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## Assessment of ready to eat cereal snacks consumption pattern of school children

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### Abstract

A study was carried out to assess ready to eat cereal snacks consumption pattern of school children of Dharwad. Total of 160 school children in the age group of 11-14 years comprising 80 children each from both rural and urban locality were selected during 2015-18. Ready to eat cereal snacks consumption pattern was assessed by personal interview method using structured schedule. Results indicated that among the total of 160 children, more than 50 per cent of children were boys (52.50 %) and remaining 47.50 per cent were girls. The consumption of snacks by urban and rural children was 85 and 90 per cent respectively. More than 40 per cent of children from rural (43.06 %) and urban (48.53 %) liked to consume both savory and sweet snacks. Papadi was liked by majority of rural and urban children (76.47 and 69.41 %, respectively) followed by milk pedha, ghate (66.67 %, respectively) in rural and milk pedha and rasgulla (63.24 and 64.71 %, respectively) in urban. Total of twelve snacks were recorded as most liked snacks by children, among them 40 per cent of snacks were purchased one to two piece or packet per visit to the shop, remaining were purchased one piece per visit (60%). Among the daily consumed snacks were *benne* biscuits (80.71 %) followed by chakli (32.14 %) and papadi (21.43 %). Maximum per cent of children consumed snacks during school leisure time (92.14 %) followed by when relatives give amount (85.71 %) and while going to school (61.43 %). All the children consumed snacks due to the taste and more than 90 per cent of children consumed snacks as they like eating again and again (97.22 and 97.06 %, respectively), because of color (95.83 and 95.59 %, respectively) and to use the amount given by parents or relatives. Children looked for the quantity (97.86 %), price (97.14 %), color (94.29 %) and taste (91.43 %) while purchasing snacks. The study concludes that, along with esthetic quality, well-portioned nutri-snacks between meals can help children to develop healthy eating habits and to maintain good health.

**Keywords:** Ready to eat, snacks, school children

### Introduction

The school age period is nutritionally significant because this is the prime time to build up body stores of nutrients in preparation for rapid growth of adolescence. School age is the active and dynamic phase of physical growth as well as mental development of the child. Micronutrient deficiencies in children is a global health problem affecting nearly two billion people from the deficiencies such as iron, iodine, zinc and vitamin A. Micronutrient deficiencies impair cognitive development and lower resistance to disease in children and adults. According to National Family Health Survey (NFHS) about 45.5 per cent of children are malnourished in India (Nair, 2007) [7]. The school children population, approximately one fifth of the total population, forms the future hope of the nation. Health of the children is the wealth of the Nation. After India became independent in 1947, several steps were taken for the improvement of health status and well-being of the children. But malnutrition continues to be a major problem in India and at present, 46 per cent of India's children under the age of three are in underweight. India has the highest percentages of undernourished children in the world (NFHS, 2005-2006) [8]. Creating a healthy snack consumption pattern can help to provide children nutritious food throughout the day. As children do not always eat enough meal, providing one to two snacks per day can help them get the missed nutrients.

The usual perception on snacking is that snack foods are high in fat and sugar and hence harmful and not conducive for healthy eating. The concepts of "snacking" and "snack" are widely agreed upon; however, they are not uniquely defined. In general, snacking can be defined as food or drink eaten between main meals and also based on the time criterion. School children tend to select snacks based on taste over nutrition, and they more often choose salty and crunchy foods as snacks over healthier alternatives. Snacking may also be associated with less frequent consumption of meals,

which may be detrimental to health since regular meal patterns are associated with greater dietary diversity, healthier food choices and better nutrient intakes.

Globalization, liberalization, mall culture and urbanization has brought about radical changes in the snacking pattern of the people across the nation, resulting into the escalating intake of processed and fast food. Further, commercial snacks are attracted by children for color and taste with addition of additives (Dixit *et al.*, 2010; Hussain *et al.*, 2008)<sup>[4, 5]</sup>. The health is being compromised at the cost of replacing nutritious balanced diets with High Fat, Sugar and Salt (HFSS) foods (Anon, 2015; Lythgoe *et al.*, 2013)<sup>[2, 6]</sup>. Well-portioned snacks between meals can help children make a habit of grazing throughout the day, and encouraging nutritious snacks will allow them to develop healthy eating habits and to maintain good health. Hence, the study has been conducted to assess the ready to eat cereal snack consumption pattern of school children.

### Material and Methods

**Selection of samples:** Total of 160 school children were selected in the age group of 11-14 years comprising 80 children each from both rural and urban locality. Children from different government schools, four schools each from both rural (Narendra, Yattingudda, Mummigatti, Mugad) and urban (Gandhinagar, Shivaji circle, Navalur, Navanagar) areas of Hubli and Dharwad taluk were selected to assess the ready to eat cereal snacks consumption pattern.

**Development of questionnaire:** Questionnaire was developed for assessment of ready to eat cereal snacks consumption pattern for school children, in consultation with nutrition experts and available literature. The questionnaire consisted of two parts, general and specific information. General information included the demographic profile, while specific part consisted of questions on information about the child, consumption and non consumption of snacks; frequency of consumption of snacks, purchasing behavior of snacks, reasons for con purchase of snacks by the children and the attributes looked for while purchasing the cereal snacks. The developed questionnaire was pretested in a non sample area and was suitably modified. Frequencies and percentages were used to interpret the data.

### Results and Discussion

Demographic profile of school age children is presented in table 1. Among the total of 160 children, more than 50 per cent of children were boys (52.50 %) and remaining 47.50 per cent were girls. Irrespective of locality higher per cent of children were vegetarians (48.13 %) followed by non vegetarian (26.25 %) and eggetarian (25.63 %). More than 40 per cent of children were living in the joint family (41.88 %) and nearly equal distributions of children were found in the small (34.38 %), medium (33.13 %) and large (32.50 %) families. Among the children higher per cent of rural children than urban were boys (57.50 and 47.50 %), vegetarian (52.50 and 43.75 %) and family income of 10, 000 to 30,000 rupees (40.0 and 46.25%). Whereas higher per cent of urban children than rural children were lived in nuclear families (56.25 and 27.50 %) and with the smaller family size of family (50 and 18.75 %) whereas, higher per cent of rural than urban children were lived in large families (47.5 and 17.5 %) and had the annual family income of rupees less than 10,000 (47.5 and 17.5 %).

The consumption of snacks by urban and rural school children was 85 and 90 per cent respectively (Table 2). More than 40 per cent of children from rural (43.06 %) and urban (48.53 %) liked to consume both savory and sweet snacks. More than 50 per cent of snacks consumed were un branded (57.14%). Among the urban and rural children papadi was liked by majority of children (76.47 and 69.41 %, respectively) followed by milk pedha, ghathe (66.67 %, respectively) in rural and milk pedha and rasgulla (63.24 and 64.71 %, respectively) in urban (Table 3). Similar results were reported by Hang *et al.* (2007) snacks availability of Taiwan elementary school children (N=722) of 4<sup>th</sup> to 6<sup>th</sup> grade children from 2001-2002. More than 90 per cent of the snacks (94.4 %) like high fat/sugar snacks, cookies, carbonated sugared beverages were available on the way to school and 47.8 per cent snacks were sold in school stores. The results of the study are in line with the study reported by Dhurv *et al.* (2011)<sup>[3]</sup> cross sectional study on snacking pattern of the urban population of Vadodara city (India) and found that the major snacking sources were shallow fried snacks (68.3%), bakery products (51.7%) and deep fried snacks (45%). A Cross sectional study on snack pattern of 245 children from eight elementary schools of Gonbad city Iran, conducted by Abedi *et al.* (2017)<sup>[1]</sup> reported the consumption of snacks by children was 97.7 per cent. Biscuits, cakes and cookies were the most frequently consumed snacks (49 %).

Frequency of consumption of snacks was from daily to more than three times in a week. It also observed that the cost of majority of commercial snacks available was related to the amount spent on purchase of snacks by rural (64 %) and urban (42 %) school children (Table 2 and 3). This indicates that, the market industry of snacks mainly fulfilling the requirement of children. Even children were getting pocket money to spend for purchase of snacks (Table 2). Snacking habit seemed to be largely influenced by the cost of snacks, their taste and availability, and the amount of pocket money. Similar studies were conducted by Oogarah (2005)<sup>[10]</sup> who reported that, factors influence purchase of snacks by children's of primary schoolchildren (8-12 year old) and found that, most of the popular snacks were high in sugar, fat, energy or salt. Snacking habit of school children was significantly associated with age and gender ( $p < 0.05$ ). In another study conducted by Park and Lee (2008)<sup>[11]</sup> reasons for snacking of Korean children revealed that, majority of children consumed snacks because of pocket money to purchase snacks and the amount spent on snacks purchase dependent on the amount they get. These results are on par with the results of the present study.

Table 4 shows pattern of snacks consumption. The children of rural and urban were enjoying the consumption of snacks during school leisure time (98.53 and 86.11 %, respectively), while going to school 60.29 and 62.50 %, respectively) and during travelling (45.83 and 60.29%, respectively). The enjoyments of relishing snacks more frequently were to satisfy aesthetic attributes (Table 6) like taste (100 %), color (95.71 %) and munching (95.71 %) and to spend the money received from parents or relatives (93.57 %). Majority of school children purchased snacks based on quantity (97.86 %), price (97.14 %), color (94.29 %) and taste (91.43 %).

Table 5 shows reasons for purchasing snacks by the school children. Irrespective of locality all the children consumed snacks mainly because of taste and more than 90 per cent of children liked to consume snacks mainly because they feel like eating again and again (97.14 %) followed by children

like to use the amount given by parents or relatives (93.57 %), because of color and for munching (95.71 %, each). All the rural and urban children consumed snacks due to the taste and more than 90 per cent of children consumed snacks as they like eating again and again (97.22 and 97.06 %, respectively), because of color (95.83 and 95.59 %, respectively) and to use the amount given by parents or relatives (91.67 and 95.29 %, respectively).

Table 6 depicts product attributes considered by school children for selection of snack items. Irrespective of locality majority of the children looked for the criteria for selection of snacks items reported that, mainly they look for quantity (97.86 %), price (97.14 %), color (94.29 %) and taste (91.43 %). Only 25 and 19.29 per cent per children see the health benefits and they bother for the nutrition respectively. Among the rural children, all of them see the criteria mainly the quantity for selection of snack items. More than 90 per cent of rural children look for price (97.22 %), color (91.67 %) and

taste (90.28) similar result was observed for the urban children 97.01, 97.01 and 92.65 per cent, respectively. Little higher per cent of urban children than rural they look the criteria of health (30.89 and 19.44 %, respectively) and nutrition (23.53 and 15.28 %, respectively) while choosing snack items.

Snacks account for 25% of all meals consumed daily. It is necessary to improve the dietary habits of school children by providing appropriate and wholesome mix of foods and also encourages them to avoid consumption of unhealthy snacks. Color usage has evoked the concern because they are being used in excess of the statutory limit in the children snacks, which cause harmful effect on the health (Dixit *et al.*, 2010; Okafor *et al.*, 2016; Hussain *et al.*, 2008) [4, 9, 5]. Thus, these snacks are generally enriched with empty calorie ingredients like fat and sugar to improve the textural quality of snacks (Anon, 2015) [2].

**Table 1:** Demographic profile of school age children, N=160

Variables	Classification	Urban (n=80)		Rural (n=80)		Total	
		f	%	f	%	f	%
Gender	Boys	38	47.50	46	57.50	84	52.50
	Girls	42	52.50	34	42.50	76	47.50
Food habits	Vegetarian	35	43.75	42	52.50	77	48.13
	Non vegetarian	24	30.00	18	22.50	42	26.25
	Eggetarian	21	26.25	20	25.00	41	25.63
Family type	Joint	30	37.5	43	53.75	73	45.63
	Nuclear	45	56.25	22	27.50	67	41.88
	Extended	5	6.25	15	18.75	20	12.50
Family size	Small (up to 4)	40	50	15	18.75	55	34.38
	Medium (5-7)	26	32.5	27	33.75	53	33.13
	Large(>8)	14	17.5	38	47.5	52	32.50
Annual Family Income (Rs)	<10000	13	16.25	27	33.75	40	25.00
	10000-30000	37	46.25	32	40.00	69	43.13
	30000-60000	11	13.75	15	18.75	26	16.25
	60000-90000	19	23.75	6	7.50	25	15.63

**Table 2:** Snacking pattern and purchasing behavior of school children, N=160

Particulars	Snack pattern	Urban (n=80)		Rural (n=80)		Total	
		f	%	f	%	f	%
Children consume snacks	Yes	68	85.00	72	90.00	140	87.50
	No	12	15	8	10	20	12.50
Kind of snacks consumption	Sweet	16	23.53	19	26.39	35	25.00
	Savory	19	27.94	22	30.56	41	29.29
	Both	33	48.53	31	43.06	64	45.71
Type of snacks eaten	Labeled	15	22.06	12	16.67	27	19.29
	Unlabelled	38	55.88	42	58.33	80	57.14
	Both	15	22.06	18	25.00	33	23.57
Amount spent/day (Rs.)	<5	14	20.59	25	34.72	39	27.86
	5	15	22.06	21	29.17	36	25.71
	5-10	17	25.00	15	20.83	32	22.86
	>10	22	32.35	11	15.28	33	23.57
Sources to get snacks	Shops near school	37	54.41	35	48.61	72	51.43
	Shops near ome	18	26.47	21	29.17	39	27.86
	Grocery shops	9	13.24			16	11.43
	Road side	23	33.82			51	36.43

**Table 3:** Frequency of snacking by school children, N=140

S. No.	Snack items	Quantity purchased/visit	Frequency of snacking/week											
			Daily			Once			Twice			>2 times		
			Urban (n=68)	Rural (n=72)	Total	Urban (n=68)	Rural (n=72)	Total	Urban (n=68)	Rural (n=72)	Total	Urban (n=68)	Rural (n=72)	Total
1.	Papadi (packet)	1 to 2	16(23.53)	14(19.44)	30(21.43)	-	-	-	-	8(11.11)	8(5.71)	52(76.47)	50(69.44)	102(72.8)
2.	Kodbale	1	9(13.24)	11(15.28)	20(14.29)	13(19.12)	8(11.11)	21(15.00)	8(11.76)	11(15.28)	19(13.57)	38(55.88)	42(58.33)	80(57.14)

	(No's)													
3.	Rasgulla (No's)	1	8(11.76)	10(13.89)	18(12.86)	8(11.76)	6(8.33)	14(10.00)	9 (13.24)	11(15.28)	20(14.29)	43(63.24)	45(62.50)	88(62.86)
4.	Biscuit (No's)	1 to 2	58(85.29)	55(76.39)	113(80.71)	-	-	-	2(2.94)	5(6.94)	7(5.00)	8(11.76)	12(16.67)	20(14.29)
5.	Milk pedha (No's)	1	11(16.18)	15(20.83)	26(18.57)	8(11.76)	5(6.94)	13(9.29)	5(7.35)	4(5.56)	9(6.43)	44(64.71)	48(66.67)	92(65.71)
6.	Ghate (packet)	1	10(14.71)	16(22.22)	26(18.57)	7(10.29)	4(5.56)	11(7.86)	9(13.24)	4(5.56)	13(9.29)	42(61.76)	48(66.67)	90(64.29)
7.	Chakli (No's)	1	24(35.29)	21(29.17)	45(32.14)	2(2.94)	4(5.56)	6(4.29)	2(2.94)		2(1.43)	40(58.82)	47(65.28)	87(62.14)
8.	Sev chakli (No's)	1 to 2	14(20.59)	10(13.89)	24(17.14)	12(17.65)	15(20.83)	27(19.29)	6(8.82)	12(16.67)	18(12.86)	36(52.94)	35(48.61)	71(50.71)
9.	Mysorepak (No's)	1	17(25.00)	12(16.67)	29(20.71)	18(26.47)	10(13.89)	28(20.00)	13(19.12)	20(27.78)	33(23.57)	20(29.41)	30(41.67)	50(35.71)
10.	Sev chikki (No's)	1	19(27.94)	10(13.89)	29(20.71)	21(30.88)	10(13.89)	31(22.14)	18(26.47)	16(22.22)	34(24.29)	10(14.71)	36(50.00)	46(32.86)
11.	Samosa (No's)	1	6(8.82)	8(11.11)	14(10.00)	16(23.53)	12(16.67)	28(20.00)	14(20.59)	19(26.39)	33(23.57)	32(47.06)	33(45.83)	65(46.43)
12.	Gulab Jamun (No's)	1	14(20.59)	7(9.72)	21(15.00)	19(27.94)	15(20.83)	34(24.29)	13(19.12)	21(29.17)	34(24.29)	22(32.35)	29(40.28)	51(36.43)

Figures in the parenthesis indicate percentage

**Table 4:** Pattern of snacks consumption N=140

S. No.	Snacking	Urban(n=68)		Rural(n=72)		Total	
		f	%	f	%	f	%
1.	During school hours/leisure time	67	98.53	62	86.11	129	92.14
3.	While going to school	41	60.29	45	62.50	86	61.43
4.	During travelling	41	60.29	33	45.83	74	52.86
5.	While doing home work	30	44.12	27	37.50	57	40.71
6.	While roaming outside with friends	32	47.06	22	30.56	54	38.57
7.	While playing	20	29.41	16	22.22	36	25.71
8.	After school	11	16.18	19	26.39	30	21.43
9.	While watching T.V.	15	22.06	10	13.89	25	17.86

**Table 5:** Reasons for purchasing snacks by the school children, N=140

S. No.	Reasons	Urban(n=68)		Rural(n=72)		Total	
		f	%	f	%	f	%
1	Tasty	68	100.00	72	100.00	140	100.00
2	Feel like eating again and again	66	97.06	70	97.22	136	97.14
3	To use/enjoy the amount given by parents/relatives	65	95.59	66	91.67	131	93.57
4	Colorful snacks	65	95.59	69	95.83	134	95.71
5	For munching	71	104.41	63	87.50	134	95.71
6	Varieties of snacks available in the shops	59	86.76	55	76.39	114	81.43
7	Satisfies hunger	52	76.47	48	66.67	100	71.43
8	Influence of the other peer group	44	64.71	51	70.83	95	67.86
9	Convenient to have anytime	35	51.47	46	63.89	81	57.86
10	Healthy and nutritious food	38	55.88	32	44.44	70	50.00
11	For refreshment	36	52.94	30	41.67	66	47.14
12	To avoid boredom	30	44.12	21	29.17	51	36.43
13	Gives calorie	27	39.71	23	31.94	50	35.71
14	To meet the days nutrient requirement	17	25.00	12	16.67	29	20.71

\*multiple responses

**Table 6:** Product attributes considered by school children for selection of snack items, N=140

S. No.	Criteria	Urban		Rural		Total	
		f	%	f	%	f	%
1.	Quantity	65	95.59	72	100.00	137	97.86
2.	Price	66	97.05	70	97.22	136	97.14
3.	Color	66	97.05	66	91.67	132	94.29
4.	Taste	63	92.65	65	90.28	128	91.43
5.	Shape	55	80.88	62	86.11	117	83.57
6	Healthy	21	30.88	14	19.44	35	25.00
7.	Nutrition	16	23.53	11	15.28	27	19.29

Multiple responses

## Conclusion

The consumption of snacks by urban and rural school children was 85 and 90 per cent respectively. More than 40 per cent of children from rural (43.06 %) and urban (48.53 %) liked to consume both savory and sweet snacks. More than 50 per cent of snacks consumed were unlabelled (57.14%). Majority of rural and urban children looked for price, color and taste. Very few per cent of children looked the criteria of health and nutrition while choosing snack items. Creating awareness and encouraging consumption of nutritive snacks allow children to develop healthy eating habits and to maintain good health.

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