

Unhealthy eating habits and obesity among rural adolescents of Dharwad Taluka, Karnataka

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ABSTRACT

The present investigations were carried out to assess the eating habits of 200 rural obese adolescents (115 girls and 85 boys) of 8 villages of Dharwad Taluk of Karnataka. The subjects were selected by purposive random sampling. A self-structured questionnaire was developed to elicit the information about obese adolescents on various aspects including general information and dietary intake. The results revealed that majority of the subjects belonged to 15-16 years of age (37.5%) and nuclear family setup (66.5%). Almost equal number of subjects had vegetarian and non-vegetarian food habits (40 and 41% respectively) and only 19 per cent were eggarian; majority of the adolescents had the habit of eating outside foods (91%); more girls (93.04%) consumed outside foods as compared to boys (88.23%); 65 per cent of the adolescents visited hotels frequently; about 49 per cent of them consumed roadside eatery once in a week; about two third of the subjects visited bakeries frequently (64%); all the adolescents consumed cereals daily (100%); 82.30 per cent of adolescents consumed pulses daily followed by weekly and fortnightly (13.99 and 3.71% respectively). Majority of subjects consumed green leafy vegetables, other vegetables and roots and tubers daily. Per cent adequacy of protein, fat and calcium was higher than the recommended dietary allowance (RDA) in case of girls (121.9, 102.4 and 107 respectively); per cent adequacy of nutrients viz iron, carotene, vitamin C, riboflavin, vitamin B₆ and niacin was lower than RDA among both boys and girls. The duration of the light activities were higher than moderate activities (21.10 vs 2.90 h respectively).

Keywords: Eating habits; obesity; adolescents; boys; girls; food; activities

INTRODUCTION

Over the past three decades the prevalence of overweight and obesity has increased substantially. Obesity in children and adolescents is gradually becoming a major public health problem in many developing countries including India. World Health Organization reported that more than 42 million children are overweight. Close to 35 million of these are living in developing countries. Disordered eating attitudes (EAs) and behaviour especially among adolescents have become an issue of worldwide concern. Obesity in childhood and adolescence is of great concern from the public health point of view as excess body fat increases the risk of several non-communicable diseases in adulthood such as coronary heart disease, type 2 diabetes, hypertension and some types of cancer which have become the main causes of morbidity and mortality worldwide. The cause of increasing childhood

overweight and obesity in developing countries is attributed to transition towards western diet or changes in eating behaviour. The rise in obesity is primarily due to altered sedentary lifestyles, energy-dense diets, low levels of physical activity, replacing family meals with unhealthy foods and not consuming enough fruits and vegetables. The aim of this research was to investigate dietary habits of rural obese adolescents in Dharwad Taluk of Karnataka.

METHODOLOGY

The study was carried out during 2014-2015; the 8 villages from Dharwad Taluk were selected for the study. About 200 adolescent subjects who were obese, overweight or likely to be overweight were purposively selected for the study. The body mass index (BMI) of children was computed using WHO growth charts (Anon 2007). A detailed questionnaire was

developed to elicit the information on various aspects including general information, nutritional status viz dietary intake and anthropometric and lipid profile. Anthropometric measurements viz height, weight, waist circumference (WC) and hip circumference (HC) were recorded as per the guidelines suggested by Jelliffe (1966). Dietary intake was assessed by using food frequency questionnaire and 24 hour recall method using a set of pre-standardized vessels. The nutrients present in the food were computed using nutritive value book (Gopalan et al 2004). Recommended dietary allowance (RDA) for Indian adolescents was considered for computing per cent adequacy of food (Anon 2010a) and nutrients (Anon 2010b). Mean and standard deviation were used to interpret the data.

Independent t-test was used to test the significance of difference between food intake of both girls and boys.

RESULTS and DISCUSSION

Distribution of subjects based on the demographic profile is presented in Table 1. Majority of the subjects belonged to 15-16 years of age (37.5%) followed by 16-17 years (32%); majority belonged to the nuclear families (66.5%). Fathers of about half of the subjects (52.0%) were farmers. About half (52.5%) parents of the obese adolescents had the annual income between Rs 60000-90000 followed by Rs 30000-60000 (30.5%). Similar trend was observed among both boys and girls.

Table 1. Demographic profile of the study subjects

Variable		Boys (n= 85)		Girls (n= 115)		Total (n= 200)	
		f	%	f	%	f	%
Age (years)	13-14	5	5.88	14	12.17	19	9.5
	14-15	15	17.65	27	23.48	42	21
	15-16	28	32.94	47	40.87	75	37.5
	16-17	37	43.53	27	23.48	64	32
Type of family	Nuclear	55	64.71	78	67.83	133	66.5
	Joint	9	10.59	15	13.04	24	12
	Extended	21	24.71	22	19.13	43	21.5
Father's occupation	Agricultural labourer	21	24.71	28	24.35	49	24.5
	Non-agricultural labourer	15	17.65	20	17.39	35	17.5
	Farming	44	51.76	60	52.17	104	52
	Service	5	5.88	7	6.09	12	6
Annual income (Rs)	<10000	1	1.18	2	1.74	3	1.5
	10000-30000	6	7.06	15	13.04	21	10.5
	30000-60000	30	35.29	31	26.96	61	30.5
	60000-90000	45	52.94	60	52.17	105	52.5
	>90000	3	3.53	7	6.09	10	5

Data on eating habits of obese adolescents are presented in Table 2. Almost equal percentage of subjects had vegetarian and non-vegetarian food habits (40 and 41% respectively) and only 19 per cent belonged to eggarian category; almost equal number of them consumed 4 and 3 meals per day (47 and 46% respectively). Most of the adolescents had the habit of eating outside foods (91%); higher number of girls consumed outside foods as compared to boys (93.04 and 88.23% respectively); about two-third (65.00%) of the adolescents had been visiting the hotels frequently; 49 per cent adolescents visited roadside eateries once a week; about two-third of the subjects visited to bakeries frequently (64.00%).

Like other places here also the modernization in food technology and processing had led to the availability of soft drinks, ready to eat foods and other processed readymade sweets, chips, chocolates etc in the close vicinity of the schools. The children were given pocket money and purchased these foods. This had led to eating of all these foods in place of traditional foods which might be the cause for overweight and obesity.

All the adolescents consumed cereals (100%) and 82.30 per cent consumed pulses daily; majority of rural obese adolescents consumed egg/fish/meat once in a month (27.50%); 86 per cent consumed milk/milk

Table 2a. Food habit of obese adolescent children

Parameter	Girls (n= 115)		Boys (n= 85)		Total (n= 200)	
	f	%	f	%	f	%
Type of diet						
Vegetarian	64	55.65	16	18.82	80	40
Non-vegetarian	33	28.69	49	57.64	82	41
Eggetarian	18	15.65	20	23.52	38	19
Number of meals						
4	53	46.08	41	48.23	94	47
3	58	50.43	34	40	92	46
2	4	3.47	10	11.76	14	7

Table 2b. Food habit of obese adolescent children who used to take outside food

Parameter	Habit/frequency	Girls (n= 115)		Boys (n= 85)		Total (n= 200)	
		f	%	f	%	f	%
Eating outside food (yes/no)	Yes	107	93.04	75	88.23	182	91.00
	No	8	6.95	10	11.76	18	9.00
Outside food source							
Hotels	Once in a week	12	10.43	5	5.88	17	8.50
	Frequently	74	64.34	56	65.88	130	65.00
	Occasionally	21	18.26	14	16.47	35	17.50
Roadside eateries	Once in week	59	51.30	39	45.88	98	49.00
	Frequently	45	39.13	34	40.00	79	39.50
	Occasionally	3	2.60	2	2.351	5	2.50
Bakeries	Once in week	17	14.78	12	14.11	29	14.50
	Frequently	74	64.34	54	63.52	128	64.00
	Occasionally	16	13.91	9	10.58	25	12.50

Table 3. Frequency of consumption of foods by rural obese adolescents (n= 200)

Name of the food	Frequency					
	Daily	Weekly	Fortnightly	Monthly	Occasionally	Never
Cereals and millets	200 (100)	-	-	-	-	-
Pulses	163 (82.30)	29 (13.99)	8(3.71)	-	-	-
Fish, meat and egg	-	26 (13.00)	19 (9.5%)	55 (27.5)	20 (10.00)	80 (40.00)
Nuts and oil seeds	13 (6.5)	62 (31.00)	37 (18.5)	10 (5.00)	45 (22.5)	33 (16.5)
Milk and milk products	172 (86.00)	28 (14.00)	-	-	-	-
Fruits	30 (15.00)	158 (79.00)	3 (1.50)	-	9 (4.50)	-
Green leafy vegetables	116 (58.00)	73 (36.50)	5 (2.50)	6 (3.00)	-	-
Other vegetables	153 (76.5)	41 (20.50)	4 (2.00)	-	-	2 (1.00)
Root and tuber vegetables	163 (81.50)	23 (11.50)	5 (2.50)	7 (3.50)	2 (1.00)	-
Sugars	171 (85.50)	29 (14.50)	-	-	-	-
Homemade foods	28 (14.00)	109 (54.50)	30 (15.00)	22 (11.00)	11 (5.50)	-
Beverages	132 (66.00)	26 (13.00)	15 (7.50)	15 (7.50)	9 (4.50)	3 (1.5)
Bakery products	28 (14.00)	107 (53.50)	26 (13.00)	17 (8.50)	21 (10.50)	1 (0.50)
Ready to eat food	59 (29.50)	20 (10.00)	5 (2.50)	38 (19.00)	49 (24.50)	29 (14.50)
Others	-	-	-	-	12 (6.00)	188 (94.00)

Table 4. Mean food intake of obese girls and boys

Food	Quantity (g)				t-test
	SDA for girls (per day)	Food intake	SDA for boys (per day)	Food intake	
Cereals	330	342.37 ± 84.70	420	439.62 ± 83.20	8.08**
Pulses	60	56.04 ± 17.05	75	67.42 ± 18.95	4.49**
Milk and milk products (ml)	500	143.8 ± 56.36	500	167.75 ± 59.82	2.89*
Fleshy foods	30	8.40 ± 35.87	30	18.08 ± 52.89	1.53 ^{NS}
Green leafy vegetables	100	40.27 ± 23.31	100	28.49 ± 18.98	3.81**
Other vegetables	200	65.05 ± 30.30	200	93.69 ± 38.17	5.91**
Root and tuber vegetables	100	47.60 ± 18.52	150	56.10 ± 23.00	2.89*
Fruits	100	20.22 ± 10.75	100	23.96 ± 16.62	1.92 ^{NS}
Sugar and jaggery	25	15.90 ± 4.87	20	20.08 ± 4.54	6.16**
Fats and oils	40	40.44 ± 12.21	45	43.34 ± 6.99	1.96 ^{NS}

*Significant at 5% level, **Significant at 1% level, NS= Non-significant, SDA (Anon 2010a)= Suggested dietary allowance, Values expressed in terms of Mean ± SD

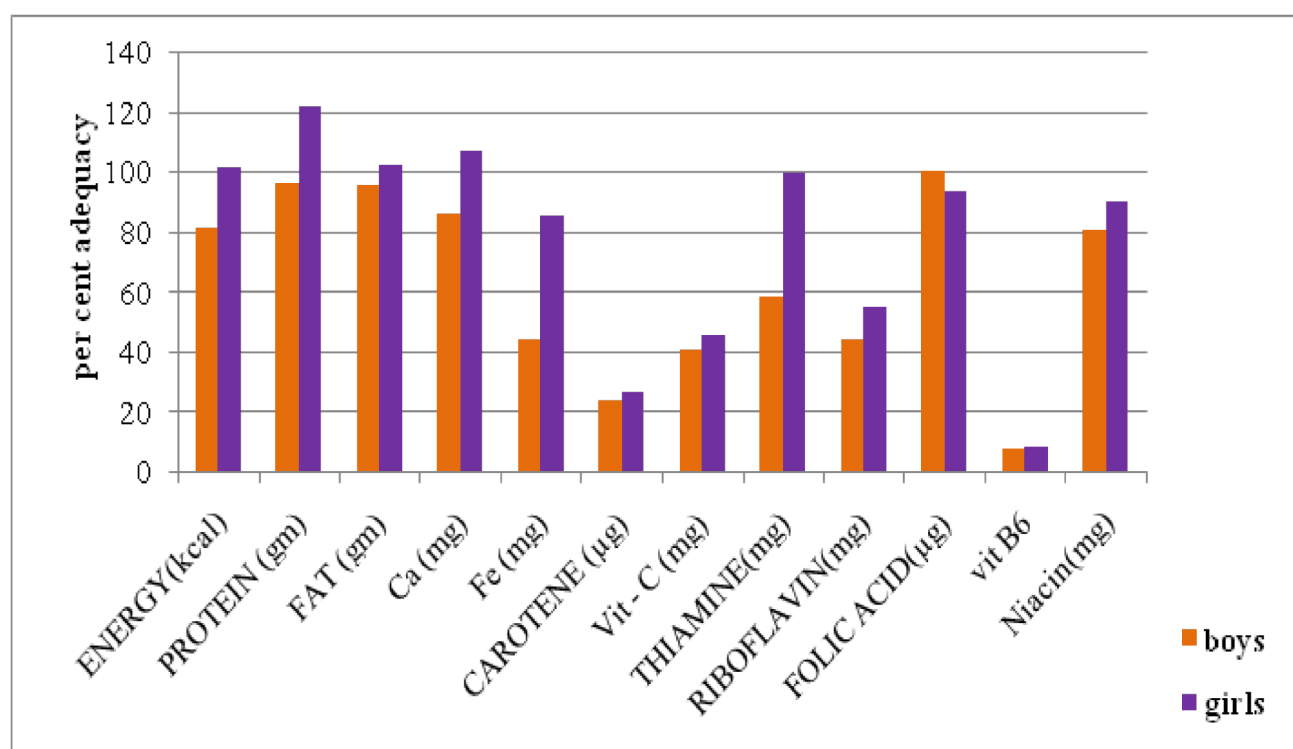


Fig 1. Adequacy of nutrients for obese girls and boys

products daily followed by weekly (14.00%); 85.5 per cent consumed sugar daily; 54.50 per cent consumed homemade foods daily; 53.5 per cent consumed bakery products weekly (Table 3).

Data given in Table 4 depict that the mean intake of all foods was lower than the suggested balanced diet in both boys and girls except for the intake of cereals, fat and oils which was found to be higher.

The per cent adequacy of protein, fat and calcium was higher than the recommended dietary allowance in case of girls (121.9, 102.4 and 107 respectively) whereas in case of boys per cent adequacy of protein and fat was on par with recommended dietary allowance (RDA) (96.34 and 95.53 respectively). Per cent adequacy of other nutrients viz iron, carotene, vitamin C, riboflavin, vitamin B₆ and niacin was lower than the RDA among

both boys and girls (Fig 1). Several workers have reported lower intake of protective foods by adolescents in comparison to suggested balance diet (Deepa 2002, Koodagi and Yenagi 2007).

Classification of adolescents based on body mass index (BMI), waist to hip ratio (WHR) and waist to hip height ratio (WHtR) is presented in Table 5. Majority of the adolescents belonged to the overweight category (49.5%) and similar trend was observed among both boys and girls.

While classifying them based on WHR it was found that more girls were abdominally obese than the boys (79.13 and 65.88% respectively). More girls were abdominally obese than boys (77.39 and 75.29% respectively) based on WHtR classification. Impaired endocrine secretions especially sex

hormones along with low levels of growth hormone may be the reasons for visceral fat deposition in girls. Similar conclusions were drawn by Bjorntorp and Rosmond (2000).

The activity pattern of the subjects is presented in Table 6. The adolescents spent more time (21.10 h) in light activities (personal, attending classes, tuition, homework, watching TV, sleeping) as compared to 2.90 per cent moderate activities (school play, exercise, household chores). This trend was almost same among both boys and girls.

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Table 5. Classification of adolescents based on body mass index (BMI), waist to hip ratio (WHR) and waist to hip height ratio (WHtR)

Classification	Boys (n= 85)		Girls (n= 115)		Total (n= 200)	
	n	%	n	%	n	%
BMI						
Likely to be overweight (75 th - 85 th percentile)	30	35.29	36	31.30	66	33
Over weight (85 th - 95 th percentile)	40	47.06	59	51.30	99	49.5
Obese (more than 95 th percentile)	15	17.65	20	17.39	35	17.5
WHR						
Non-obese	29	34.12	24	20.87	53	26.5
Abdominal obesity	56	65.88	91	79.13	147	73.5
WHtR						
Non-obese	21	24.71	26	22.61	47	23.5
Abdominal obesity	64	75.29	89	77.39	153	76.5

Table 6. Activity pattern of obese adolescents

Activities	Time utilized (h) in different activities			t-value
	Girls	Boys	Mean	
Light activities				
Personal	3.04 ± 0.56	2.86 ± 6.57	2.95 ± 0.57	2.27*
Attending classes	7.06 ± 0.24	7.38 ± 0.49	7.22 ± 0.36	6.22**
Tuition and homework	2.13 ± 0.57	2.41 ± 0.87	2.27 ± 0.72	2.72**
TV watching	1.19 ± 0.53	1.43 ± 1.56	1.31 ± 1.054	1.52 ^{NS}
Sleeping	7.66 ± 0.61	6.99 ± 1.81	7.33 ± 1.21	3.64**
Total light activities	21.10 ± 0.53	21.10 ± 0.84	21.10 ± 0.69	0.001 ^{NS}
Moderate activities				
School play	1.29 ± 0.48	1.37 ± 0.53	1.33 ± 0.51	1.082 ^{NS}
Exercise	0.59 ± 0.41	0.63 ± 0.55	0.61 ± 0.48	0.68 ^{NS}
Household chores	1.00 ± 0.40	0.89 ± 0.53	0.95 ± 0.47	1.64 ^{NS}
Total moderate activities	2.89 ± 0.55	2.91 ± 0.93	2.90 ± 0.74	0.14 ^{NS}
Grand total	24.00 ± 0.06	24.01 ± 0.27	24.01 ± 0.17	0.56 ^{NS}

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