FOOD AND NUTRITION INTAKE OF BHIL TRIBE CHILDREN (6-12 YEAR) IN BHILWARA*

BY

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ABSTRACT

The study was conducted in Bhilwara district of Rajasthan state. The sample consisted of 500 Bhil tribe children comprising of 237 boys and 263 girls aged between 4 to 12 year old in Suwana block Bhilwara. In this study, 24 hours dietary recall method was used to assess dietary intakes of children. Mean intake of food groups with Recommended Dietary Intake (RDI) and nutrients intake with Recommended Dietary Allowances (RDA) per day was calculated and compared for Indians. The data revealed that RDI intake of children was substantially inadequate (<50%) in all food groups, whereas intake of sugar was marginally adequate (92%). Intake of protein of respondents was 72.06 % of RDA. The results of the study indicated that there were significant differences with respect to certain food groups (pulses, green leafy vegetables, roots and tubers, milk and milk products, fruits, sugar and egg) and nutrients (protein, calcium, iron) between 4-6 year age group, 7-9 year age group and 10-12 year age group of Bhil tribe children. On the basis of research findings that majority of the children their food and nutrient intake was inadequate as compared to reference values.

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KEYWORDS

Recommended Dietary Allowances (RDA), Recommended Dietary Intake (RDI).

INTRODUCTION

Good nutrition means maintaining a nutritional status that enables us to grow well and enjoy good fitness (WHO, 1988). Children are the wealth of any nation as they constitute one of the important segment of the populations. Good health and good nourishment are important factors in the child's growth and development. United Nations Educational Scientific and Cultural Organization (UNESCO) since 1972, for the purpose of statistics consider 6-11 years as primary school age and 12-17 years as secondary school age. Nutritional status of the population largely depends on the consumption of food in relation to their needs, which in turn is control by the availability of food and purchasing power. The socio-economic conditions like agricultural pattern and occupation profile are different among different tribes and are determined by the eco-system they live in (Varadharajan, 2013). Several studies have display a close relation between the tribal eco-system and their nutritional status. The tribal populations are ‘at risk’ of undernutrition because of household food and nutrition insecurity. The health and nutrition status of children is one of the crucial elements in the assessment of quality of life of the people. Access to healthy diet and optimum nutrition is key to good health. Adequate nutrition is an essential element of individual welfare which is accepted in the development literature. The link between adequate nutrition on the one hand, and health and survival on the other is well established. Following reviews focus its attention on the health consequences of malnutrition among children. Lack of nutritious food, poor hygiene and sanitary practice in the household, poverty, illiteracy among mothers and lack of health care only aggravate the problem. Since in rural India these attributes are wide spread, the process of recovering from poor nutritional status in later life is more difficult for these children. Child nutrition is positively influenced by urbanization, female literacy, access to health care, safe water and sanitation (Osmani and Bhargava, 1998). Almost any ‘summary index’ of the child development indicators would place India at the bottom level of this list (NFHS-3, 2005-06, DLHS-RCH survey, 2002-04). Nutrition is a fundamental pillar of human life, health and development across the entire life span. The fundamental WHO goals of ‘Health for All’ means that people everywhere, throughout their lives, have the opportunity to reach and maintain the highest attainable level of health. This is

impossible to attain in the presence of food insecurity and malnutrition problems. Good health is as essential to nutritional wellbeing, as good nutrition is crucial for maintaining healthy growth and development. Besides nutritional and vitamin deficiencies, rural and urban populace in the country also face lack of access to safe drinking water as well as sanitation facilities. Children 5 are the most valuable asset of a nation; their welfare and health is the edifice of sound and sustained economic development. An insufficient food intake and ignorance about nutrition coupled with low immunity ensure that the most vulnerable experience very fragile health. In this context, the greatest changes can occur only when there is an improvement in children's health and nutrition status. The health, nutrition, education and development opportunities given to a child at this stage to large extent determine his health and wellbeing for the entire life time. However, the preschool children receive low priority in policies and programmes in India in spite of all indicators showing that greater investments are urgently needed (Planning Commission, 2007).

METHODS AND MATERIALS

The study was conducted in Bhilwara district of Rajasthan state. The Scheduled Caste and Scheduled Tribe population in Bhilwara district is 16.9 percent and 9.5 percent whereas the State percentage of Scheduled Caste and Scheduled Tribe population is 17.8 and 13.5 respectively (Census 2011). There are eleven block in Bhilwara district. List of blocks was obtained from the Block Development Officer (B.D.O.). The sample consists of 500 Bhil tribe children comprising of 237 boys and 263 girls aged between 4 to 12 year old in Suwana block Bhilwara. This section dealt with study to food intake and nutrients intake of children. The intake was food and nutrient compared to RDA and RDI given by NIN (2010). Food consumed by Bhil children was calculated using 24 hour recall method for one day.

RESULTS AND DISCUSSION

Food intake by Bhil Tribe Children

Cereals: The mean intake for 4-6 age group, 7-9 age group and 10-12 age group was 107.15 g/day, 172.04 g/day and 223.61 g/ day. The overall mean intake of cereals was 166.1g/day as indicated in Table 1. The cereals intake of children was found lower as compared to RDI but overall percent on children cereal adequate intake was 92.71. Cereals were the main source of

energy in their diet. Among cereals, wheat was consumed daily by 100 percent families, whereas maize was consumed weekly in winter season. The result of present study was found to be statistically no significant difference.

Pulses: Pulses are the good source of protein for muscles in Indian diet. Perusal of Table 4.15 indicates that the mean of pulses intake by 4-6 year age group was 13.13g/day which was very low intake when compared to RDI. For 7-9 year age group it was 24.51g and for 10-12 year, it was 33.62 g/day. Overall inadequacy of children was 46.60 % of RDI which is low.

Green leafy vegetables: Among green leafy vegetables bathua, spinach, radish leaves, meethi leaves and amarnath were consumed by majority of the families on weekly basis. Agarwal (2009) in his study reported that only green leafy vegetables were being consumed in large quantity by a higher proportion of indigenous mass of Jharkhand. Table 1 depicts that the mean intake of green leafy vegetables for 4-6 year age group, 7-9 year age group and 10-12 year age group was 73.21g, 74.52g and 77.27g/day respectively. For 10-12 year age group, mean intake of green leafy vegetable was found half of the RDI. Overall adequacy of children of green leafy vegetable is 75 percent of RDI.

Other vegetables: The intake of other vegetable was mostly jungle veg and easily available due to low purchasing power. The mean intake for 4-6 age group, 7-9 age group and 10-12 age group was 53.2g/day,74.38g/day and 149.58g/day., Which was 67.28 percent of RDI and found not significantly difference in children. Chakma *et al*. (2006) in their study on tribal of Madhya Pradesh and Chhattisgarh reported that, consumption of other vegetables; roots and tubers were also not up to the mark.

Root and tubers: Consumption of Potato, onion and Garlic was high. Children most frequently consume garlic. The mean intake for 4-6 age group, 7-9 age group and 10-12 age group was 75.65 g/day, 80.86 g/day and 80.11g/day. Overall, adequacy was found 79.98 percent of RDI (fig 1).

Fruits: The fruits consumed mostly were banana and guava due to them being cheaper than other fruits. Mostly children consumed banana in Mid-day Meal (MDM) in school - Once in a week distributed by MDM. They were unable to buy fruits for daily consumption. The mean intake for 4-6 age group, 7-9 age group and 10-12 age group was 63.88g/day, 70.11g/day and 78.65g/day and overall adequacy of fruit was 53.16 percent of RDI (fig 1).

Milk and milk products: Children consumed milk that was only provided by MDM in school and curd, buttermilk was consumed at home only. However, most of the children did not consume milk and milk products in study. The mean intake for 4-6 age group, 7-9 age group and 10-12 age group was 148.75ml/day, 159.88 ml/day, and 160.06ml/day. Overall mean intake of milk and milk products was 156.23ml, which was 30.06 percent of RDI hence inadequate intake for children.

Fat and Oil: Consumed oil on daily basis in the form of vegetable and dal for cooking but ghee was consumed only occasionally. This may be attributed to unaffordability of ghee due to its high cost. The mean intake for 4-6 age group, 7-9 age group and 10-12 age group was 15.91g/day, 18.18g/day and 19.87g/day. The overall mean intake of fats by the children was 17.94g. Children fat and oil adequate intake was 60.45 percent of RDI. Statistically not significant.

Sugar: Sugar and jaggery are the two most commonly consumed sweetner by every Indian household. Overall sugar intake of children was 14.74g /day which is 65.43 percent of RDI.

Non vegetarian food: The mean intake for 4-6 age group, 7-9 age group and 10-12 age group was. 43.12g/day, 70.83g/day and 80g/day. The overall mean intake of non-vegetarian foods was 66.5g/day, which was 78.00 percent of RDI. Significance difference between children in non-vegetarian food.

Egg: The overall mean intake of children egg was 59.16g/day, which is 43.28 percent of RDI.

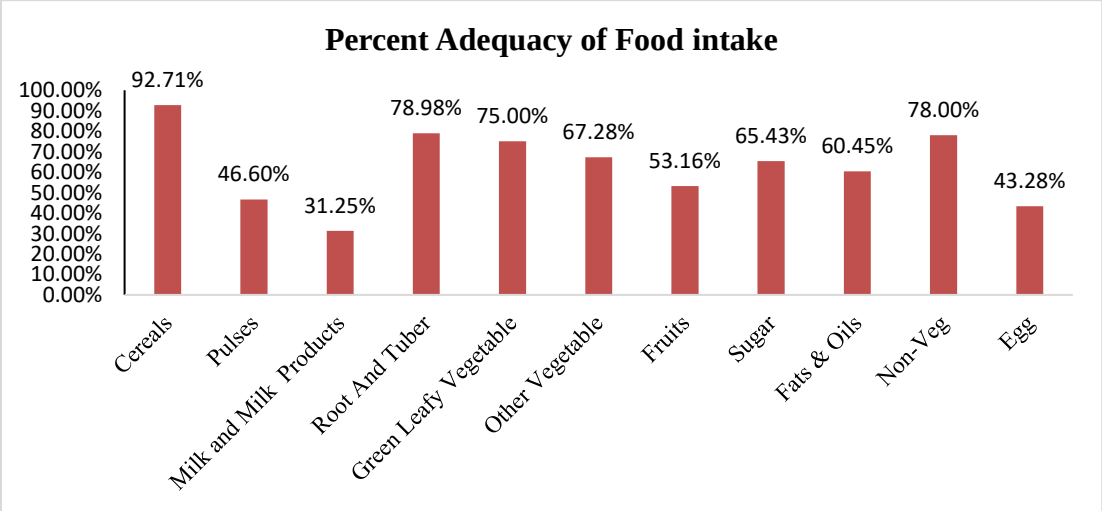

Fig 1: Overall Percentage adequacy (RDI) of food intake of Bhil Children (6-12year)

Table 1: Mean and percent adequacy of food intake of 6-12 year of Children

S. No	Food groups	Age groups	RDI[#] (g)	Mean/SD	% of RDI	F value
1.	Cereals	4-6	**120**	107.15±9.95	89.30	**5.167^{NS}**
		7-9	**180**	172.04±7.8	95.58	
		10-12	**240**	223.61±11.38	93.17	
2.	Pulses	4-6	**30**	13.13±4.4	43.79	**0.441***
		7-9	**60**	24.51±7.1	40.86	
		10-12	**60**	33.62±13.59	50.05	
3.	Milk and milk products	4-6	**500 ml**	148.75±51.98	29.75	**0.058***
		7-9	**500 ml**	159.88±52.99	31.98	
		10-12	**500 ml**	160.06±52.19	32.01	
4.	Other vegetables	4-6	**100**	53.2±20.07	53.20	**4.829^{NS}**
		7-9	**100**	74.38±25.09	74.38	
		10-12	**200**	149.58±50.83	74.79	
5.	Green leafy Vegetables	4-6	**100**	73.21±25.04	73.21	**2.023***
		7-9	**100**	74.52±25.11	74.53	
		10-12	**100**	77.27±25.01	77.27	
6.	Roots and Tubers	4-6	**100**	75.65±25.15	75.66	**4.029***
		7-9	**100**	80.86±24.45	80.86	
		10-12	**100**	80.11±31.74	80.11	
5.	Fruits	4-6	**100**	63.88±22.55	63.89	**7.062***
		7-9	**100**	70.11±24.66	70.11	
		10-12	**100**	78.65±26.88	78.66	
6..	Fats and oil	4-6	**25**	15.91±4.38	63.67	**3.013^{NS}**
		7-9	**30**	18.18±5.08	60.61	
		10-12	**35**	19.87±4.48	56.77	
7.	Sugar	4-6	**20**	14.61±5.01	73.08	**0.049***
		7-9	**20**	14.85±4.03	74.26	
		10-12	**30**	14.72±5.02	49.08	
8.	Non Veg	4-6	**30**	43.12±16.46	86.25	**5.705^{NS}**
		7-9	**100**	70.83±25.74	70.83	
		10-12	**100**	80±25.81	80.00	
9.	Egg	4-6	**30**	50±0	25.00	**0.028***
		7-9	**100**	62.5±25	62.50	
		10-12	**100**	61.5±17.00	61.50	

* Significant at $p<0.05$, NS Non Significant

[#]Recommended Dietary Intake (RDI), (NIN-2010)

Mean nutrient intake of the Children

Mean nutrient intake of 4-6 age group, 7-9age group, and 10-12 age group year of Bhil tribe children was calculated by using Food Composition Tables (Gopalan *et al.* 1989). Mean nutrient intake was compared with recommended dietary allowances (RDA), (NIN-2010). Intake of 4 nutrients which includes protein, energy, calcium, and iron was calculated.

Energy: The energy requirement of an individual is the level of energy intake from food which is necessary for maintenance of economically necessary and socially desirable physical activity. A study done by Varadarajan and Prasad (2009) on tribes of Andhra Pradesh stated that respondents had inadequate calorie intake thus suffering from mild to severe form of malnutrition in the study area. Overall intake of energy was 1236.35kcal. 4-6 age group children intake of energy was 887.18kcal/day. 7-9age group children intake of energy was 1264.17 kcal/day and 10-12 age group children intake of energy was 1584.00kcal/day. Overall adequacy of energy was 71.94 percent of RDA. (fig 2). According to Rao *et al*. (2006) the energy intake among Saharia tribe was below the recommended value.

Protein: Proteins are essential for life as they are the basic constituent of our body and are involved in the structure of living cell and its function. Protein keeps the body healthy by resisting diseases that are common to malnourished people**.** The mean intake for 4-6 age group, 7-9 age group and 10-12 age group was 15.14g/day, 21.42g/day and 27.47g/day. Overall protein intake adequacy of children was 72.06 percent of RDA (fig 2). Prabhakar and Gangadhar (2011) in their study on Jenu kuruba and Yerava tribe stated that the intake of protein by the tribals was in line of respective RDA**.**

According to Bhattacharjee *et al.* (2009) there was least significant difference in the intake of protein in both the panchayat samities.

Calcium: Calcium is the most important divalent cation in the human body, making up to 1.5-2% of its total weight. It performs various structural regulatory functions. Among the five major food group milk and milk products form a major source of calcium in diet and Bhil children mainly consume cow milk and buttermilk which contain very less amount of calcium as compared to calcium content of goat and buffalo milk. The mean value for calcium intake was 4-6 age group children 562.39 mg/day. 7-9 age group of children 595.52mg/day and 10-12 age

group of children 681.15mg/day (Table 2). Overall adequacy of calcium was 54.09 percent of RDI. (fig 2).

Iron: Iron has several vital functions in the body, as a carrier of oxygen to the tissue from lungs, as a transport medium of electrons, with in cells and an integral part of important enzyme reactions in various tissues (Gopalan *et al*. 1989). Perusal of Table 2 clearly depicts that 4-6 age group, 7-9 age group and 10-12 age group iron mean intake was 10.67mg/day, 9.87mg/day and 12.06mg/day. Due to high availability of GLVs during winter season and especially *bathua, palak and cholai* which was available free of cost in abundance in wheat fields. Over all adequacy of iron was 69.90 percent of RDA. (fig 2).

Table 2: Mean and percent adequacy of Nutrient Intake of 6-12 year of Children

S. No.	Nutrients	Age groups	RDA#	Mean/SD	% of RDA	F value
1.	**Energy (kcal/d)**	4-6	1350	887.18±97.31	65.72	**2.263**^{NS}
		7-9	1690	1264.64±113.08	74.83	
		10-12	2100	1584.42±127.51	75.45	
2.	**Protein (g/d)**	4-6	20.1	15.14±2.9	75.34	**3.781***
		7-9	29.5	21.42±4.8	72.61	
		10-12	40.15	27.47±5.7	67.85	
3.	**Calcium (mg/d)**	4-6	600	443.91±178.34	73.99	**9.410***
		7-9	600	471.34±180.50	78.56	
		10-12	800	527.30±166.45	65.91	
4.	**Iron (mg/d)**	4-6	13	11.15±8.7	85.83	**0.045***
		7-9	16	10.84±9.0	67.79	
		10-12	24	13.18±9.5	54.93	

* Significant at $p<0.05$, NS Non Significant
#Recommended Dietary Allowances (RDA), (NIN-2010)

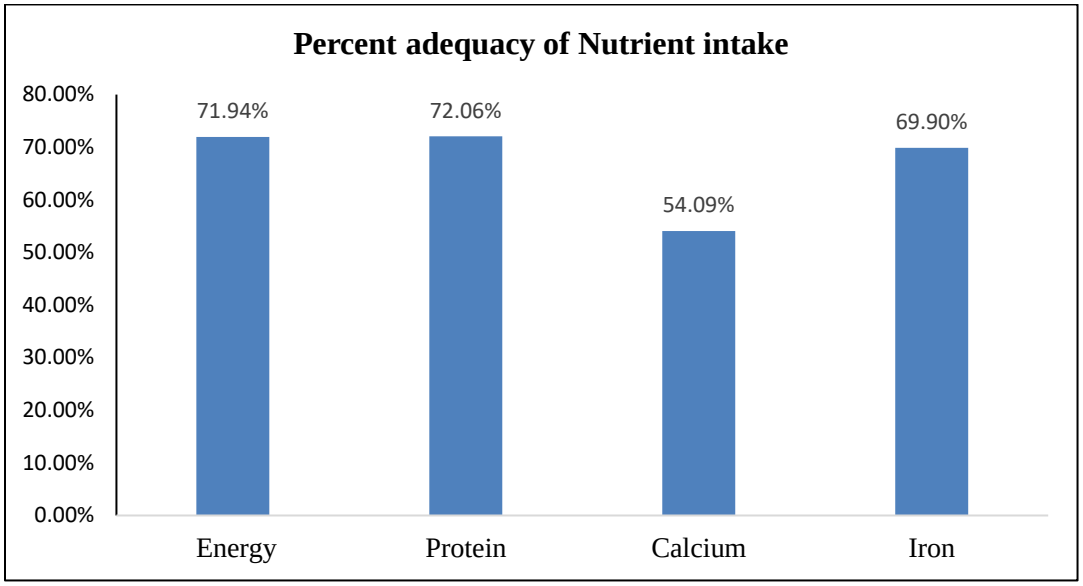

Fig: 2: Percent adequacy of nutrient intake of Children (6-12year)

CONCLUSION

To conclude, there was significant difference in the adequacy of protein, calcium and iron. Overall, mean intake of energy was 1236.19 kcal/day, protein was 21.17g/day, iron was 11.67 mg/day, and calcium was 479.42 mg/day for the sample population. Similarly, there was significant difference in the adequacy of pulses, green leafy vegetables, roots and tubers, milk and milk products, fruits, sugar and egg while there was no significant difference in the adequacy of cereals, other vegetables, fats and oil and non- vegetarian in children in Suwana block.

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