

Research Paper :

Extent of malnutrition and daily mean iron and calcium intake of children in three zones of rural Haryana

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ABSTRACT

The present investigation was conducted on the sample of 450 pre-school children in rural Haryana. Haryana State has been divided into three different agro- climatic zones namely, hot and dry, hot and semi-dry and hot and humid. A multi-staged random sampling techniques was adopted for collection of data. Data were collected with the help of self-prepared interview schedule by paying repeated visit to the study area. Mother of the children were the main respondents for gathering the information for the selected children. Frequency and percentage were calculated to find out the extent of malnutrition and daily mean iron and calcium intake of children in three zones of rural Haryana. The study reported the dietary intake analysis had highlighted low iron intake irrespective of age and sex of the children, whereas, adequacy ratio of calcium was maintained irrespective of the age and sex of the children.

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Malnutrition can be simply defined as a precipitated stage of disproportion between the demands of the body for a certain nutrient and its intake. Malnutrition is an inclusive term that involves the lack, imbalance or excess of one or more of some 50 or so nutrients that are required by the body. In the United States and throughout the world, poverty or ignorance is leading cause of malnutrition. Lack of available food is a principal cause of malnutrition in the underdeveloped and developed countries of the world but not in North America, Europe and Oceania (Tabassum Ara, 2005). India contributes its 50 per cent of the child population towards under nourishment. Further, due to under nourishment, the development of 188 million children in the villages of India remains stunted from the moment of their birth (Budhiraja, 1999). Among the states, Bihar and Kerala had the highest and lowest prevalence of malnutrition, respectively. Even in Kerala, which had the lowest prevalence, 27 per cent of children below age four were stunted, 28 per cent of children were under weight and 12 per cent were wasted (Mishra *et al.*, 1999). In pre-school children, prevalence of under- nutrition was considerably more for girls than boys (Verma *et al.*, 1980). Malnutrition during critical phases of early growth can lead not only to the stunting of physical growth, but also to sub-optimal intellectual development and poor- neuro-integrative competence in children. Apart from protein malnutrition, vitamin A deficiency and iodine deficiency are also major nutritional problems. Most of the anthropometric measurement of the children were below the reference standards. The

weights of the children were highly correlated with their energy and protein intake (Bains and Mann, 1991). The analysis also revealed that the mean nutrient intake of proteins, carbohydrates, fat calories, vitamin C, calcium and iron was higher in case of children from nuclear families than their joint family counterparts (Srivastava *et al.*, 1992). Diet consumed by a large majority of pre-school children was based mainly on cereals and which contain only small amounts of milk and flesh foods diets were deficient in calories, proteins and several essential vitamins and minerals. Incidence of protein- caloric malnutrition and vitamin A deficiency disease particularly high among this age group. Mean daily food intake of cereals, pulses, green leafy vegetables, other vegetables, roots and tubers, milk products, fats and oils, sugar and jiggery and fruits was found lower than their respective recommended dietary intake (RDI) in summer season whereas in winter season, mean daily food intake of milk and milk products provided more than RDI in the diet of pre-schoolers (Jood *et al.*, 2000). Dietary intake pattern of children revealed that food was deficient in energy as compared to RDA for Indians in particulars which ultimately resulted in nutritional deficiency disorders.

METHODOLOGY

The sample for the study comprised of 450 children in the age group of 1-6 years of age representing the three agro-climatic zones, namely, hot and dry, hot and semi-dry and hot and humid of rural Haryana (150 subjects were selected randomly from each identified zone of

Haryana). The realization of the objective was done by adopting multiple methods and multistage sampling technique : Anthropometry : Dietary Enquiry and Survey Methods. Data were collected with the help of self-prepared interview schedule by paying repeated visit to the study area. Mother of the children were the main respondents for gathering the information for the selected children. Frequency and percentage were calculated to find out the extent of malnutrition and daily mean iron and calcium intake of children in three zones of rural Haryana.

FINDINGS AND DISCUSSION

The findings obtained from the present study are presented in Table 1 and 2.

Iron:

The mean intake of iron was considerably low in both the age groups (1-3 and 4-6 years) when compared to the recommended norms. The intake of iron was reported to be 44.66 and 46.66 per cent of the recommended standards in males in age group of 1-3 and 4-6 years, respectively (Table 1). Similar trend had been observed amongst females, as the low iron intake of the recommended norms was reported from both the age groups (1-3 and 4-6 years) the percentage being 39.15 and 47.77, respectively. Further analysis had shown the sex disparity as iron intake was low amongst females than the males in general (in both the age groups) and it was further raised amongst females in higher age group than the recommended norms and percentage being raised from 39.15 to 47.77 amongst females. This low intake of iron among children may be due to lack of green leafy

vegetables in their diets and lack of awareness about the importance of iron in their body well as of its source. The zone wise data depicted a remarkable trend regarding daily mean intake of iron by the children. They were found consuming lower iron intake than RDA in all three zones. A similar trend revealing increase of iron deficiency with the advancement of age had been found in Zone I and Zone III which was observed in the above interpretation of the finding in general but variations were found in Zone II only in case of male children who reported an opposite trend in iron- intake the percentage being 49.15 and 45.55, respectively (Table 1).

Further interpretation to this regard had revealed that all children were found consuming inadequate amount of iron in all zones as compared to RDA. This could be due to variation in dietary practices being practiced specially with regard to green leafy vegetables.

Calcium:

The overall trend depicted in calcium intake of the children was different than the all above nutrient intake (Table 2). As the data presented in Table however, depicted the lower calcium intake than the recommended norms in age group of 1-3 years in male (98.25%) but was just minimal.

With regard to the zonal interpretation of the data, the female children were given lower calcium in Zone 1 in both the age groups 1-3 and 4-6 years the percentage being 74.75 and 81.82, respectively, and 75.32 in the lower age group of the males (1-3 years). The lower intake of calcium (76.25%) was observed in female in the higher age group (4-6 years) amongst Zone II. Mean daily intake of calcium was higher than RDA in Zone III. Perusal of

Table 1 : Daily mean iron intake of children in three zones of rural Haryana (N = 450)

Zone	Age group (years)	Sex	Number of observations (n)	Standard (ICMR, 1998)	Iron (mg/d) intake	Nutritional adequacy ratio (NAR)
Zone-I	1-3	M	56	12	4	37.50
	4-6		29	18	9	57.33
	1-3	F	44	12	5	42.50
	4-6		21	18	10	58.33
Zone-II	1-3	M	47	12	5	49.15
	4-6		52	18	8	45.55
	1-3	F	46	12	4	39.15
	4-6		5	18	8	47.77
Zone-III	1-3	M	57	12	6	44.66
	4-6		38	18	8	46.66
	1-3	F	36	12	6	44.66
	4-6		19	18	9	47.77

Table 2 : Daily mean calcium intake of children in three zones of rural Haryana (N = 450)

Zone	Age group (years)	Sex	Number of observations (n)	Standard (ICMR, 1998)	Iron (mg/d) intake	Nutritional adequacy ratio (NAR)
Zone -I	1-3	M	56	400	301	75.32
	4-6		29	400	416	104.05
	1-3	F	44	400	299	74.75
	4-6		21	400	327	81.82
Zone-II	1-3	M	47	400	441	110.30
	4-6		52	400	515	101.20
	1-3	F	46	400	434	103.50
	4-6		5	400	305	76.25
Zone-III	1-3	M	57	400	444	111.10
	4-6		38	400	535	133.80
	1-3	F	36	400	540	135.20
	4-6		19	400	498	124.60

data indicate that intake of calcium was more among children of Zone III because of more consumption of milk than the others (Table 2).

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