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AN ANALYSIS UPON DETERMINANTS OF NUTRITIONAL HEALTH STATUS OF SCHOOL AGE CHILDREN IN INDIA

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An Analysis upon Determinants of Nutritional Health Status of School Age Children in India

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Abstract – The health and nutritional status of children is an index of national investment in the development of its future manpower. Malnutrition affects the child's physical and cognitive growth and increases the susceptibility to infections while having an adverse impact on economic growth of the country indirectly. With 40% of the world's malnourished living in India, we face a double jeopardy of malnutrition. School children from various primary and middle level educational facilities from a rural health block were surveyed during the School Health Program. Height and weight was measured following standard procedures.

Under-nutrition continues to be a primary cause of ill health and mortality among children in developing countries. Besides poverty, there are other factors that directly or indirectly affect the nutritional status of children. In the present study, an attempt was made to find the prevalence of under-nutrition among school children and the role of socio-demographic characteristics of mother on child nutrition.

Malnutrition is a grave threat to maternal and child health across the world with its most of the victims observed in the developing nations. It is the condition that results from consuming a diet in which certain nutrients are lacking. A miserable picture of malnutrition and under-nutrition is prevalent among mothers and children in rural areas on one hand and slums and shanties of the urban areas on the other in India as well as in the state of West Bengal. Kwashiorkor, Marasmus, Rickets are the common diseases seen among children due to malnutrition. A number of nutritional deficiency syndromes tend to affect the overall physical and mental development making the child susceptible to various childhood diseases. Children living in the unhygienic slum areas cursed with malnutrition are vulnerable to pediatric tuberculosis as well. Early marriage coupled with early pregnancy, improper feeding habits, inadequate diet and negligence culminates into signs and symptoms of malnutrition among pregnant women, the result of which is reflected after birth of the infant who is also vulnerable to inherit symptoms of malnutrition, under-nutrition and anaemia.

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INTRODUCTION

Since 1947, India has made substantial progress in human development. Still the manifestations of malnutrition are at unacceptable levels. Nineteen per cent of world's children live in India. India is a home to more than one billion people, of which 42 per cent are children. More broadly, malnutrition in India is in a state of silent emergency and thereby demands greater priority than ever before. The nutritional status of population is therefore critical to the development and well-being of the nation (National Nutrition Policy, 1993 Government of India). The present status of malnutrition in India is that a devastating half of all the newborns are malnourished and 30 per cent are born underweight making them more vulnerable to further malnutrition and diseases. To evaluate nutritional status, assessors can use measure of body composition and development (anthropometric measurements) or measures of how well the body performs certain tasks (functional tests of nutrition status). Anthropometric measurements and functional tests useful in nutritional assessment indicate that each measurement depends on adequate nutrition. Poor growth in children indicates malnutrition. Malnutrition is an impairment of health resulting from deficiency of calories and/or more essential nutrients, and over nutrition, which is an excess of one or more nutrients and usually of calories.

Under nutrition is a major public health problem worldwide, particularly in developing countries. One third of the children under 5 years old worldwide are moderately or severely undernourished. Under

nutrition impairs physical, mental and behavioural development of millions of children and is a major cause of child death.

School health services play an important role in the development of every child by providing comprehensive care of the health and wellbeing of children during the school years. As health and education are intimately related, the advantages of health education can be attained best in the school. Health education should give more emphasis to prevent health problems rather than providing cure.

The health and nutritional status of children is an index of national investment in the development of its future manpower. According to World Health Organization, protein energy malnutrition refers to "imbalance between the supply of protein and energy and the body's demand for them to ensure optimal growth and function. This imbalance includes both inadequate and excessive energy intake; the former leading to malnutrition in the form of wasting, stunting and underweight, and the latter resulting in overweight and obesity". The consequences of child malnutrition are enormous and are intertwined with the development of society. Malnutrition affects the child's physical and cognitive growth and increases the susceptibility to infections and severity of diseases while having adverse implications on income and economic growth indirectly.

According to UNICEF data, 90% of developing world's undernourished children live in Asia and Africa while 40% of the world's malnourished live in India. The 2013 Global Hunger Index Report ranked India 16th, which represents the serious hunger situation. The National Family Health Survey (NFHS) data indicates that 43% of children under 5 years of age are underweight and 2% of them are overweight. In India, we face a double jeopardy of malnutrition i.e., children from urban areas are affected with problems of over-nutrition while those from rural area suffer from effects of under-nutrition.

The long term consequences of malnutrition on a child-turned-adult are issues of deep concern. Under-nutrition impairs the child's immune system and weakens the defenses against other diseases. Whereas over-nutrition contributes to childhood obesity and leads to the early onset of hypertension, Diabetes mellitus, coronary heart diseases, orthopedic disorder and other respiratory diseases .

School age is the active phase of childhood growth. Poor nutritional status in children leads to high absenteeism and early school dropouts thereby affecting the literacy rate of the country apart from affecting health status of the children. On the other hand, increasing lifestyle changes in urban areas has led to the emergence of over-nutrition and childhood obesity. To evaluate this changing trend and to determine the burden of malnutrition, we carried out a cross sectional study to assess the nutritional status of school children.

NUTRITIONAL STATUS BY ANTHROPOMETRY (INSTRUMENTS)

Nutritional status of the students was assessed by anthropometric measurements. After we checked the scale for accuracy, weight was measured to the nearest 0.1 kg with an electronic scale with students wearing light clothing and without shoes. Student height was measured to the nearest 0.1 cm with a wooden stadiometer placed on a flat surface.

Weight, height, and age data were used to calculate z-scores of the three different nutritional indicators in comparison to the newly published World Health Organization/National Center for Health Statistics (WHO/ NCHS) reference population using the WHO Anthro Plus Software (Version 10.4, 2010).

These indicators were underweight defined as weight-for age z-score (WAZ) < −2 SD, stunting defined as height-for age z-score (HAZ) < −2SD, and malnourished students aged more than 10 years (N = 655) defined as body mass index for age (BMI/A) z-score [<−2SD (underweight) or >+2SD (obese)]. Dietary habits have been studied depending on the questions addressed regarding daily and weekly consumption of common food groups.

IODINE NUTRITION STATUS AMONG

Iodine deficiency disorder (IDD) is a global public health problem with clusters around the mountainous regions of Europe, the central Mediterranean, South and Central America, Africa and Asia. It is one of the oldest and most insidious of human health problems. Iodine deficiency not only causes goiters, but may also result in irreversible brain damage in the fetus and infant and retard psychomotor development in the child. Iodine deficiency is the most common cause of preventable mental retardation; it also affects a child's learning ability. Though the prevalence varies, the problem of IDD is confined to developing countries. About 1,000 million people are at risk for IDD, of which 200 million suffer from goiter, 5 million have gross cretinism with mental retardation and 15 million suffer from lesser mental defects (Sarkar et al, 2007).

The daily intake of iodine sufficient to prevent iodine deficient goiter in adults is 150 µg per day. Additional iodine is required during pregnancy and lactation (WHO, UNICEF and ICCIDD, 2001). Iodine is rapidly absorbed in the circulation in the form of inorganic iodine, which is rapidly cleared by the kidneys. In humans, greater than 90% of iodine intake is excreted in the urine providing an estimate of current iodine intake rather than past iodine intake (Guttikoda et al,

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2003). Urinary iodine excretion (UEI) is therefore considered a good biochemical marker of recent dietary intake of iodine and is the test of choice for evaluating the degree of iodine deficiency and its correction (WHO, UNICEF and ICCIDD, 2001).

School age children, 6-11 years old, form a useful study group for assessing iodine deficiency because of their physiological vulnerability to disease, their accessibility through school (Joshi et al, 2006), and as a representation of iodine deficiency in the community (Biswas et al, 2006).

Even though increased median urinary iodine excretion and decreased prevalence of IDD has been achieved by salt iodization and various public awareness programs, it has not been able to progress towards sustainable elimination of IDD as a public health problem (20% of the population having a UIE below 50 μg/l and 50% below 100 μg/l). Thus, this study aimed to determine the current urinary iodine status in Nepalese schoolchildren by measuring UIE.

METHODOLOGY

This work is a combination of primary and secondary data. Information was generated on health conditions of the pregnant women as well as lactating mothers and children below six years of age. Most of the secondary data were collected from the Department of Health and Family Welfare, Government of West Bengal. A number of reports published by World Health Organization, UNICEF and Indian Academy of Pediatrics have been consulted for the purpose apart from articles published in several relevant journals.

The study was undertaken with the objective "to assess the nutritional health status of children". Assessment of nutritional status is the first step in the formulation of any public health strategy to combat malnutrition. The children within 7-9 years of age were selected randomly from the identified schools. Two hundred children from rural and urban areas each constituted the total sample of 400. Three tools were used in the study to assess the nutritional health status- Clinical Nutrition Survey Chart, 24-hr recall method, Food frequency questionnaire.

Clinical examination is commonly used in survey, since it is relatively simple and do not call for sophisticated equipment. It reveals the anatomical changes due to malnutrition that can be diagnosed by the naked eyes.

24-hr recall method is generally used by dietician to obtain a general picture of person's food intake. It is used to elicit an accurate picture of the diet history. In 24-hr recall method, the actual food and drink consumed in the immediate past 24 hours is recorded. Sometimes, a longer period may be used. The recorded food consumed in the last 24 hours is then converted to the nutrients available in each food item used in preparing it and then compared with the Recommended Dietary Allowances.

Food Frequency Questionnaire is either interviewer administered or self-completed. A detailed questionnaire includes the list of foods and the subject answers as to how often and in what quantity each food is eaten per day, per week and per month. The collected information of the food consumed is then checked with the Recommended Dietary Allowances. It gives an estimate of the amount and frequency of the various nutrients consumed by the individual.

RESULTS AND DISCUSSION

The results of the present study conducted on the primary school children are discussed below:

Clinical Signs	Category	Rural	Urban
General Appearance	Good	6%	97%
	Fair	45%	3%
	Poor	45%	-
	Very Poor	4%	-
Hair	Normal	37.5%	99.5%
	Loss of Luster	51%	0.5%
	Discolored & Dry	13.5%	-
	Sparse & Brittle	21.5%	-
Eye Discharge	Absent	99%	100%
	Watery	1%	-
	Mucopurulent	-	-
Lips	Normal	6.5%	98%
	Angular Stomatitis, Mild	65%	2%
	Angular Stomatitis, Marked	17.5%	-
Gums	Normal	94.5%	98.5%
	Bleeding	4.5%	1.5%
	Pyorrhoea	-	-
	Retracted	1%	-
Teeth	Absent	21%	98%
	Chalky Teeth	44%	2%
	Pitting of Teeth	8.5%	-
	Discoloured	26.5%	-
Skin	Normal	46.5%	99.5%
	Loss of Luster	49.5%	-
	Dry & Rough	4%	0.5%
	Hyperkeratosis	-	-
Bones	Normal	100%	100%
	Rickets		

TABLE 1: Clinical Nutritional Survey Chart of Rural and Urban Children.

Table 1, shows the percentage distribution of the nutritional deficiency signs amongst rural and urban respondents. The description of the rural children is as follows- General Appearance: A majority of the rural respondents (90%) were classified as fair, (45%) and poor (45%). Eyes: 99 per cent of rural respondents had normal eyes with no presence of discharge, only 1 per cent having watery eyes. Lips: 65 per cent of the children were observed to suffer mild Angular Stomatitis and close to 17.5 per cent had marked Angular Stomatitis. Gums: were observed normal in 94.5 per cent of the rural respondents, while 4.5 per cent of them had bleeding gums. Teeth: 44 per cent of the rural children had chalky teeth confirming the deficiency of Calcium,

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26.5 per cent had discolored teeth which could be a result of poor dental care. Hair: 37.5 per cent of rural children had normal hair. However, 51 per cent had dull hair or hair without luster. 13.5 per cent of the respondents had discolored and dry hair and 21.5 per cent had sparse and brittle hair. A not so encouraging hair condition of the respondents indicates a significant deficiency of protein amongst the rural respondents. Bones: were found normal. None of the children had Rickets or any other visible orthopedic problem. Skin appearance: was normal in 46.5 per cent, dull in luster in 49.5 per cent. The balance 4 per cent of the respondents had dry and rough skin. Hyperkeratosis was not observed in any respondent.

S.No.	Food Groups	Daily	Weekly	Twice a month	Monthly
1.	Pulses and Legumes	92%	8%	-	-
2.	Cereals	100%	-	-	-
3.	Milk & Milk products	96%	4%	-	-
4.	Green Leafy Vegetables	60%	3%	-	-
5.	Fats & Oils	92%	6%	2%	-
6.	Meat, Fish & Poultry	38%	16%	4%	-

TABLE 2 Percentage Distribution of Urban Children based on Frequency of Food groups' intake

Table 2 shows the percentage frequency of consuming various food groups for urban child respondents. The diet intake of the urban children was found to be good and better than their rural counterparts. Pulses and legumes were consumed by 92 per cent children on a daily basis while the rest consumed it weekly. Cereals were consumed by all the respondents on a daily basis, possibly in the form of chapatti/s. Milk was also consumed by a majority of respondents on a daily basis with only 4 per cent consuming it weekly. Green leafy vegetables were not found to be preferred by urban respondents as much as their rural counterparts. Only 63 per cent of the urban respondents recall consuming green leafy vegetables of which 60 per cent consumed it daily and 3 per cent consumed it weekly. Consumption of fats was high amongst urban respondents.

CONCLUSION

The condition of maternal and child health has been in a tragic state in West Bengal with some initiatives taken by the State Government in recent years. The activities of ICDS in this respect have been praiseworthy. The Anganwadi schools meant for the children of low socio-economic background has been running successfully in various municipal wards of state. The health workers have been visiting households to distribute iron tablets among pregnant women. The children in the Anganwadi schools are given nutritious food like khichdi, vegetables, boiled egg and pulses. They are also provided with medicine in case of severe malnourishment and taken to doctors for height and weight check-up at regular interval. The Government run health centers in the city conduct institutional deliveries, ante-natal checkup and post-natal checkup for mothers. Inspite of such initiatives

worth mentioning, the coverage has not been satisfactory in various wards of the city. The pregnant women and lactating mothers of the vulnerable groups in some areas are not aware of Government initiatives and consequently they remain deprived of the benefits of the welfare programmes.

We conclude our study re-emphasizing the various determinants of malnutrition and highlighting the changing trend in the nutritional status of children in urban, semi-urban and rural area. More attention on educating parents to improve nutrition in rural areas, lifestyle modifications in urban areas and preferential target on lower socio economic class can bring about changes in the issue of malnutrition in India.

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