frequently associated with repeated exposure to adverse economic conditions, poor sanitation, and the interactive effects of poor energy and nutrient intakes and infection. Low weight-for-age indicates a history of poor health or nutritional insult to the child, including recurrent illness and/or starvation, while a low weight-for-height is an indicator of wasting (i.e., thinness) and is generally associated with recent illness and failure to gain weight or a loss of weight (Bloss E, Wainaina F, Bailey RC (2004)).

RESULTS

Comparative Study: NFHS- 4 (2015- 16) & NFHS-5 (2019-20). The NFHS-5 data showed that the percentage of children who were stunted (low height-for-age), wasted (low weight-for-height) and underweight (low weight-for-age) has gone down. There was a slight increase in the percentage of overweight children. Prevalence of diarrhea and ARI both increased in the survey of NFHS-5 compared to NFHS-4. Merely 72% of infants were exclusively breastfed for 6 months (180 days) according to the recommendations of the WHO/UNICEF. Breastfeeding children and total children within age 6-23 months receiving supplementary food decreased in NFHS-5. The majority of children were breastfed within the first hour after birth (72 %), still nearly every third child (28 %) was deprived of colostrum. Prevalence of diarrhea increased from 5.6 percent in NFHS-4 to 9.5 percent in NFHS-5. Again the prevalence of ARI in Birbhum district increased from 0.4 percent in NFHS-4 to 4.7 percent in NFHS-5. As per NFHS -5, nearly 59 % of women below 20 years become mothers and 11.24 % of mothers are illiterate regarding study. Anaemia prevalence among respondent mother was nearly 50 % regarding NFHS-5. Nutritional supplementation to women during their pregnancy is crucial for health of their children. In India, Anganwadi Workers of the AWC under the ICDS programme are given responsibility for distributing nutritional supplementation, primarily in the form of take-home ration, to pregnant mothers. The ICDS supplied the supplementary food without considering the micro-nutrient value on health. Several studies show that micronutrient supplementation starting in pregnancy can correct important maternal nutrient deficiencies, but effects on child health outcomes are disappointing.

Table 1. Health and Nutritional status of under -5 children in Birbhum, West Bengal

Indicators	NFHS-5 (2019-20)	NFHS-4(2015-16)
Children under 5 years who are stunted (height-for-age (%) ¹	37.0	40.5
Children under 5 years who are wasted (weight-for-height) (%) ¹	25.5	29.5
Children under 5 years who are underweight (weight-for-age)(%) ¹	41.8	43.1
Children under 5 years who are overweight (weight-for-height) ²	3.4	1.3

¹Below -2 standard deviations, based on the WHO standard; ²Above +2 standard deviations, based on the WHO standard.

Table 2. Child Feeding Practices and Nutritional Status of Children, Birbhum, West Bengal

Indicators	NFHS-5 (2019-20)	NFHS-4(2015-16)
Children under age 3 years breastfed within one hour of birth (%)	72.0	54.6
Breastfeeding children age 6-23 months receiving an adequate diet (%)	24.8	31.0
Total children age 6-23 months receiving an adequate diet (%)	24.6	30.3
Children age 6-59 months who are anaemic (<11.0 g/dl)(%)	76.5	59.0
Prevalence of diarrhoea in the 2 weeks preceding the survey (%)	9.5	5.6
Prevalence of symptoms of acute respiratory infection (ARI) in the 2 weeks preceding the survey (%)	4.7	0.4

Table 3. Socio Economic Backgrounds of Mother

Indicators	Birth weight < 2500gm		Birthweight >=2500 gm	
	Number	Percent	Number	Percent
Age Group of Mother at First Birth				
<= 19	15	6.02	132	53.01
20-25	11	4.42	76	30.52
25-35	3	1.20	12	4.82
Education of mother				
No Education	10	4.02	28	11.24
Primary	10	4.02	62	24.90
Secondary	9	3.61	115	46.18
Higher	0	0.00	15	6.02
Prevalence of Aneamia of mother				
Moderate	4	1.61	24	9.64
Mild	16	6.43	100	40.16
Not Aneamic	9	3.61	96	38.55

Table 4. Socio Economic Backgrounds of Low Birth Weight Children

Indicators	Birth weight < 2500gm		Birthweight >=2500 gm	
	Number	%	Number	%
Type of Toilet Facility				
Hygienic	8	3.21	81	32.53
Unhygienic	21	8.43	139	55.82
Source of Drinking Water				
Protected	29	11.65	215	86.35
Unprotected	0	0.00	5	2.01
Type of Cooking Fuel				
LPG	3	1.20	29	11.65
Agricultural crop	8	3.21	89	35.74
straw/shrubs/grass	6	2.41	19	7.63
wood	5	2.01	46	18.47
Other	7	2.81	37	14.86
Type of House				
Floor Material				
Kuccha	21	8.43	146	58.63
Semi pukka	1	0.40	3	1.20
Pukka	7	2.81	71	28.51
Type of Wall				
Kuccha	13	5.22	120	48.19
Semi pukka	10	4.02	50	20.08
Pukka	6	2.41	50	20.08
Type of Roof				
Kuccha	11	4.42	73	29.32
Semi pukka	13	5.22	95	38.15
Pukka	5	2.01	52	20.88
Wealth Index				
Lower	24	9.64	164	65.86
Middle	4	1.61	22	8.84
Upper	1	0.40	34	13.65

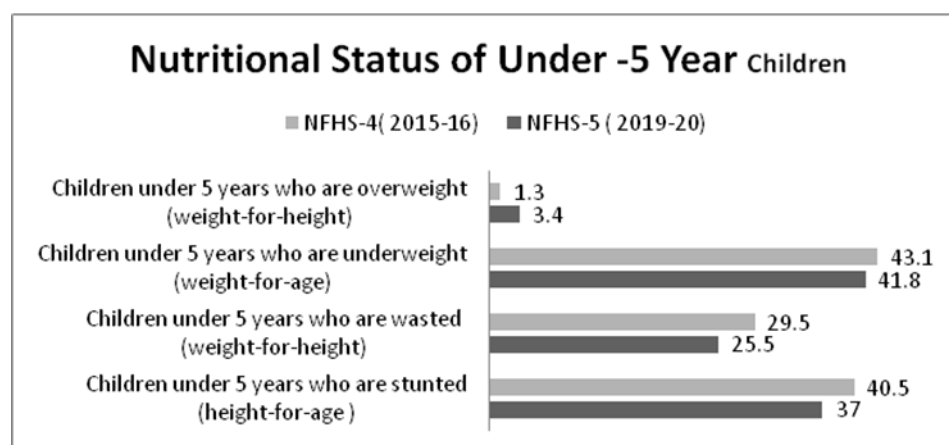
**Chart 1.**

Table 5. Binary logistic regression model that indicates the role of explanatory factors of Low Birth weight children

Binary logistic regression model that indicates the role of explanatory factors of Low Birth weight children			
Explanatory factors	Low Birth weight		p-value
	AOR (95% C.I)		
Type of House			
Floor			
Kuccha (Reference)			
Semi pukka	-3.14	1.46	0.476
Pukka	-.523	1.27	0.411
Wall			
Kuccha (Reference)			
Semi pukka	-1.501	.274	0.176
Pukka	-1.124	.9197	0.845
Roof Kuccha (Reference)			
Semi pukka	-.786	.930	0.869
Pukka	-.679	1.550	0.444
Type of Fuel			
LPG(Reference)			
Agricultural crop	-1.250	1.532	0.843
straw/shrubs/grass	-2.617	.385	0.145
wood	-1.554	1.455	0.949
Other	-2.040	.8335	0.410
Toilet Facility			
Hygiene(Reference)			
Unhygienic	2.617	.385	0.332
Wealth Index	-2.617	.385	
Poor(Reference)			
Middle	-1.365	.931	0.711
Rich	-.429	3.63	0.122

Table 6. Benefits received from Anganwadi/ ICDS

Indicators	NFHS-5
Benefits Received from Anganwadi / ICDS	Percent
During Pregnancy	86.76
Supplementary Food during pregnancy	97.19
Health & Nutrition Education during pregnancy	93.17
While breastfeeding	75.25
Supplementary food during breastfeeding	97.22
Health check-ups during pregnancy	85.14
Health & Nutrition Education during breastfeeding	93.45

CONCLUSION

This review has clearly revealed that there is recognition within the policymaking leadership that nutrition is a core public health issue that needs to be addressed at multiple levels—this is evident from the large number of policy and strategic documents on diverse issues related to reducing under nutrition. It is beyond doubt that political will at the highest levels has been mobilized, but it is also clear that progress from commitment to action has been slow and is complicated by many management and program-related issues. There is enough evidence and knowledge available on the direct, essential actions and many other priorities. A greater mobilization of existing knowledge, along with generation of new knowledge on a continuous basis and its more systematic and institutionalized availability, can improve the efficiency of policies and programs on the ground.

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