Original Article

Nutritional Status of Rural School-Going Children (6-12 Years) of Mandya District, Karnataka

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Abstract

Introduction: Nutritional deficiencies are common in children of developing countries like India although the prevalence is reduced due to various steps taken by the Government and the health care personnel for the prevention and treatment of the same. This study is to understand the common nutritional disorders in rural school going children so that further measures can be taken for the improvement of their health status.

Objective: To assess the nutritional status of rural school-going children (6-12 years) of Mandya district, Karnataka.

Materials and methods: We conducted an observational cross sectional study of children of age group 6-12 years, studying in BGS Model Public School, BG Nagara, Nagamangala Taluk, Mandya district, Karnataka. The children were assessed for nutritional status by clinical examination as well as anthropometric assessment and were compared with the standard national data.

Results: A total of 484 children were studied. The overall prevalence of underweight was 30.3% (147) and stunting was 27.9% (135). Pallor was noted in 123 (25.4%). Hair changes were seen in 19 (3.9%). Eye changes noted in the form of conjunctival xerosis in 100 (20.7%) and bitot's spots in 10 (2.1%). Teeth changes were noted in the form of dental caries in 137 (28.3%) and enamel mottling in 19 (3.9%). Skeletal changes were noted in 7 (1.4%) children. Flat nails or koilonychia were noted in 57 (11.8%).

Conclusion: Nutritional status of the school children in Mandya district was found to be low especially with respect to the high prevalence of anemia, micronutrient deficiencies and personal hygiene. Emphasis should be given towards nutrition education, personal hygiene education, health education apart from the regular educational activities in the community.

Keywords: Health education, Nutritional status, School children

INTRODUCTION

There is a growing concern over the child health all over the world with rapid economic growth and social changes. Major determinant of health status in an adult is their nutritional status in childhood. Protein Energy Malnutrition is the most important nutritional problem globally which is more severe in third world countries affecting children of under five age category. 20-80% of primary school children are suffering from nutritional deprivation. Assessment of nutritional status of this segment of population is essential for improving the overall health. Recent study by NFHS-3 has not reported on nutritional status of school age children.[1]

The term malnutrition refers to both under-nutrition and over-nutrition. Good nutrition provides stronger immune system, better health and productivity. Various forms of malnutrition including both macro and micronutrient deficiencies affect a large segment of population in India.[2]

Study done by Nigudgi SR et al. from Gulbarga, Karnataka, among 935 students in higher primary schools of Gulbarga city showed that, 50.05% children were below average weight for age, 22.35% children had specific deficiency diseases in which bitot's spot in 48.80% children and anemia in 10.05%.[3] Hasan et al. from Bangalore, conducted nutritional assessment study among 500 children in three Government Urdu higher primary schools of Azad Nagar and its surrounding area. The overall prevalence of malnutrition in the school children was found to be 52% (260). The prevalence of malnutrition among boys was 53.85% (161) and among girls was 49.25% (99).

Stunting was seen in 41.47% (124) boys and 38.81% (78) girls.[4]

Similar studies were also performed in various parts of India. Study done by Navaneethan et al. among 810 school going students of Vellore, Tamilnadu belonging to age group 11-18 years, showed that 83% students were underweight for their age.[5] 150 school going children from Allahabad belonging to age group 7-10 years were studied by Ruchika et al., and found that mean height and weight in these children were significantly less than the National standards. 65.33% had hemoglobin level below the normal values, indicating anemia, out of which 53.33% were mild anemic and 12% were moderately anemic.[6] Vandana et al. studied 200 rural school going children of 7-9 years in Hisar district, Haryana, found that 55.5% were underweight and 54.11% of the children were stunted.

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.[3]

AIMS AND OBJECTIVES

Children of the age group 6-12 years accounts to about 1/5th of the total Indian population. During the adolescent growth spurt body requires lot of nutrients which should be stored in the body during childhood and if body stores are deficient it can result in adverse health consequences like growth retardation, scholastic backwardness and reduced work capacity. There is a relative scarcity of available literature on the information regarding nutritional status of school going children particularly from rural areas. Keeping this in view, the objective of present study was to assess the nutritional status of rural school-going children of Mandya district, Karnataka.

MATERIALS AND METHODS

This was an observational cross sectional study of children studying in BGS Model Public School which comes under the management of Sri Adichunchanagiri Shikshana Trust, located in BG Nagara, Nagamangala Taluk, Mandya district, Karnataka.

Method of Collection of Data

After obtaining authorized consent from the management, the school was visited and the data was collected using readymade proforma. All children between 6-12 years of age as determined using school records were included in the study. The data was collected by interviewing and examining the children with the help of class teacher. The children were assessed for nutritional status by clinical examination and by measuring height (cm), weight (kg) which was compared with the NCHS (National Center for Health Statistics) Standards and the standards given by ICMR (Indian Council of Medical Research). Weight was measured using a floor type weighing scale with due respect to the standardization of the equipment and procedure. The measurements are taken to the nearest 0.5 Kg. Height was measured using a measuring tape applied to the wall. The measurements are taken with children barefoot with their back of heels, buttocks and head touching the wall. Readings are taken to the nearest 0.5 cm. The important signs looked for during clinical examination are Pallor, Hair changes (sparse hair/depigmentation of hair), Eye changes (conjunctival xerosis, bitot's spots, corneal xerosis, corneal ulceration, keratomalacia) Cheilosis/angular stomatitis, Teeth changes (enamel mottling, caries, delayed eruption), Skeletal changes, Goiter, Skin changes (dry skin, flaky paint dermatosis, crazy pavement dermatosis) and Koilonychia.

RESULTS & DISCUSSION

A total of 484 children were studied belonging to the age group 6 to 12 years (Table 1). Out of the 484 students, 254 (52.5%) were boys and 230 (47.5%) were girls.

Among the 484 children, 67 (13.8%) were belonging to 6-7 years age group, 74 (15.3%) were belonging to 7-8 years age group, 72 (14.9%) were belonging to 8-9 years, 90 (18.6%) were belonging to 9-10 years, 93 (19.2%) were belonging to 10-11 years age group and 88 (18.2%) were belonging to 11-12 years age group (Table 2).

Prevalence of Underweight

The overall prevalence of underweight in the studied school children was 30.3% (147) (Table 3). The prevalence of underweight in boys was 32.3% (82) and in the girls, it was 28.3% (65). The prevalence of underweight was more among boys compared to girls (32.3% vs 28.3%). Among the boys underweight was seen more commonly in the age group 6-7 years (44.4%) and among girls in 11-12 year age group (34.1%).

Prevalence of Stunting

The overall prevalence of stunting in the under study school children was 27.9% (135) (Table 4). The prevalence of stunting in boys was 29.1% (74) while in girls it was 26.5% (61). The prevalence of stunting was more in boys as compared to girls (29.1% vs 26.5%). Among both boys and girls, stunting was noted more commonly in the age group 11-12 years with 34% in boys and 29.2% in girls.

In the present survey we observed a prevalence of under nutrition (30.3% and 27.9% for underweight and stunting respectively). It was found to be less when compared to results of study done by Hasan et al. from Bangalore among 5-14 year old children (58.2% and 40.4% for underweight and stunting respectively).[4] Ruchika et al. from Allahabad reported a prevalence of 25% underweight and 17.3% stunting in children of 7-10 years age group.[6] Anjum et al. in a study from Kashmir among 5-14 year old children had reported only 11.1% and 9.25% for underweight and stunting respectively.[1] G K Mendhi et al. from Assam reported a prevalence of 47.4% stunting and 51.7% underweight in 6-8 year old children.[7] Bandopadyay et al. from Navinagar Mumbai reported prevalence for stunting 16.8% and underweight 42.3%.[8] Mitra et al. from Chatisgarh reported prevalence of underweight 90.0% and stunting 47.5%.[9] Similarly Chowdhary et al. from Puriliya West Bengal also reported figures of underweight 33.7% and stunting 17.0%.[10]

Table 1: Sex wise distribution of children studied

Sex	Number of children	Percentage
Boys	254	52.5
Girls	230	47.5
Total	484	100

Table 2: Age wise distribution of children studied

Age group (years)	Number of children (%)	Boys (%)	Girls (%)
6-7	67 (13.8)	36 (53.7)	31 (46.3)
7-8	74 (15.3)	40 (54)	34 (46)
8-9	72 (14.9)	40 (55.5)	32 (44.5)
9-10	90 (18.6)	44 (48.9)	46 (51.1)
10-11	93 (19.2)	47 (50.5)	46 (49.5)
11-12	88 (18.2)	47 (53.4)	41 (46.6)
Total (%)	484 (100)	254 (52.5)	230 (47.5)

Table 3: Prevalence of underweight

Age group	Boys (%)	Girls (%)
6-7	16 (44.4)	10 (32.2)
7-8	14 (35)	9 (26.4)
8-9	10 (25)	9 (28.1)
9-10	14 (31.8)	10 (21.7)
10-11	13 (27.6)	13 (28.2)
11-12	15 (31.9)	14 (34.1)
Total (%)	82 (32.3)	65 (28.3)

Table 4: Prevalence of stunting

Age group	Boys (%)	Girls (%)
6-7	10 (27.8)	8 (25.8)
7-8	11 (27.5)	8 (23.5)
8-9	11 (27.5)	9 (28.1)
9-10	12 (27.3)	11 (23.9)
10-11	15 (31.9)	13 (28.2)
11-12	16 (34)	12 (29.2)
Total (%)	74 (29.1)	61 (26.5)

Prevalence of Nutritional Deficiencies

Iron deficiency anemia is the most common nutritional deficiency which affects health, education, economy, and productivity of the entire nation (Table 5). Appropriate and timely intervention can prevent a large portion of cases.

In our study, out of 484, pallor was noted in 123 (25.4%) children who included 59 boys and 64 girls and was more common in the age group 9-10 years (42%). Flat nails or koilonychia were noted in 57 (11.8%) children who included 25 boys and 32 girls. It was more seen in age group 6-7 years.

Pravin et al. in a study among 1808 school going children of 49 villages of Dharwad and Haliyal taluks reported an anemia prevalence of 25.5%.[11] Muthayya S et al. in a study study among school age children in Bangalore reported an overall low prevalence of anemia of 13.6%. Anemia prevalence was lower in boys than girls (12.0%; n = 1037 vs 15.3%; n = 993 respectively, $P < 0.05$). There was no significant difference in anemia prevalence between children in urban and rural locations (14.6 and 12.3%, respectively). They also concluded that the current low anemia prevalence in Bangalore could be due to the impact of school-based intervention programs that have been in place since 2003.[12] Verma M et al. reported a 51.5% prevalence of anemia among urban school children of Punjab.[13]

Hair changes in the form of sparse hair or depigmented or lusterless hair were seen in 19 (3.9%) who included 12 boys and 7 girls and was more in the age group 9-10 years (6.7%). Prabhakar et al. assessed the nutritional status of Jenukuruba tribal children in Mysore District, Karnataka and found that majority of the children had lack of luster (94.1%), sparseness (94.1%) and straightness (83%) in hair.[14]

Vitamin A deficiency disorder spectrum has the unique distinction of being one of the most important causes of 'Preventable blindness' the world over, and xerophthalmia still remains a problem in the developing countries. In our study, eye changes noted in the form of conjunctival xerosis in 100 (20.7%) who included 58 boys and 42 girls and bitot's spots in 10 (2.1%) who included 7 boys and 3 girls. Conjunctival xerosis was seen more commonly in the age group 8-9 years (36.1%) and bitots spots in the age group 9-10 years (4.4%). Prasanna et al. studied the prevalence of ocular morbidity among school going children (6-15 years) in Kolar district of Karnataka found that Vitamin A deficiency was the commonest ocular morbidity (33.8%) which manifested as bitot spots and

Table 5: Prevalence of nutritional deficiencies

Age group	Pallor (%)	Hair changes (%)	Conjunctival xerosis (%)	Bitots spots (%)	Dental caries (%)	Enamel mottling (%)	Skeletal changes (%)	Skin changes (%)	Koilonychia (%)
6-7	21 (31.3)	3 (4.5)	14 (20.9)	2 (2.9)	31 (46.2)	4 (5.9)	3 (4.5)	4 (5.9)	19 (28.3)
7-8	15 (20.2)	2 (2.7)	19 (25.6)	1 (1.3)	20 (27)	2 (2.7)	2 (2.7)	7 (9.4)	13 (17.5)
8-9	14 (19.4)	3 (4.2)	26 (36.1)	2 (2.7)	20 (27.7)	1 (1.4)	2 (2.8)	3 (4.1)	9 (12.5)
9-10	38 (42)	6 (6.7)	28 (31.1)	4 (4.4)	34 (37.7)	8 (8.9)	0 (0)	8 (8.9)	6 (6.7)
10-11	20 (21.5)	2 (2.1)	8 (8.6)	0 (0)	23 (24.7)	3 (3.2)	0 (0)	4 (4.3)	9 (9.7)
11-12	15 (17)	3 (3.4)	5 (5.7)	1 (1.1)	9 (10.2)	1 (1.1)	0 (0)	8 (9)	1 (1.1)
Total (%)	123 (25.4)	19 (3.9)	100 (20.7)	10 (2.1)	137 (28.3)	19 (3.9)	7 (1.4)	34 (7)	57 (11.8)

conjunctival xerosis.[15] In a study at rural north Mahrashtra by Jayant D and Malathi, 25.58% Vitamin A deficiency was reported.[16]

The prevalence pattern of dental caries varies with age, sex, socio economic status, race, geographical location, food habits and oral hygiene practices. In our study teeth changes were noted in the form of dental caries in 137 (28.3%) who included 71 boys and 66 girls and enamel mottling in 19 (3.9%) who included 8 boys and 11 girls. Dental caries was most commonly seen in the age group 6-7 years (46.2%) and enamel mottling in the age group 9-10 years (8.9%). Saravanan S et al. from Pondicherry reported a prevalence of dental caries of 44.4% in 5 years age group and 22.3% in 12 years age group.[17]

Skeletal changes were noted in 7 (1.4%) children who included 4 boys and 3 girls and seen more in 6-7 years age group. There is a high prevalence of subclinical and biochemical hypovitaminosis D in apparently healthy school children in India. Raman et studied the vitamin D and bone mineral density status of healthy school children of north India and Clinical evidence of vitamin D deficiency was noted in 10.8% of the children.[18]

Only a healthy body can harbor a healthy mind. Malnutrition accounts for the majority among the various problems faced by the school going children. It should be efficiently and timely assessed and corrective measures should be employed accordingly. Despite the fact that several national nutrition programmes are in operation, especially for the benefit of children, the prevalence of micronutrient deficiencies, particularly among rural children, continues to be of public health concern. There are certain limitations for this study. Nutritional status of the children depends on the education, occupation and socioeconomic status of the parents which was not assessed in this study as parental interview is required. Detailed diet history of the children from the time of birth also helps in establishing the cause for particular nutrient deficiencies as well as laboratory testing for the confirmation of certain nutritional deficiencies were not done.

CONCLUSION

The present study reveals that, the rural school going children of Mandya district are suffering from different grades of malnutrition. Mothers of these children should be educated about the importance of balanced diet. Consumption of foods like cereals, pulses, green leafy vegetables, roots and tubers, sugar and jaggery, fats and oil, milk and milk products, fruits etc., should be promoted. Government should introduce awareness programs through community participation, involvement of NGOs and other sectors regarding affordable but nutritious foods.

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