Original Research Article

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20173862

An outlook on nutrition and food labelling among selected school children aged 10-12 years in Coimbatore city

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Received: 25 July 2017 Revised: 09 August 2017 Accepted: 10 August 2017

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ABSTRACT

Background: Use of nutritional labels in choosing food is associated with healthier eating habits including lower fat intake. Current public health efforts have focused on the revamping of nutritional labels to make them easier to read and use for the consumer. The objective of this study is to assess the frequency of use of nutritional labels and find out the awareness of nutrition labels.

Methods: The study was designed to find the awareness among 1409 school children constituting both boys and girls from various boards like Government, Government aided, Matriculation and CBSE schools aged 10-12 years in Sundrapuram, Coimbatore city. The structured and validated questionnaire on basic information like Personal Information, socio-economic information, anthropometry and frequency and awareness nutrition labelling was made by asking dichotomous questions.

Results: Many children who belong to low-income do not regularly use the nutrition facts panel information.

Conclusions: The study took initiative in creating knowledge through demonstration on facts about Nutrition Labeling.

Keywords: Nutrition labels, Healthier eating habits, Awareness, Nutrition facts

INTRODUCTION

India has the largest adolescent population in the world and is home to over 20% of the world's adolescents. These 10- to 19-year-olds constitute 243 million of India's 1.2 billion population. About 10% to 15% of adolescents in urban areas in India are overweight or obese.²⁻⁴ The reported rates of overweight and obesity among affluent school-going adolescents were 17.6% and 5%, respectively.⁵ Although there are many reasons for an increase in the prevalence of obesity, frequent consumption of unhealthy processed foods is an important risk factor. Consumption of nontraditional fast foods (such as pizza and burgers), processed foods (such

as candy and bakery goods), and packaged foods (convenience or shelf stable foods, which are ready to eat or need minimal processing, and which come in packaged form) has been increasing in India at a rapid pace, and more so among adolescents and children in urban areas.^{6,7} According to Food Safety and Standards Authority of India (FSSAI), 2011, nutrition information on NFP shall be given as "per 100 gm" or "100 ml" or "per serving" of the product on the label. On the other hand US Food and Drugs Administration (USFDA) mandates that NFP should report nutrients in "amount per serving" and "% Daily Value", with footnote and caloric conversion information.⁸ The purpose of this research was to assess the frequency of nutrition label usage among school

children and determine if label users differed from nonusers in terms of their knowledge of nutrition labels and basic nutrition information, attitudes toward nutrition labels, and beliefs about diet-disease relationships.

METHODS

Selection of population

The author contacted 11 Government schools (Government and Government aided) and 8 non-government schools (Matriculation and CBSE). Government schools are run by government where the fee ranged from Rs.1000-2000/year, whereas the selected non-government school collected a fee of Rs. 30,000-50,000/year. Permission was granted and data collection was done among 6 government and 5 non-government schools respectively. Consenting male and female students of class 5-7 were included in the study.

Selection of sample

Our sample size was 1409 school children. Gender differences were not considered in our calculation. However, we collected data from all consenting students from within the selected grades and schools. Duration of Study was about 3 months starting from July –September 2016.

Data collection

Using validated questionnaire, data like Age and Gender, Socio-Economic Background, anthropometry, frequency and awareness about nutrition labels were collected. Data collection was carried out using interview schedule method as it allows the researcher to build a rapport with the child and gives validation to the data.

A. Socio-economic status

India, a country with vast differences among people based on their economy so this is assessed using Revised Kuppuswamy Scale 2012⁹as tabulated below

Socio-economic catego	ory* Monthly income (Rs.)
Upper	≥32,050
Upper middle	12020-32,049
Middle/lower middle income	12,019-8,010
Lower/upper lower	8,009-4,810
Lower	4,809-1,600/ and less
d. D. 1 1.77	1 2012

^{*} Revised Kuppuswamy scale 2012.

Because of the convenience, we have merged upper middle and Middle/lower Middle income to a category of middle SES, in the same way lower SES comprises of lower/upper lower and lower income.

B. Anthropometry

i) Height

A stadiometer was used to measure the height of the children. The children were made to stand erect without shoes on a flat floor by the scale with heels together and toes apart. The head was comfortably held erect and the arms were relaxed and held in a natural manner. The head piece of the stadiometer was lowered slowly and was placed in the sagital plane over the head of the child applying a slight pressure to reduce the thickness of hair and make contact with the top of the head. Using this technique, the height of the children was measured to the nearest 0.1 cm accuracy. ¹⁰

ii) Weight

Body weight is the most widely used and the simplest reproducible anthropometric measurement for the evaluation of nutritional status of young children. Body weight of all the children was measured using a digital weighing balance. The balance was validated using known weight for every 5 readings. The children were made to stand erect with minimum clothing and barefoot. The weight was noted to the nearest 0.1 kg. 10

iii) Body mass index (BMI)

BMI is a simple index and is defined as weight in kilograms divided by height in meters squared. 11

$$BMI = \frac{Weight (kilograms)}{Height (metres)^2}$$

After calculating the BMI for the children, BMI percentiles and Z score were calculated using the online calculator.

C. Frequency and awareness of viewing nutrition labeling

A pre and post questionnaire to check the awareness on nutrition labeling (Dichotomous questions) was collected from the respondents (School children). These dichotomous type questions were framed since the school children may find easier to mark a yes or no.

D. Education on nutrition labeling

Education on nutritional labels emphasizing on certain facts were demonstrated with a help of nutrition label as found in the image.

Ethical statement

The study was granted approval by the Ethics Review Committee of the PSG Institute of Medical Research, Coimbatore. Consent forms, in both English and Tamil, for all students of grades 5 to 7th were signed by either of

Serving size: The first Servings per container: This lets **Nutrition Facts** place to start when you you know how many servings are in look at the Nutrition Serving Size 1 cup (228 g) the package. This number is very Facts is the serving important and must be taken into Servings per Container 2 size. The label on the account whenever you buy container is based on a something that contains more than Amount Per Serving serving. one serving. To find out how much Calories from Fat 110 Calories 250 you eat, multiply the amount in one % Daily Value serving and the number of servings Amount per serving: you eat. Total Fat 12g 18% This line tells you the number of calories per Saturated Fat 3g 15% serving and the number Trans Fat 3g of calories from fat. 10% Cholesterol 30mg Sodium 470mg Calories: This is 20% the amount of 20% Potassium 700mg calories in one Total Carbohydrate 31g 10% serving. A calorie Dietary Fiber 0g is a measure of the fuel you get from 0% the food you eat. Sugars 5g Protein 5g Vitamins & Minerals: The 4% Vitamin A food manufacturers are 2 % Vitamin C required to list the amount 20% Calcium of vitamin A, vitamin C, calcium and iron that are in Iron this product. *Percent Daily Values are based on a 2,000 calorie diet. Percent daily values: The percent daily values are based on a 2,000 calorie Your daily values may be higher or lower depending on your caloric needs diet, which has 30% or less Calories 2,000 calories from fat a day. Total Fat Less Than 65mg 80g Knowing the individual 25g value allows you to look at Sat Fat Less Than 20g the information in the left Cholesterol Less Than 300mg 300mg column and decide whether Sodium Less Than 2.400mg 2.400mg or not these numbers fit into Total Carbohydrate 300g 375g your daily allowance for that nutrient. Dietary Fiber 30g

the parents of the children, and data were collected only from them.

Figure 1: Children's hospital of the King's daughter, way to grow, reviewed on 04/2008. 12

25g

RESULTS

Number of children by age group

The results depicts that government school students comprise 58% of the study population whereas 40% were from non-government schools. More than 50% of the children belong to 11 years age in both the schools (Table 1).

Distribution of different school children according to socio-economic status

Distribution of different school children according to socio-economic status is clearly mentioned in the Table 2 given below.

Table 2 and Figure 1 shows that 50% of government school students belong to middle Income category (Rs.

12,020-Rs. 32,049/ month) and 73% of non-government school students belong to the family earning Rs. ≥32,050/month (high income category). Overall we could note that 49% of the selected school children belong to high SES followed by 40% (Middle SES) and 11% in low SES category (Rs. <12,000/month)

BMI categories against socioeconomic status for selected school children.

From the Table 3 and Figure 3 we could understand the BMI categories against socio-economic status for selected school children

We could note that 17% of government school children were categorized as underweight and obese, as usual results support that underweight was prevalent among low SES.

Table 1: Number of children by age group (n=1409).

C		Age g	group (i	n years)		Total	Dougoutogo		
No	Schools	10		11	11			Total	Percentage
		No	%	No	%	No	%	number	(%)
1	Government	264	32	443	54	111	13.5	818	58
2	Non-government	116	20	386	65	89	15	591	42

Table 2: Distribution of different school children according to socio-economic status (n=1409).

S. No	Socio-economic Class	Government school children			vernment children	Total	Percentage
INO		No	%	No	%	number	(%)
1	Low SES	154	19	2	0.33	156	11
2	Middle SES	406	49.6	160	27	566	40
2	High SES	257	31.4	430	73	687	49

Table 3: BMI categories against socioeconomic status for selected school children (n=1409).

	Conto	Obese (n=407)				Overweight(n=284)				Normal (n=526)				Under Weight (n=192)			
	Socio economic Status	Govt Scho child	ol	Non-s Schoo childa	ol	Govt Schoo child	ol	Non- govt. Scho child	* ol	Govt Scho child	ol	Non- govt* Scho- child	: ol	Govt Scho child	ol	Non- govt ^s Scho child	* ool
	Low	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
1	SES	2	1			34	22			63	41	1	50	55	36	1	50
2	Middle SES	95	23	102	64	62	15	33	21	202	50	12	8	47	12	13	8
3	High SES	40	16	168	39	39	15	116	27	141	55	107	25	37	14	39	2
	Total	137	17	270	46	135	17	149	25	406	50	120	20	139	17	53	9

^{*}Non-govt= non-government.

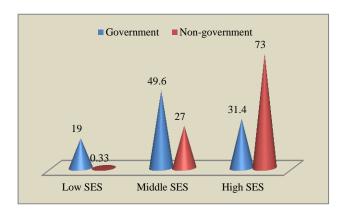


Figure 2: Distribution of different school children according to socio-economic status.

Intervention study

An intervention study was carried out for a period of 5 continuous days with an education given to the selected school children for the duration of 30 minutes. A pre-test questionnaire was formulated and the responses for the questions were recorded in the beginning of the study. A demonstration with the help of a food product cover was

taught and the randomly selected children were made to explain the concepts of food and Nutrition labeling after the education to assure the child whether it is learned. A post test was conducted and the responses were recorded to find out the effectiveness of the education.

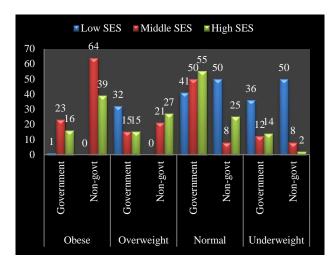


Figure 3: BMI categories against socio-economic status for selected school children.

Pre-test awareness on food and nutrition labeling before education

From the Table 4 we could see the pre-test awareness on Food and Nutrition labeling before education. From the above Table 4 shows the pre-test awareness on nutrition labeling before education showed majority response

percentage showed higher in the children who had an unknown answer for the questions about food labels and food product certifications in government school children. This shows that the government school children require a good education on nutrition and food labels along with a knowledge given on food safety and product certifications.

Table 4: Pre-test awareness on food and nutrition labeling before education (N=1409).

S.			Nutrition labeling assessment									
No	Questions		rnment			Non-	governn					
		Yes	%	No	%	Yes	%	No	%			
1	Do you know about food labels?	355	43	463	57	366	52	225	48			
2	Do you consider examining food labels while food product purchase?	318	39	500	61	392	66	199	34			
3	Do you read nutrition labels before snack purchase?	262	32	556	68	466	79	125	21			
4	Do you choose food products according to nutritional information?	305	37	513	63	362	61	229	39			
5	Where do you acquire information about a food product other than food labels (media/health professionals/retailers)?	362	44	456	56	446	75	145	25			
6	Do you think food label to be standardized and applied to all food products?	446	54.5	372	45.5	432	73	159	27			
7	Do you think food labels are mandatory for all food products?	317	39	501	61	346	58.5	245	41.5			
8	Do you think all the food product manufacturers/entrepreneurs must include food labels for their upcoming innovations?	142	17	676	83	218	37	373	63			
9	If a food product new to market, low in MRP, providing free gifts/offers but without nutritional information, will you prefer it?	201	24.5	617	75.5	316	53	275	47			
10	If your favourite celebrity is introducing a food product through advertisements but the product is without food product certification, will you prefer it?	322	39	496	61	443	75	148	25			
11	Are you aware about the food product certifications and seal in food products?	301	37	517	63	321	54	270	46			
12	Are you aware in choosing healthier food choices by comparing food and nutrition labels?	306	37	512	63	396	67	195	33			
13	Are you aware about manufacturing/expiry date in food labels?	541	66	277	34	252	43	339	57			
14	Do you consider brand name of a product for choosing a food product?	320	39	498	61	317	54	274	46			
15	Do you think imported foods are healthy and prefer it?	456	56	362	44	328	55	263	45			
16	Do you think traditional snack/product made with commonly cultivated crop in the zone is healthy comparing to imported foods?	246	30	572	70	266	45	325	55			
17	Do you think artificial food preservatives/colours added to food product is healthy and can be considered for purchase?	346	42	472	58	104	17.5	487	82.5			

Post-test awareness on nutrition labeling after education

Table 5 shows the post-test awareness on nutrition and food labeling after education. Table 5 showed posttest awareness on Nutrition labeling after education. This result clearly depicts that there was an excellent

improvement in the responses given by selected children after education. From this we could understand that nutrition labeling education should be given periodically to government school children with more attention given on food product certifications and choosing healthy snack by viewing nutrition and food labeling.

Table 5: Post-test awareness on nutrition labeling after education (N=1409).

a		Nutrition labeling assessment									
S.	Questions		nment			Non-government (n=591)					
No		Yes	%	No	%	Yes	%	No	%		
1	Do you know about food labels?	627	44	191	56	496	84	95	16		
2	Do you consider examining food labels while food product purchase?	592	72	226	28	432	73	159	27		
3	Do you read nutrition labels before snack purchase?	636	78	182	22	514	87	77	13		
4	Do you choose food products according to nutritional information?	721	88	97	12	536	91	55	9		
5	Where do you acquire information about a food product other than food labels (media/health professionals/retailers)?	568	69	40	31	431	73	160	27		
6	Do you think food label to be standardized and applied to all food products?	621	76	197	24	449	76	142	24		
7	Do you think food labels are mandatory for all food products?	726	89	92	11	476	80.5	115	19.5		
8	Do you think all the food product manufacturers/entrepreneurs must include food labels for their upcoming innovations?	749	91.5	69	8.5	493	83	98	17		
9	If a food product new to market, low in MRP, providing free gifts/offers but without nutritional information, Will you prefer it?	718	88	100	12	432	73	159	27		
10	If your favourite celebrity is introducing a food product through advertisements but the product is without food product certification, will you prefer it?	663	81	155	19	441	75	150	25		
11	Are you aware about the food product certifications and seal in food products?	638	78	180	22	509	86	82	14		
12	Are you aware in choosing Healthier food choices by comparing food and Nutrition Labels?	697	85	121	15	516	87	75	13		
13	Are you aware about Manufacturing/Expiry date in food labels?	796	97	22	3	492	83	99	17		
14	Do you consider brand name of a product for choosing a food product?	749	91.5	69	8.5	446	75	145	25		
15	Do you think imported foods are healthy and prefer it?	242	29.5	576	70.5	133	22.5	458	77.5		
16	Do you think traditional snack/product made with commonly cultivated crop in the zone is healthy comparing to imported foods	341	42	477	58	433	73	406	27		
17	Do you think artificial food preservatives/colours added to food product is healthy and can be considered for purchase?	633	77	185	23	466	79	494	21		

Table 6: Awareness on nutrition labeling before and after education.

	Mean	SD	No.
Pre-test awareness	9.07	1.27	1409
Post-test awareness	12.20	1.49	1409

DISCUSSION

Mean values for the pre-test of the study was 9.07±1.27 S.D. The posttest study on awareness on nutrition labeling was 12.20±1.49 SD. The study showed the significant difference in the mean values indicating the effectiveness of the study on nutrition labeling for all the children in both government and non-government school children. Frequent label reading is a good practice that needs to be inculcated in an individual from adolescence. However, the majority of studies have shown that adolescents read food labels less frequently. According to the National Health and Nutrition Examination Survey 2005-6 in USA, less than 25% of adolescents used food labels during food purchase, while it was 37.8% among female university students in Korea and 31.3% in another study among students in Louisiana.

CONCLUSION

Overall, school children have mixed views on food labelling. Some find it to be useful for making better choices, whereas others believed it is complicated, taking time they felt it should be easier to use. For school children, taste and price was the most highly rated factor when buying food product rather that nutrition labelling. It may be due to limited budget, time constrain and just to get energy and fulfill their appetite. However, information concerning the food label was limited. This finding also suggest that the program about the important for food labelling and how to use it should be held and give awareness to the school children that "reading food labels" as one strategy.

ACKNOWLEDGEMENTS

We would like to thank all the students, teachers and the principals of the schools for their co-operation and valuable support during the study period.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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Cite this article as: Anitha MC, Anusuya K. An outlook on nutrition and food labelling among selected school children aged 10-12 years in Coimbatore city. Int J Community Med Public Health 2017;4:3461-7.