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Eating Patterns of Adolescents Aged 14-16 Years in Chengalpattu District – A Cross Sectional Study

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Abstract

Background: Eating patterns during adolescence significantly influence long-term health outcomes. This study explores the dietary habits and associated factors among adolescents aged 14-16 years in Chengalpattu district, Tamil Nadu, India.

Methods: A cross-sectional study was conducted at Shri Sai Medical College and Research Institute, involving 250 adolescents aged 14 to 16 recruited from pediatric outpatient departments, community camps, and local schools. Data were collected over 18 months using a structured Food Frequency Questionnaire (FFQ), along with anthropometric measurements and socioeconomic status assessment using the Modified Kuppuswamy scale. Statistical analysis was performed using SPSS 21, with key indicators including mean, standard deviation, and p-values.

Results: Among 250 patients, the majority were 16 years old (36.4%) and male (67.2%). BMI analysis showed a higher prevalence of overweight individuals, especially among 16-year-olds, though the correlation with age was statistically insignificant (p=0.653). Socioeconomic analysis indicated that 64.4% belonged to the upper lower class. Dietary habits revealed that most patients consumed three or more servings of cereals (82.8%), but intake of pulses and legumes was low, with 59.2% having no intake. Vegetable consumption was higher, with 40.4% having three or more servings, while 44.8% of patients reported no fruit intake. Milk and milk products, as well as non-vegetarian foods, were poorly consumed, with significant gender differences observed. Energy-dense snacks and beverages were widely consumed, with 69.6% and 46.8% of patients respectively having three or more servings. Water intake was similar between genders and was statistically insignificant (p=2.92).

Conclusion: Teenagers in Chengalpattu district exhibit poor eating habits, favoring energy-dense, nutrient-poor foods, which increases their risk of chronic diseases. To combat this, public health initiatives are essential, including food literacy programs and regulations on healthier school food options. These measures will help promote healthier diets among India's 238 million adolescents, improving both immediate and long-term health outcomes.

Keywords: Eating patterns, Adolescents, Dietary habits, Fruits, Cereals.

INTRODUCTION

Adolescence is a critical period marked by rapid physical, psychological, and social changes that influence eating behaviors and nutritional needs. During this stage, dietary patterns established can have long-term implications on health, contributing significantly to both the prevention and development of chronic diseases such as obesity, cardiovascular diseases, and type 2 diabetes [1]. In India, the nutritional transition, characterized by shifts from traditional diets to more Westernized food patterns, has raised concerns about the dietary habits of adolescents, who are increasingly exposed to energy-dense, nutrient-poor foods [2].

The World Health Organization (WHO) highlights adolescence as a pivotal phase where nutritional status can either support or hinder growth and development [3,4]. Proper nutrition during adolescence is essential not only for physical growth but also for cognitive development and mental well-being [5]. However, studies have shown that adolescents often exhibit irregular eating habits, such as skipping meals, excessive snacking, and high consumption of fast foods and sugary beverages, which may lead to nutritional deficiencies and unhealthy weight gain [6].

In India, regional dietary patterns are influenced by cultural practices, socioeconomic status, and availability of food. The state of Tamil Nadu, where Chengalpattu district is located, has a diverse food culture, but urbanization and lifestyle changes have led to alterations in traditional diets [7]. Despite these changes, there is limited data on the specific eating patterns of adolescents in this region, particularly those attending schools and outpatient departments in rural and semi-urban areas.

Given the potential health implications of poor dietary habits during adolescence, it is crucial to assess the current eating patterns of adolescents in Chengalpattu district. This study aims to provide insights into the dietary behaviors of adolescents aged 14-16 years, focusing on their meal consumption patterns, snack choices, and overall food environment. Understanding these patterns will help in designing targeted nutritional interventions and public health strategies to promote healthier eating behaviors among adolescents in this region.

METHODOLOGY

Study Design: A Cross-sectional study
Study Area: Shri Sai Medical College and Research Institute, Chengalpattu district, Tamil Nadu, India.

Study Population: Adolescents aged 14 – 16 years attending to paediatric outpatient department, camps organised by SSSMCRI, and schools of Chengalpattu district.

Duration: The study to be conducted from 30th September 2022 to 30th March 2024,18 months.

Inclusion Criteria: To study the eating patterns of adolescents aged 14–16 years attending the paediatric outpatient department, camps organized by SSSMCRI, and schools in Chengalpattu district.

Exclusion Criteria: Those who are suffering from chronic illnesses or are on long- term medications will be excluded.

Study Tools and Sample Size:
This study employed a Food Frequency Questionnaire (FFQ) to assess dietary habits, a stadiometer to measure height, a weighing machine for weight, and the Modified Kuppuswamy scale to determine socioeconomic status. Based on a prior study indicating a 38.7% prevalence of disordered eating behaviors, the sample size was calculated to be 250, accounting for a 10% non-response rate.

Study Variables:
The Dietary and Lifestyle Questionnaire (DALQ) covered questions on vegetarianism, meal patterns, food and beverage intake, snacking practices, household food rules, home food environment, school canteen usage, food skills acquisition, media exposure, consumerism, family characteristics, and demographics. Additional data collected included anthropometric measurements (height, weight, BMI) and socioeconomic status.

Data Collection:
The study included adolescents aged 14–16 years attending the pediatric outpatient department, participating in camps organized by Shri Sathya Sai Institute of Medical Sciences and Research Centre, and attending schools (both government and private) in Chengalpattu district. Both genders were represented in the study. Brief oral introductions were provided to parents, school principals, teachers, and participants about the survey procedures. Participation was voluntary, with written consent obtained from parents or guardians, and assent from students. Data on dietary intake from the previous day was collected using a questionnaire.

RESULTS

In this study, we examined the eating patterns of adolescents aged 14 to 16 years attending the paediatric outpatient department, camps organized by SSSMCRI, and schools in the Chengalpattu district.

The distribution of the patients and their percentages were calculated and tabulated in Table 6. 1. Out of 250 patients, 78 were in the age group of 14 years, 81 were in the age group of 15 years, and 91 patients were in the age group of 16 years, as observed and graphically represented in Figure 6 .1. The highest number of patients was observed in the age group of 16 years.

Table 1: Age distribution of the patients and their frequency

Age Distribution	Frequency	Percentage (%)
14 Years	78	31.2
15 Years	81	32.4
16 Years	91	36.4
Total	250	100

The comparison of gender frequency and their percentages was calculated and tabulated in table 2. Out of 250 patients, 168 were male patients and 82 were female patients, as observed in this study; a higher number of male patients was noted.

Table 2: Comparison of gender frequency and their percentages.

Gender	Frequency	Percentage(%)
Male	168	67.2
Female	82	32.8

Comparison between the age group and BMI of the patients was observed and tabulated in Table 3. In the age group of 14 years, 2 underweight patients, 21 normal weight patients, and 55 overweight patients were observed. In the age group of 15 years, 2 underweight patients, 25 normal weight patients, and 55 overweight patients were observed. In the age group of 16 years, 3 underweight patients, 34 normal weight patients, and 54 overweight patients were observed. A higher number of overweight patients were observed in the age group of 16 years. The p-value of age group and BMI of the patients is 0 .653, which is greater than 0.05, indicating statistical insignificance.

Table 3: Comparison between the age group and BMI of the patients

BMI	14 Years	15 Years	16 Years
Underweight	2	2	3
Normal	21	25	34
Over Weight	55	54	54
P Value	0.653		

The comparison of socioeconomic status of the patients' frequency was calculated and tabulated in Table 4. Out of 250 patients, 23 patients are in Lower <5 , 161 patients are in Upper Lower 5 -10, 43 patients are in Lower Middle 11- 15, 17 patients are in Upper Middle 16- 25, and 3 patients are in Upper 26-29. The highest number of patients was observed in Upper Lower 5- 10 (64.4%).

Table 4: Comparison of socio- economic status of the patient's frequency

Socio Economic Status	Frequency	Percentage (%)
Lower<5	23	9.2
Upper Lower 5-10	161	64.4
Lower Middle 11-15	43	17.2
Upper Middle 16-25	17	6.8
Upper 26-29	3	1.2

Comparison between cereals and gender (male and female patients) frequency and their percentages was calculated and tabulated in Table 5. In the intake of cereals among male patients, 10 male patients had no intake, 4 male patients had one serving, 17 male patients had two servings, and 137 male patients had three or more servings. In the intake of cereals among female patients, 2 female patients had no intake, 2 female patients had one serving, 8 female patients had two servings, and 40 female patients had three or more servings. A higher number of patients were observed in the category of three or more servings in both male and female patients. The p-value of cereals and gender is 0. 00001, which is less than 0. 05, indicating statistical significance.

Table 5: Comparison between cereals and gender male and femalepatient) frequency and their percentages

Cereals	Total	Percentage (%)	Male	Percentage (%)	Female	Percentage (%)
No intake	12	4.8	10	5.95	2	2.43
One serving	6	2.4	4	2.38	2	2.43
Two serving	25	10	17	10.12	8	9.75
Three or more serving	207	82.8	137	81.54	70	85.36
P value	<0.00001					

Comparison between pulses and legumes intake and gender (male and female patients) frequency and their percentages was calculated and tabulated in Table 6 . 10. In the intake of pulses and legumes among male patients, 101 male patients had no intake, 24 male patients had one serving, 23 male patients had two servings, and 20 male patients had three or more servings 10. In the intake of pulses and legumes among female patients, 47 female patients had no intake, 11 female patients had one serving, 18 female patients had two servings, and 6 female patients had three or more servings. A higher number of patients were observed in the category of no intake of pulses and legumes in both male and female patients; the p-value of pulses and legumes intake and gender is 0.319, which is greater than 0.05, indicating statistical insignificance.

Table 6: Comparison between pulses with legumes and gender (maleand female patient)

frequency and their percentages

Pulses and Legumes	Total	Percentage (%)	Male	Percentage (%)	Female	Percentage (%)
No intake	148	59.2	101	60.11	47	57.31
One serving	35	14	24	14.28	11	13.41
Two serving	41	16.4	23	13.69	18	21.95
Three or more serving	26	10.4	20	11.91	6	7.31
P value	0.319					

The comparison between vegetables intake and gender frequency and their percentages was observed and represented in Table 7. In the intake of vegetables among male patients, 52 male patients had no intake, 17 male patients had one serving, 26 male patients had two servings, and 73 male patients had three or more servings. In the intake of vegetables among female patients, 23 female patients had no intake, 13 female patients had one serving, 18 female patients had two servings, and 28 female patients had three or more servings. A higher number of patients were observed in the category of three or more servings in both male and female patients; the p-value of vegetables intake and gender is 0. 00001, which is less than 0.05, indicating statistical significance.

Table 7: Comparison between vegetables and gender (Male andFemale patient) frequency and their percentages

Vegetables	Total	Percentage (%)	Male	Percentage (%)	Female	Percentage (%)
No intake	75	30	52	30.95	23	28.05
One serving	30	12	17	10.12	13	15.85
Two serving	44	17.6	26	15.48	18	21.95
Three or more serving	101	40.4	73	43.45	28	34.15
P value	<0.00001					

The comparison between fruit intake and gender frequency and their percentages was observed and represented in Table 8. In the intake of fruits among male patients, 78 male patients had no intake, 16 male patients had one serving, 26 male patients had two servings, and 48 male patients had three or more servings. In the intake of fruits among female patients, 34 female patients had no intake, 4 female patients had one serving, 15 female patients had two servings, and 29 female patients had three or more servings. A higher number of patients were observed in the category of no intake of fruits in both male and female patients; the p- value of fruit intake and gender is 0.00005, which is less than 0. 05, indicating statistical significance.

Table8: Comparison between fruits and gender (Male and Femalepatient) frequency and their percentages

Fruits	Total	Percentage (%)	Male	Percentage (%)	Female	Percentage (%)
No intake	112	44.8	78	46.43	34	41.46
One serving	20	8	16	9.52	4	4.88
Two serving	41	16.4	26	15.48	15	18.29
Three or more serving	77	30.8	48	28.57	29	35.37
P value	0.00005					

In the intake of milk and milk products among male patients, 60 male patients had no intake, 15 male patients had one serving, 47 male patients had two servings, and 46 male patients had three or more servings. In the intake of milk and milk products among female patients, 31 female patients had no intake, 3 female patients had one serving, 18 female patients had two servings, and 30 female patients had three or more servings, as clearly represented in Table 9. A higher number of patients were observed in the category of no intake of milk and milk products in both male and female patients; the p-value of milk and milk products intake and gender is 0. 00013, which is less than 0.05, indicating statistical significance.

Table9: Comparison between milk with milk products and gender(Male and Female patient) frequency and their percentages

Milk and milk products	Total	Percentage (%)	Male	Percentage (%)	Female	Percentage (%)
No intake	91	36.4	60	35.71	31	37.80
One serving	18	7.2	15	8.93	3	3.66
Two serving	65	26	47	27.98	18	21.95
Three ormore serving	76	30.4	46	27.38	30	36.59
P value	0.00013					

In the intake of non- vegetarian food products among male patients, 87 male patients had no intake, 23 male patients had one serving, 21 male patients had two servings, and 37 male patients had three or more servings. In the intake of non-vegetarian food products among female patients, 42 female patients had no intake, 10 female patients had one serving, 12 female patients had two servings, and 18 female patients had three or more servings, as clearly represented in Table 10. A higher number of patients were observed in the category of no intake of non-vegetarian food products in both male and female patients; the p-value of non- vegetarian food products intake and gender is 0.00001, which is less than 0.05, indicating statistical significance.

Table10: Comparison between non-vegetarian food products andgender (Male and Female patient) frequency and their percentages

Non-vegetarian food products	**Total**	**Percentage (%)**	**Male**	**Percentage (%)**	**Female**	**Percentage (%)**
No intake	129	51.6	87	51.79	42	51.22
One serving	33	13.2	23	13.69	10	12.20
Two serving	33	13.2	21	12.50	12	14.63
Three or more serving	55	22	37	22.02	18	21.95
P value	<0.00001					

In the intake of energy-dense snacks among male patients, 16 male patients had no intake, 14 male patients had one serving, 26 male patients had two servings, and 112 male patients had three or more servings. In the intake of energy-dense snacks among female patients, 8 female patients had no intake, 5 female patients had one serving, 7 female patients had two servings, and 62 female patients had three or more servings, as clearly represented in Table 6.15 and Figure 6. 15. A higher number of patients taking three or more servings of energy-dense snacks was observed in both male and female patients; the p-value of energy- dense snacks intake and gender is 0. 00023, which is less than 0.05, indicating statistical significance.

Table11: Comparison between energy-dense snacks and gender frequency and their percentages

Energy-dense snacks	Total	Percentage (%)	Male	Percentage (%)	Female	Percentage (%)
No intake	24	9.6	16	9.52	8	9.76
One serving	19	7.6	14	8.33	5	6.10
Two serving	33	13.2	26	15.48	7	8.54
Three or more serving	174	69.6	112	66.67	62	75.61
P value	0.00023					

In the intake of energy- dense beverages among male patients, 39 male patients had no intake, 7 male patients had one serving, 42 male patients had two servings, and 80 male patients had three or more servings. In the intake of energy-dense beverages among female patients, 18 female patients had no intake, 7 female patients had one serving, 20 female patients had two servings, and 37 female patients had three or more servings, as clearly represented in Table 6. 16 and Figure 6.16. A higher number of patients taking three or more servings of energy-dense beverages was observed in both male and female patients; the p-value of energy-dense beverages intake and gender is 0.00023, which is less than 0.05, indicating statistical significance.

Table12: Comparison between energy-dense beverages and genderfrequency and their percentages

Energy-dense beverages	Total	Percentage (%)	Male	Percentage (%)	Female	Percentage (%)
No intake	57	22.8	39	23.21	18	21.95

One serving	14	5.6	7	4.17	7	8.54
Two serving	62	24.8	42	25.00	20	24.39
Three or more serving	117	46.8	80	47.62	37	45.12
P value	0.0031					

The comparison of water intake between male and female patients was calculated and tabulated in Table 6.17, and it is graphically represented in Figure 6.17. The water intake of male patients was observed to be 7 .2± 3 .04, while the water intake of female patients was 7.45±3. 71. The p-value for water intake is 2. 92, which is greater than 0.05, indicating statistical insignificance.

Table13: Comparison of water intake of the male and female patients

Water intake	Male	Female
Mean	7.2	7.45
SD	3.04	3.71
P value	2.92	

DISCUSSION

The study reveals a concerning dietary pattern among adolescents in Chengalpattu, characterized by excessive consumption of energy-dense, nutrient-poor foods and insufficient intake of nutrient-rich foods such as vegetables, pulses, and animal products. These poor dietary habits place adolescents at risk of nutrient deficiencies and excessive weight gain, particularly during the critical pubertal period when lifelong eating habits are established.

The influence of food globalization has led to an increase in the consumption of high-calorie, low-nutrient foods and sugary beverages, particularly in urban areas. This study found that over 75% of participants consumed three or more energy-dense snacks and drinks daily, consistent with findings from Singh et al., who reported that 32.1% of secondary school students in New Delhi consumed fast food three or more times per week. The widespread availability and palatability of these foods contribute to their dominance in adolescent diets, increasing the risk of obesity, insulin resistance, and other chronic diseases [8].

The study also found significant disparities in dietary intake based on gender and age. Both male and female adolescents, particularly those aged 16 years and older, showed a high prevalence of overweight status. Most participants consumed three or more servings of cereals, although the intake of pulses and legumes was notably low, with a significant proportion reporting no intake. This decline in pulse consumption aligns with national trends and has been attributed to a decrease in per capita pulse availability.

Vegetable and fruit consumption among participants was also below national recommendations. This is consistent with previous research in both India and internationally, where adolescents showed low daily intake of these essential food groups. For example, the Global School-Based Health Survey reported that 28% of Southeast Asian adolescents consumed fruit less than once daily [9,10].

Furthermore, dairy consumption was observed to be low, particularly among female participants, reflecting a broader trend of decreasing milk intake among adolescents in both developing and developed countries [11].

In summary, the dietary patterns observed in this study underscore the urgent need for targeted interventions to improve adolescents' nutrition. Educational initiatives promoting food literacy and encouraging the consumption of nutrient-dense foods such as fruits, vegetables, and dairy products could play a critical role in reversing these trends and fostering healthier eating habits among Indian adolescents.

CONCLUSION

In general, teenagers aged 14 to 16 who visit the paediatric outpatient department, Shri Sai Medical College and Research Institute camps, and schools in Chengalpattu district demonstrate poor eating habits. They frequently consume energy- dense, nutrient-poor foods and sugar-sweetened beverages, while omitting a variety of healthy foods from their daily diets. This places them at risk of developing chronic degenerative diseases. Given the increasing incidence of food- related illnesses and obesity, it is crucial to encourage adolescents to adopt healthier diets. Effective public health campaigns are needed to target India's teenage population of 238 million. Implementing food literacy programs and enforcing regulations on healthier school food options are essential steps toward promoting healthier eating habits among adolescents. These initiatives aim not only to improve immediate health outcomes but also to establish lifelong healthy dietary patterns.

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