

## Dietary Intake Pattern of Basic Five Food Groups by (4-6 Years) Children of Jorhat, Assam

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### ABSTRACT

**Background:** The present investigation was undertaken to assess the consumption pattern of basic five food groups by children of (4-6 years) of Jorhat, Assam. **Methods:** A total of 200 pre-school children (4-6 years) were selected at random from four schools of Jorhat district of Assam. The qualitative adequacy of the study population was assessed by using a self administered food frequency questionnaire and the quantitative adequacy by the 24 hours dietary recall method and food models by interviewing the mothers of the target children. **Results:** In the present study, the frequency of consumption in terms of basic five food groups by the 4-6 years boys and girls revealed that cereals, pulses, fats and oils and sugar and jaggery were consumed by all the target children daily. The consumption of fruits, other vegetables and meat, fish and poultry was quite frequent in comparison to green leafy vegetables and milk and milk products. There was no daily consumption of green leafy vegetables among the target children. Though milk was included in the daily diet, the consumption of milk and milk products was also quite low as compared to other food groups. While the food intake pattern of the target group was analyzed in terms of balanced diet, the results revealed that the mean daily intake of cereals, fats and oils, sugar and jaggery, pulses, roots and tubers and fruits by the 4-6 years children were (91.58-95.41%), (89-90.8%), (79.25-89.15%), (79.83-83.33%), (79.45-74.45%) and (61.75-62.20%) of the Balanced Diet Recommended (BDR) respectively. The 4-6 years children could meet only (44-47.51%), (42.6-43.5%) and (22.3-23.8%) of the BDR in terms of milk and milk products, other vegetables and green leafy vegetables respectively. **Conclusion:** As evidenced by the results of the present study, inadequate consumption of the green leafy vegetables, other vegetables and dairy food group is becoming a concern because poor intake leads to shortfalls in the consumption of key vitamins and minerals and may affect growth and development.

**Keywords:** Jaggery, Pre-schoolers, Pulses, Vegetables, Balanced Diet Recommended (BDR)

### INTRODUCTION

Pre-schoolers have very special nutritional needs because of their continuous growth and development, which is dependent on the adequacy of diet consumed [1]. Moreover, pre-schoolers succumb readily to malnutrition particularly when their diets are inadequate both in terms of quantity and quality, therefore, they need to be given special attention from the nutritional point of view. Adequate nutrition in terms of balanced diet, during this age is of paramount importance to have a substantial and persistent impact on their physical and mental development and also on the health status and productivity as adults [2]. A balanced diet can be rightly defined as one which contains different types of foods in such amounts and proportions that the requirements for energy, proteins, vitamins, minerals and other nutrients is adequately met, in order to help in proper functioning and development of the body [3]. A balanced diet, both in terms of quality and quantity can be obtained through a judicious choice and combination of

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variety of foodstuffs from different food groups system used in different countries. In India, five food group systems are followed while formulating dietary guidelines in general and balanced diet requirements for preschool children in particular. The five food group is a system of food grouping where food items are grouped together depending upon the content of major nutrients present in them [4]. The five food groups include: cereals grains and products, pulses and legumes, milk and milk products, fruits and vegetables, fats and sugars. The proper blending of variety of foods from the basic five food groups in the daily diet of the pre-schoolers will furnish all the essential macro and micro nutrients in balanced amount required for their growth, body building, development of bones, protection from infections and diseases. Adequate nutrition in terms of balanced diet, provided to the children from their early years of their life will lead to proper growth and development and eventually help the pre-schoolers to overcome the maladies of malnutrition and develop potentials for future adulthood. Therefore, the basic five food group consumption shall ensure a balanced diet in terms of food quality and quantity and thus fulfill the nutritional adequacy of the children from their early years of growth and development. Moreover, most of the nutritional studies carried out in Jorhat town of Assam, have been found on anthropometry, dietary intake in quantitative terms and nutritional deficiencies in preschoolers, adolescents, pregnant and lactating mothers but least attention has been paid to the consumption pattern of five food groups by 4-6 years children both in terms of quality and quantity. Hence, the present investigation was aimed at assessing the consumption pattern of basic five food groups of children (4-6 years) of Jorhat, Assam.

#### **METHODS AND MATERIALS**

A total of 200 pre-school children (4-6 years) were selected at random from four schools of Jorhat district of Assam. The dietary assessment for the present study was conducted on 15 percent (15% of 200=30) of the total population. Qualitative adequacy of the study population was assessed by using a self administered food frequency questionnaire and the quantitative adequacy by the 24 hours dietary recall method and food models by interviewing the mothers of the target children. The average daily food intake was calculated and was compared with the Balanced Diet Recommended (BDR) and the daily nutrient intakes were computed with the help of ICMR food composition tables [5] and were compared with the Recommended Dietary Allowances (RDA).

## RESULTS AND DISCUSSION

Table 1: Frequency of consumption of basic five food groups by 4-6 years children (n=200)

Food groups	Food stuffs	Daily				Weekly				Monthly				Never	Occasionally
		Thrice	Twice	Once	Total	Thrice	Twice	Once	Total	Thrice	Twice	Once	Total		
Group I	Cereals	100			100										
Group II	Pulses	16	84		100										
Group III	Milk & milk product		10.5	13	23.5	12	17.5		29.5					17	30
	Meat, fish & poultry		13.5	32.5	46	30.5	20	3.5	54						
Group IV	Fruits		13	11	24	13.5	14	18.5	46	4.5			4.5	20	5.5
	Green leafy vegetables					8.5	12.5	13.5	34.5					38.5	27
	Other vegetables	18	22.5	33	73.5										26.5
Group V	Fats & oils	100			100										
	Sugar & jaggery	48	34.5	17.5	100										

Table 1 revealed that percentage of the 4-6 years boys and girls consumed cereals thrice daily. The 84% of the target children consumed pulses and legumes twice daily while 16% consumed thrice daily. In the present study the frequency of milk and milk products consumption by 4-6 years boys and girls revealed that daily milk and milk products were consumed by 23.5% of the 4-6 years children of which 10.5% consumed twice daily and 13% consumed once daily. On weekly basis, 29.5% of the target children consumed milk and milk products which consisted of 12% thrice daily and 17.5% twice daily. It is noteworthy to mention that 17% of the 4-6 years boys and girls never consumed milk and milk products while 30% of them occasionally consumed milk and milk products. While assessing the frequency of consumption of meat, fish, poultry and egg by 4-6 year children, it was found that 46% of them consumed meat, fish, poultry and egg daily which comprised of 13.5% twice daily and 32.5% once daily. 54% of the target children consumed meat, fish and poultry and egg weekly where 30.5, 20 and 3.5% consumed thrice, twice and once a week, respectively. 24% of the 4-6 years boys and girls consumed fruits daily which comprised of 13% twice daily and 11% once daily. 46% of the target children consumed fruits weekly where 13.5, 14 and 18.5% of them consumed fruits thrice, twice and once a week respectively. Green leafy vegetables were consumed by 34.5% of the 4-6 years boys and girls weekly which comprised of 8.5, 12.5 and 13.5% thrice, twice and once a week respectively. A striking feature is that 38.5% of the target children never consumed green leafy vegetables while 27% of them occasionally consumed green leafy vegetables. The frequency of consumption of other vegetables by 4-6 years boys and girls revealed that 73.5% of them consumed other vegetables on a daily basis which included 18, 22.5 and 33% of the target children thrice, twice and once a week respectively. 26.5% of the 4-6 years boys and girls occasionally consumed other vegetables. It was found that percentage of the target children consumed fats and oils thrice daily. Percentage of the target children consumed sugar and jaggery daily which included 48, 34.5 and 17.5 of the 4-6 years children thrice, twice and once a week respectively.

It has been observed that, cereals mainly comprises rice and its products like rice flakes, puffed rice and wheat products like atta, maida, bread and extruded products like noodles. The children may not be consuming all the cereals as a part of their daily diet; however, rice being the staple food was consumed daily by percentage. Majority (81%) of the target children consumed pulses twice daily and 19% of them consumed pulses thrice daily. The most commonly consumed pulses and legumes include lentil, red gram dhal, soya bean and dry peas. The consumption of milk and milk products among the 4-6 year children was not found to be frequent. This may be due to the fact that food likes and dislikes or food preferences play a significant role. Some of the children dislike milk and milk products and they did not consume milk and milk products [6] reported that 26.33% of the 4-9 years children of Ram Nagar town of Varanasi district prohibited milk and butter. Another reason may be due to inadequate availability of good quality milk and cost of the commodity particularly in this part of the state of Assam. The findings of the present study is concurrent with the results reported by [7] that the consumption of milk and dairy products were insufficient among under five children of Aracaju, Northeast Brazil, in Sergipe, due to association of family eating habits, that affect the eating habit of the children. The consumption pattern of meat, fish, poultry and egg among the 4-6 years children revealed that 47% of them consumed the meat group daily. Egg was the most preferred item among the target children. The frequency of consumption of fruits among the 4-6 years children was not frequent. Infrequent consumption of fruits was due to lack of availability since it was not home-grown produce and price of the commodity as mostly the fruits were made available from the market. While it was observed children who never took fruits, the reason behind was ascertained as they did not like to eat fruits. The findings of the present study is concurrent with the results reported by [7] that the consumption of fruits was insufficient among under five children of Aracaju, Northeast Brazil, in Sergipe, which was due to low level of parental education and the per capita family income [8] in a study conducted among 7-10

years school going children of Allahabad district, India, reported that the consumption of fruits among the children was not frequent. The consumption of green leafy vegetables among the 4-6 years children revealed that none of them consumed green leafy vegetables daily. This may be due to the reason that the target children did not like the taste of the green leafy vegetables and they refused to take it. Another reason may be the mothers were not aware about the importance of green leafy vegetables in the daily diet. Similar results were reported by [9] in a study conducted among 4-5 years Indian rural preschool children in Fatehabad district of Haryana, where the consumption of green leafy vegetables among the preschoolers was low and depends on availability only. In terms of frequency of consumption of other vegetables it was found that other vegetables were frequently consumed by the target children. The mostly consumed vegetables among the 4-6 years children were potato followed by pumpkin, tomato, lady's finger and Brinjal. While assessing the frequency of fat consumption by 4-6 years children, it was found that percentage of the girls consumed fats and oils thrice daily. Fats mainly include cooking oil. In addition to cooking oil they consumed fats in the form of butter with bread, ghee smeared in chapatti, semolina and vermicelli, and also fried and junk foods. The present study revealed that percentage of the target children consumed sugar and sugar products daily. The most common ways of including sugar in the diet of the target children include milk, tea or health drinks with sugar, biscuits, sweets, jam and jelly, candies, chocolates.

**Table 2: Mean daily food intake of 4-6 years boys and girls (n=200)**

Food Groups	Food stuffs (g)	BDR (g/day)	Mean food intake per day (g)			
			Boys (n=100)		Girls (n=100)	
			Mean $\pm$ S.D	% adequacy of BDR	Mean $\pm$ S.D	% adequacy of BDR
<b>Group I</b>	Cereals	120	114.5 $\pm$ 5.45	95.41	109.65 $\pm$ 6.09	91.58
<b>Group II</b>	Pulses	30	25 $\pm$ 5.92	83.33	23.95 $\pm$ 5.89	79.83
<b>Group III</b>	Milk & milk products	500	237.55 $\pm$ 205.83	47.51	220.25 $\pm$ 219.33	44
	Meat, fish, poultry	50	40 $\pm$ 9.28	80	40 $\pm$ 9.21	80
<b>Group IV</b>	Fruits	100	62.6 $\pm$ 19.02	62.60	61.75 $\pm$ 13.76	61.75
	Green leafy vegetables	50	11.9 $\pm$ 16.36	23.80	11.15 $\pm$ 12.92	22.30
	Other vegetables	50	20.75 $\pm$ 10.87	43.50	20.1 $\pm$ 13.72	42.60
	Roots and tubers	100	79.45 $\pm$ 10.23	79.45	74.45 $\pm$ 12.80	74.45
<b>Group V</b>	Fats and oils	25	22.7 $\pm$ 7.14	90.80	22.25 $\pm$ 5.20	89
	Sugar and jaggery	20	15.85 $\pm$ 2.35	79.25	17.83 $\pm$ 2.97	89.15

n = number of samples

BDR = Balanced Diet Recommended (Dietary Guidelines for Indians, NIN, ICMR, 2010)

From the Table 2, it has been observed that mean daily cereal intake of boys was 114.5g and girls were 109.9g. When the cereal consumption was compared with BDR, it was observed that the boys fulfilled 95.41per cent and girls fulfilled 91.5% of food adequacy. While evaluating the daily intake of pulses, it was found that the mean intake was 25g and 23.95g respectively and fulfilled an adequacy of 83.33 and 79.83% of the BDR by boys and girls respectively. The average daily consumption of milk and milk products by boys and girls was 237.55g and 220.25g respectively which reflect that the intake was below the BDR. The percentage adequacy of milk and milk products intake among boys and girls was 47.51% and 44% of the BDR respectively. While evaluating the daily intake of meat, fish and poultry, it was found that the mean intake by both boys and girls was 40g which was below the BDR. However, the boys and girls had fulfilled an adequacy of 80% of the RDA respectively. The mean daily intake of fruits was 62.60g and 61.75g respectively and the adequacy of fruit intake was 62.60 and 61.75% of the BDR by the boys and girls respectively. The average daily consumption of green leafy vegetables was 11.90g and 11.15g by boys and girls, respectively which was alarmingly below the BDR. The percentages adequacy of green leafy vegetables among boys and girls was 23.80 and 22.30% of the BDR respectively. While investigating the daily intake of other vegetables, it was observed that the mean intake was 20.75g and 20.10g per day respectively by boys and girls, where the adequacy of BDR was only 43.50% among boys and 42.60% among girls. The mean daily intake of roots and tubers by boys and girls was 79.45 g and 74.45g and it was 79.45 and 74.45% adequate of the BDR respectively. The average daily consumption of fats and oils by boys and girls was 22.70g and 22.25g respectively with percentage adequacy of 90.8% and 89% of the BDR respectively. While investigating the daily intake of sugar and jaggery, it was observed that the mean intake was 15.85g and 17.83g per day respectively by boys and girls, where the adequacy of BDR was only 79.25% among boys and 89.15% among girls.

Thus, it has been observed that the mean daily intake of cereals, pulses, roots and tubers, meat, fish, poultry and egg, fruits, fats and oils and sugar and jaggery by the 4-6 years children was quite adequate of the BDR. While the mean daily consumption of milk and milk products and other vegetables by the 4-6 years children was less than 50% of the BDR. Inadequate intake of milk and milk products among the boys and girls may be due to the reason that they did not like to eat milk and milk products. Another reason may be due to lack of good quality milk. Moreover, ignorance on the part of the mothers regarding the importance of milk and milk products in the daily diet of the children is another contributory factor. Similar results were reported by [10] that the percentage adequacy of milk and milk products intake among 4-6 years pre-school boys and girls of Sonapat district of Haryana was 49.2% and 49.4% respectively of the BDR [11] found that the% adequacy of milk and milk products intake among 1-3 years and 3-4 years children of Ludhiana city was 24% and 20% of the BDR respectively, which was perhaps due to poor purchasing power and the ignorance of the nutritional value of foods was widespread combined with different food fads and fallacies. Inadequate intake of other vegetables among the target children may be due to the reason that they do not prefer to eat other vegetables unless of their own choice. Similar results were reported by [10] where the intake of other vegetables among the 2-4 year boys and girls of Sonetpat district of Haryana was 43.9 and 35.8% of the BDR respectively. The average daily consumption of green leafy vegetables by the target children was alarmingly below the BDR. Less consumption of green leafy vegetables might be due to the reason that children did not like the taste of the green leafy vegetables. Moreover, the mothers were not aware about the importance of green leafy vegetables in the daily diet. The results of the present study is in line with the results reported by [10] that the percentages adequacy of green leafy vegetable intake among 4-6 years pre-school boys and girls of Sonapat district of Haryana was 22.8% and 24.8% respectively of the BDR, which was due to the reason that children did not like the taste of the green leafy vegetables.

## SUMMARY AND CONCLUSION

The present study was conducted on 4-6 years children drawn from 4 schools of Jorhat town, to assess their consumption pattern of basic five food groups both in terms of quality and quantity. The frequency of consumption of basic five food groups by 4-6 years children revealed that cereals, pulses, fats and oils and sugar and jaggery were consumed by all the target children daily. The consumption of fruits, other vegetables and meat, fish and poultry was quite frequent in comparison to green leafy vegetables and milk and milk products. Green leafy vegetables were consumed by the 4-6 years children on weekly basis. There was no daily consumption of green leafy vegetables among the target children. Though milk was included in the daily diet, the consumption of milk and milk products among the target children was also quite low as compared to other food groups. While the food intake pattern of the target group was analyzed in terms of balanced diet, the results revealed that the mean daily intake of cereals, fats and oils, sugar and jaggery, pulses, roots and tubers and fruits by the 4-6 years children were (91.58-95.41%), (89-90.8%), (79.25-89.15%), (79.83-83.33%), (79.45-74.45%) and (61.75-62.20%) of the Balanced Diet Recommended (BDR) respectively. The 4-6 years children could meet only (44-47.51%), (42.6-43.5%) and (22.3-23.8%) of the BDR in terms of milk and milk products, other vegetables and green leafy vegetables respectively. As evidenced by the results of the present study, inadequate consumption of the green leafy vegetables, other vegetables and dairy food group is becoming a concern because poor intake leads to shortfalls in the consumption of key vitamins and minerals and may affect growth and development.

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