

DIETARY PATTERNS AND NUTRITIONAL AWARENESS AMONG LATER ADOLESCENTS IN CHENNAI: A PILOT STUDY

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Abstract:Background: The period of adolescence is a time of growth and development that requires the adoption of healthy eating habits and adequate nutrition awareness for future health and well-being. The purpose of this pilot study was to evaluate the dietary pattern and nutritional awareness of the later adolescents (17–19 years old) in rural and urban areas of Chennai, India.

Methods: The approach adopted was a cross-sectional pilot study involving 51 later adolescents by administering a structured questionnaire. The data obtained from the questionnaire included socio-demographic, eating habits and nutritional awareness information. Jamovi (version 2.6.26) was used to analyse data. The dietary behaviours were analysed by descriptive data, frequency distribution, reliability analysis (Cronbach's α) and Chi-square tests were conducted to explore the differences between nutritional awareness and place of residence.

Results: The findings showed that many of the participants consumed the breakfast regularly and consumed appropriate number of meals and fruits and vegetables daily. Unhealthy eating habits, however, were also noted including skipping meals, eating lots of snacks, eating late at night, and eating out at restaurants. The internal consistency of the dietary pattern scale was acceptable (Cronbach's $\alpha = 0.739$). Some nutritional awareness variables were found to differ significantly between the teens in the rural and urban areas ($p < 0.05$) such as knowledge on the sources of vitamin C, protein and health risks from overconsumption of sugar.

Conclusion: The study offers preliminary evidence of later adolescents' healthy and unhealthy eating habits, as well as of nutritional awareness levels. The results indicate the need to further enhance nutrition education in the schools, home, and community. The pilot study also proves the feasibility and reliability of the research instrument for the larger study on adolescents in Chennai.

Keywords: Dietary patterns; Nutritional awareness; Later adolescents; Rural–urban differences; Pilot study Chennai

Introduction

The late adolescent period (ages 17-19) represents an important period of rapid physical and psychological development. Dietary habits formed during this stage can have important long-term health consequences, including obesity, micronutrient deficiency, and lifestyle disease's shift has been observed from the consumption of traditional foods to the consumption of ultra-processed, high-energy foods in both urban and rural areas. Although many adolescents believe they know about healthy eating, they continue to have a poorer understanding of nutrition than they do about healthy eating, thus creating a large gap between knowledge and behavior. Nutrition issues and dietary changes in India can be worsened by socioeconomic and cultural factors. Studies show that teenagers are eating more snack foods and sugary drinks than ever before—but not nearly enough fruits and vegetables—which can result in negative health effects. Understanding both dietary patterns and nutritional knowledge of adolescents in Chennai is critical in developing interventions to support long-term healthy eating habits.

the present study aims to assess dietary patterns and nutritional awareness among late adolescents aged 17–19 years in selected rural and urban areas of Chennai using quantitative methodologies to generate comprehensive public health insights. Food consumption patterns in Indian teens are not well understood. The National Family Health Survey-3 and the National Sample Survey Office did not include urbanized Indian adolescent eating patterns in their evaluations; consequently, an absence of research about adolescent food consumption will be a serious obstacle for the creation of effective nutrition education and disease prevention programs. There are considerable differences between boys' and girls' eating behaviors. Studies from around the world link the generally better eating choices made by females than those of males. {24-26}. Generally, females choose to eat less saturated fat, more fruit and dietary fiber, and are more likely than males to choose to limit their intakes of sodium. {24}. For instance, within Australia, adolescent females selected fruits more frequently than males, while males tended to drink more sodas than females. The Census reported that in 2011, approximately 72% of adolescents live in a rural area of India; the percentages of the adolescent population living in urban areas decreased from 21.9% from 2001 to 19.2% in 2011, while those of the rural population remained about the same. There were 268 million adolescent Indians in the ten to nineteen age groups in India as of 2019. As of this moment, India has the world's largest adolescent population. Twenty-one per cent of the entire population of India falls within this age group (10-19 years). Therefore, to satisfy their need for growth and development, there should be enough attention given to the health and nutrition of this demographic profile. The health and nutritional problems affecting adolescents in India are malnutrition, overweight and obesity, anemia, and other nutrition-related disorders. However, the evidence on the nutritional requirements of adolescents aged ten to fourteen years has historically not been systematically reviewed. The literature that is available looks at the dietary patterns of females more than males. Due to globalization and Western influence, adolescent males and

females in developing countries have adopted a more ‘westernized’ way of eating. A global phenomenon is the development of the fast-food industry and fast-food culture. According to market analysis, the fast-food market was estimated at USD 527 billion in 2019, with a projected compound annual growth rate of 4% between 2024 and 2030 USD 750.08 billion by 2031.

Adolescence represents a critical transitional phase characterized by rapid physical growth, hormonal changes, and psychological development. Nutrients are needed for growth spurts, bone mineralization, and development of cognitive faculties when one reaches the late adolescent stage (17 years until 19 years). Poor nutritional intake following either inadequate or incorrect eating habits can lead to health issues like some micronutrient deficiency diseases, anemia, obesity, and the onset of non-communicable diseases. Currently, a nutritional transition is occurring in India where under nutrition is accompanied by over nutrition. The Chennai District of Tamil Nadu has experienced socio-economic changes which have affected the availability of foodstuffs, the dietary habits of people, and their way of life. Although access to food has improved in this area of India, nutritional knowledge is inconsistent especially in rural areas of the country where people do not have access to health education and information on dietary habits. This paper analyzes dietary habits and nutrition-related knowledge of young adults in Chennai. Studies confirm that family dynamics have a significant impact on adolescents’ eating behaviors. Parents with adequate nutrition knowledge are more likely to be role models for their children and assist them in making healthy eating decisions (Berge et al., 2016). It was found that the adolescent girls from the rural parts of India faced problems with stunting and underweight as a result of the consumption of unhealthy food and improper health care. Some anthropometric indicators such as height-for-age, weight-for-age, and BMI may be used for measuring the nutritional status of adolescents (Choedon et al., 2023). Those teenagers who consume a high sugar and low fiber diet are more prone to various metabolic diseases and obesity. Such teenagers are also characterized by sedentary lifestyle and low level of physical exercise (Menezes et al., 2023; Nogueira-de-Almeida et al., 2024).

It is critically necessary to implement efficient home and school-based programs that prioritize dietary education and encourage physical activity in order to counteract these trends. (Raut et al., 2024). In Tamil Nadu, rapid expansion of peri-urban areas such as Vandalur, Padappai, Kolapakkam, Tambaram, and Guindy has led to lifestyle changes that may influence adolescent dietary behaviors. Rural and semi-urban adolescents may face unique challenges, including limited structured nutrition education, peer influence, and accessibility to inexpensive processed foods. Although several national surveys have reported adolescent nutritional issues, updated region-specific data focusing on late adolescents in Chennai are limited. Moreover, few studies have simultaneously examined both dietary patterns and nutritional awareness using a Quantitative method approach

Literature Review

Global Adolescent Diet Trends “Ayu Lestari et al” investigated the diet and food goals of teenage populations around the world. Adolescents consume a lot of ultra-processed foods, which are heavy in sugar and fat but low in dietary micronutrient quality. This contributes to teenage obesity and nutritional deficits. In Kolkata, for example, teenagers' lack of fruit and vegetable consumption has resulted to a pattern of high calorie density from snacks and insufficient fruit and vegetable intake, highlighting the need for more effective nutrition promotion measures. Roy and Saha found that teenagers with higher levels of nutritional literacy make healthier food choices, which leads to better health outcomes. Teenagers' Nutrition and Diet a significant percentage of teenagers routinely miss breakfast, according to Agnihotri et al. This kind of dietary behavior was also demonstrated by the fact that many teenagers prefer to nibble rather than eat nutritious items. In

Indore, India, Solanki et al. looked into how different socio demographic characteristics affected the eating habits and nutrition awareness of teenage girls. Changes in lifestyle and socioeconomic level have been associated with changes in traditional dietary patterns and an increase in the use of Western-style foods. There are some educational inequalities between rural and urban adolescent girls, according to research on nutritional awareness (Arora et al.) that examined differences in nutritional outcomes and knowledge. Studies on youth nutrition awareness have revealed that their knowledge varies, which is strongly related to how well they eat. Three dietary patterns—healthy, junk food, and traditional—were found in Brazilian studies using Principal Components Analysis (PCA), which also showed a relationship between the degree of diet quality and various socioeconomic categories. Other research has found that families with a higher level of functioning and who participate in health-promoting activities are more likely to report positive dietary habits (i.e., eat healthier), whereas families with a lower level of functioning and who engage in health-detracting activities are more likely to report negative dietary habits (i.e., eat less healthy). Research conducted in Northern India revealed that many teenagers in India have varying nutritional statuses, and their dietary and physical activity habits are fast changing. Evidence suggests that adolescents with little dietary diversity are less likely to be undernourished or at risk of developing anemia, however adolescents with limited dietary diversity are more likely to participate in sedentary behavior's and be overweight as a result of eating patterns.

Adolescents around the world tend to have eating habits characterized by high amounts of high-calorie processed food, while they eat low amounts of fruits and vegetables. A systematic review has shown how urbanization and changes to lifestyle are leading to increases in the consumption of ultra-processed foods and sugar-sweetened beverages globally, potentially negatively affecting adolescent health. (Smith et al., 2020). India's Changing Eating Habits Numerous surveys conducted in India have revealed both undernutrition and overnutrition. For instance, a study by Gupta et al. (2019) showed that, especially in urban and semi-urban areas, teenagers are starting to eat more Western-style foods that are higher in fat and sugar. Differences in Nutrition in the City and Country Researchers found that rural youth generally eat a more traditional diet than urban youth such as cereals and pulses; however, urban youth are able to access more junk food and convenience foods. The food environments have changed and affected adolescent eating patterns in every part of the world; therefore, researchers recommend further research on adolescent nutrition in rural versus urban environments in 2026 due to the lack of rural/urban comparisons before this study (Rajesh & Kumar, 2016) Science and Education in Nutrition According to a 2020 study by Sharma & Singh on high school students' nutritional knowledge, students showed a sufficient level of awareness to encourage the intention to eat healthily. It was also shown that a large number of pupils do not fully comprehend the recommended dietary allowance (RDA) for their age and degree of exercise. This suggests that simply knowing about nutrition does not equate to choosing appropriate, healthful eating choices. A cross-sectional study by Thomas et al. (2018) identified breakfast skipping as a common behavior among adolescents, significantly associated with poorer diet quality and lower overall nutrient intake.

According to Verma et al. (2020), it was discovered in alternative research that teenagers residing in cities tend to consume a larger amount of junk food because of the simple access to it as well as with the help of peer pressure from their pals. Socioeconomic Position and Quality of Diet Despite different social statuses of various groups of people, their eating habits can vary dramatically. Rao and Balakrishnan (2022) provided support for this claim by proving that people of higher social status had diversified eating habits and also possessed the understanding of nutrition and the nutrients they were eating i.e., knowledge of food. Influence of Family on Eating Whether Family

Setting and Parents' Level of Awareness of Nutrition has any Influence on Teens' Dietary Patterns appears in the work of Menon et al. (2019) according to which teenagers whose parents have greater knowledge of healthy eating achieve better nutrition than teenagers whose parents pay little attention to eating habits. Food consumption influenced by Culture There is no doubt that cultural habits related to food affect eating behavior. Pillai et al. (2021) conducted research among adolescents living in South India and found out that social and educational standards resulted in the families abandoning traditional eating practices in favor of faster and easier meals.

School environment and eating habits schools have a tremendous impact on the food habits of today's youngsters. Nair and Rao (2020) discovered that adolescents who attended schools with nutrition education programs were more likely to consume healthier meals than those who did not have access to these programs Eating Behavior and Nutrition Knowledge Patel's research team (2021) discovered that having high levels of nutrition knowledge was positively connected with a decreased prevalence of anemia and a greater level of general health among teenagers, particularly in the rural areas Dietary Patterns by Gender Studies have also revealed gender disparities in nutrition awareness and behavior. According to Suresh and Kaur (2023), female teenagers had substantially greater nutritional knowledge than males, but they also engaged in far more dieting behavior. The Impact of Digital Media Reddy and Kumar (2022) conducted a study on teenagers' social media exposure and discovered that junk food marketing on digital platforms boosted adolescents' cravings and inclinations for unhealthy snacking. Psychological Aspects' Impact on Nutrition Poor eating habits have been linked to psychological stress, body image issues, and academic pressure. A research study carried out by George and Jacob (2021) has revealed that emotional eating is correlated with unhealthy eating practices in recent teenagers. There exist some deficiencies in literature as far as recent studies related to certain countries are concerned, particularly with regards to dietary habits as well as nutritional knowledge among the teenagers in the rural and peri-urban areas. The justification behind conducting the study in Chennai area can be cited from the above research. As a conclusion, many research studies have unrealized dietary quality along with the gaps in nutrition knowledge and the correlation between diet and health between the teenagers.

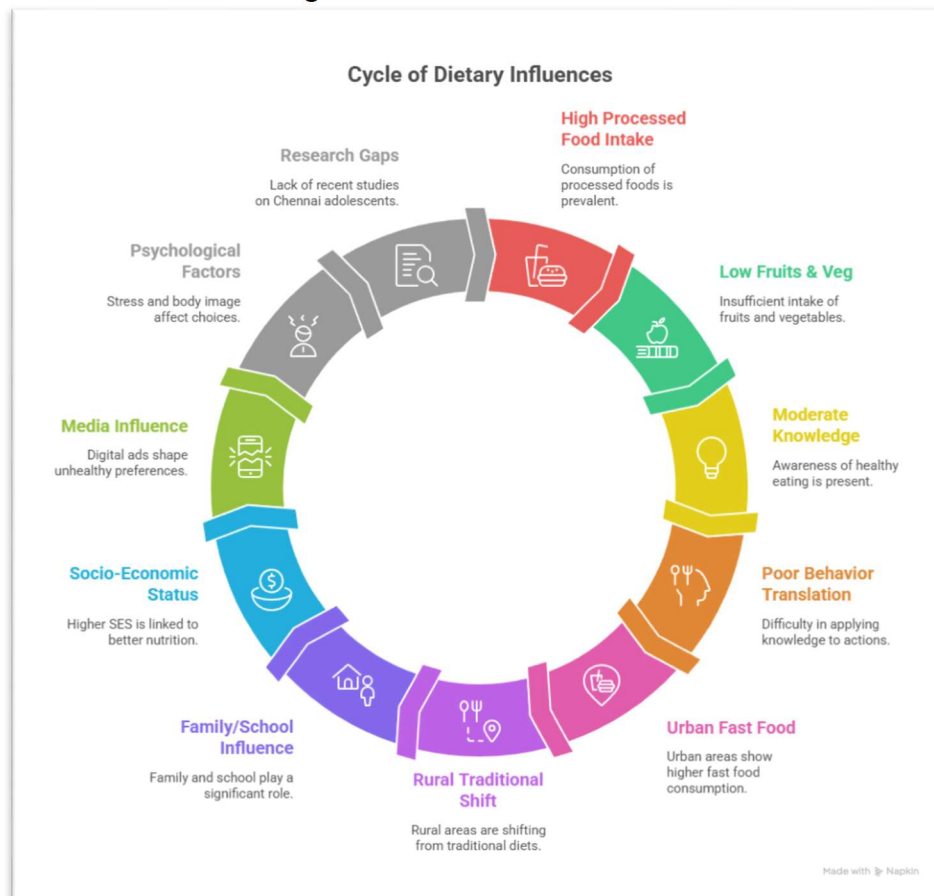
Research Gap

Few studies have particularly examined eating habits and nutritional awareness among late teens (17–19 years old) in the Chennai region, despite the fact that adolescent nutrition is receiving more attention worldwide. Previous research conducted in India mostly looked at broad adolescent populations or concentrated on nutritional status without examining the connection between food practices and nutrition knowledge. Furthermore, there is little and out-of-date research comparing Tamil Nadu's rural and urban populations; some of it was done almost ten years ago. Adolescents' dietary preferences may have changed dramatically in recent years due to rapid urbanisation, more exposure to processed foods, and shifting lifestyle habits.

Therefore, there is a need for updated research that investigates both **dietary patterns and nutritional awareness among late adolescents in rural and urban areas of Chennai**, using this method approach to provide a more comprehensive understanding of current trends and determinants.

Objectives

- To examine the dietary patterns of late adolescents aged 17–19 years in selected rural and urban areas of Chennai.
- To assess the level of nutritional awareness among late adolescents in the study population.
- To compare dietary patterns between rural and urban adolescents.
- To analyze the association between nutritional awareness and dietary habits among late adolescents.
- To identify socio-demographic factors influencing dietary behavior and nutrition awareness among adolescents.



Methodology

Research Design:

The research area totally takes a part of the quantitative Approaches to obtain a comprehensive understanding of the diet pattern and nutritional awareness among the adolescents the age of later age 17 to 19 age limits the quantitative numerical data focus to access diet patterns and diet habits level of nutrition awareness using a structure questionnaire adolescent participate our knowledge of nutrition awareness brief statistical analysis adolescent diet behaviors.

Study Area:

2.1.1 The study was carried out in Chennai's rural and urban areas in the north of Tamil Nadu. The rural participants were recruited from Vandalur, Padapai, and Kolapakkam, while the urban areas of Guindy and Shaidhapet regions were compared. These locations were chosen to

capture the disparities in adolescent populations' knowledge and access to lifestyle, food consumption level, diet scale, and nutritional awareness between rural and urban populations.

2.1.2 study populations:

Participants chosen included late teen boys and girls age 17-19 living in the rural or urban outskirts of Chennai. Each participant had consented to participate in conducting research.

Sampling Method

As part of the recruitment process, participants were recruited using a convenience sample because of accessibility and feasibility. Adolescent youth who met the criteria for inclusion and were available to participate in the study were invited to participate based on data collection period.

Sample Size

The number of Sample is totally **50 adolescents** in the area of level. The sample size adequate for conducting basic statistical analysis and identify the diet patterns and diet habits in adolescent age group finally nutritional awareness among the population

Data Collection Tools

1. **Food Frequency Questionnaire (FFQ)** – used to assess the dietary patterns and frequency of consumption of various food groups such as fruits, vegetables, cereals, dairy products, and fast foods.
2. 1. The Nutritional Awareness Questionnaire was created to assess individuals' understanding of good eating habits, balanced diets, and nutritional sources.
Approval of questions based on expectations and nutrition

Quantitative Phase

The answered questionnaires were entered in to Jamovi for statistical analysis using descriptive statistics (frequency, percentage, mean and standard deviation)

Data Analysis

Data were compiled, coded, and imported into Jamovi statistical software packages for statistical processing and evaluations. Summary statistics were used to define the following: subject's demographic characteristics; subject's nutritional knowledge/level of awareness; and subject's overall eating habits. Comparative analyses were performed using chi-square tests as well as correlation analyses to analyze the relationship between participant dietary practices, level of nutritional awareness, and demographic information.

Results:

Table1; Descriptives

	age	gender	Educational qualification	occupation	place of Residence	Type of Family	Family Income	Residence Status	Parents Education
N	51	51	51	51	51	51	51	51	51
Mean	1.82	1.63	3.24	2.06	1.43	2.08	2.02	2.39	1.76
Median	2	2	3	2	1	2	2	2	2
Standard deviation	0.684	0.488	0.862	0.705	0.500	0.659	0.510	0.777	0.473

Frequencies

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	17	17	33.3
	18	26	51.0
	19	8	15.7
Gender	Male	19	37.3
	Female	32	62.7
Educational Qualification	10th/12th	1	2.0
	Diploma	11	21.6
	Arts & Science	14	27.5
	Engineering/Medical	25	49.0
Occupation of Parent/Guardian*	Daily Wage Worker	7	13.7
	Organized Sector	38	74.5
	Unorganized Sector	2	3.9
	Others	4	7.8
Place of Residence	Urban	29	56.9
	Rural	22	43.1
Residence Status	Hostel	6	11.8
	Day Scholar	22	43.1
	Living with Parents	20	39.2
	Single Parent	3	5.9

Variable	Category	Frequency (n)	Percentage (%)
Family Income (INR/month)	Below ₹10,000	5	9.8
	₹10,001–₹30,000	41	80.4
	₹30,001–₹50,000	4	7.8
	Above ₹50,000**	1	2.0
Type of Family	Joint Family	9	17.6
	Nuclear Family	29	56.9
	Extended Family	13	25.5
Religion	Hindu	40	78.4%
	Christian	07	13.7%
	Muslim	04	7.8%

table 1 summarizes the demographic characteristics of the 51 participants included in the pilot study. The majority of participants were 18 years of age (51.0%), followed by 17 years (33.3%) and 19 years (15.7%). Female participants constituted 62.7% of the sample, while males represented 37.3%. Nearly half of the participants (49.0%) were pursuing Engineering or Medical education, followed by Arts and Science courses (27.5%) and Diploma (21.6%). More than half of the participants resided in urban areas (56.9%), while 43.1% were from rural areas. Most participants belonged to nuclear families (56.9%), and 80.4% reported a monthly family income between ₹10,001 and ₹30,000.

Table :2

Meal Pattern Variable	Response	n	%
Fixed meal timings	Yes	31	60.8
	No	14	27.5
	Rarely	6	11.8
Gap between meals	Yes	38	74.5
	No	6	11.8
	Rarely	7	13.7
Breakfast before starting the day	Yes	41	80.4
	No	7	13.7
	Rarely	3	5.9
Three or more meals per day	Yes	40	78.4
	No	10	19.6
	Rarely	1	2.0
Late-night eating (after 10 PM)	Yes	33	64.7
	No	17	33.3
	Rarely	1	2.0
Skip meals regularly	Yes	29	56.9

Meal Pattern Variable	Response n %	
	No	19 37.3
	Rarely	3 5.9
Snack between meals regularly	Yes	26 51.0
	No	19 37.3
	Rarely	6 11.8

The following table displays the eating habits of the participants. Most of the respondents (80.4%) said they had breakfast before starting their routine, while 78.4% said they ate at least 3 meals per day. About 74.5% of the young people didn't eat their meals immediately after finishing their previous one, and 60.8% stated they observed strict timing of meals. Over half of the participants admitted to eat late at night (64.7%), skipping meals (56.9%), and snacking in between meals (51.0%).

Table 3: Eating Behavior of the Participants

Eating Behavior	Category 1 n (%)	Category 2 n (%)	Category 3 n (%)
Snack between meals regularly	26 (51.0)	19 (37.3)	6 (11.8)
before buying packaged food Read food labels	29 (56.9)	16 (31.4)	6 (11.8)
Eat while watching TV/mobile	24 (47.1)	7 (13.7)	20 (39.2)
Frequently eat in a restaurant	10 (19.6)	19 (37.3)	22 (43.1)
Prefer home-cooked food	20 (39.2)	14 (27.5)	17 (33.3)
Consume restaurant food every week	18 (35.3)	18 (35.3)	15 (29.4)
Continue eating after feeling full	14 (27.5)	17 (33.3)	20 (39.2)
Overeat frequently	15 (29.4)	19 (37.3)	17 (33.3)
Overeat favourite food	18 (35.3)	18 (35.3)	15 (29.4)
Feel regret after overeating	20 (39.2)	18 (35.3)	13 (25.5)
Feel your dietary behaviour is poorer than others	4 (7.8)	28 (54.9)	19 (37.3)
Overeat when eating out (canteen)	19 (37.3)	18 (35.3)	14 (27.5)
Eat when not hungry	25 (49.0)	11 (21.6)	15 (29.4)
Tried to lose weight but not succeeded	26 (51.0)	11 (21.6)	14 (27.5)
Stop eating when feeling full	22 (43.1)	20 (39.2)	9 (17.6)
Eat snacks instead of a regular meal	10 (19.6)	27 (52.9)	14 (27.5)

In Table 3, the characteristics of participants' eating behaviors are displayed. A great percentage among the youth – 56,9% informed they read food labels before buying ready-to-eat foods while 51,0% declared they often eat something between meals. Meanwhile, 49,0% confessed that sometimes they eat even being not hungry and 51,0% said they had previously attempted to lose weight unsuccessfully. Almost 39,2% choose home-made meals while 43,1% notified they are able to stop eating once full. Eating behaviors in terms of restaurant food consumption were demonstrated in different manners which gave the potential to say that there are both good and bad eating behaviors among the participants.

table 4 – Healthy Food Consumption

Healthy Food Consumption Practice	Category 1 n (%)	Category 2 n (%)	Category 3 n (%)
Consume fruits daily	43 (84.3)	6 (11.8)	2 (3.9)
Eat vegetables daily	36 (70.6)	10 (19.6)	5 (9.8)
Consume dairy products	22 (43.1)	10 (19.6)	19 (37.3)
Include protein-rich foods	43 (84.3)	4 (7.8)	4 (7.8)
Prefer multi-grain rice	30 (58.8)	13 (25.5)	8 (15.7)
Eat traditional foods regularly	33 (64.7)	9 (17.6)	9 (17.6)
Eat bread/pizza/fried chicken instead of regular meals	12 (23.5)	27 (52.9)	12 (23.5)
Choose soft drinks/juice instead of water	16 (31.4)	20 (39.2)	15 (29.4)
Eat greasy foods (bhaji/samosa/vada)	14 (27.5)	26 (51.0)	11 (21.6)
Eat instant noodles (e.g., Maggi)	19 (37.3)	23 (45.1)	9 (17.6)
Eat red meat frequently	17 (33.3)	24 (47.1)	10 (19.6)
Eat fast food twice a week	15 (29.4)	20 (39.2)	16 (31.4)
Consume sugary foods frequently	13 (25.5)	17 (33.3)	21 (41.2)

Table 4 presents the healthy food consumption practices of the participants. A high proportion of adolescents reported consuming fruits (84.3%) and protein-rich foods (84.3%) daily, while 70.6% reported regular vegetable consumption. Traditional food intake was reported by 64.7% of the participants, and 58.8% preferred multi-grain rice over white rice. However, unhealthy dietary practices were also evident. Approximately 39.2% reported choosing soft drinks or fruit juice instead of water, 39.2% reported consuming fast food twice a week, and 41.2% selected the third response category for frequent sugary food consumption. These findings suggest that healthy food choices coexist with the consumption of energy-dense and processed foods among later adolescents.

Table 5 – Nutritional Awareness

	Nutritional Awareness Item	Mean	SD
Basic Nutrition Knowledge	C is present in Vitamin	3.39	1.06
	Disease related to high salt intake	2.57	0.58
	Main source of energy for the body	2.16	0.54
	Calcium Source Highest	2.10	0.50
Healthy Dietary Practices	Recommended water intake per day	2.92	0.77
	Skipping breakfast can lead to health problems	2.51	0.73
	Recommended daily fruit and vegetable intake	2.18	0.59
	Healthy snack choice	2.47	0.78
Nutrition Attitudes	Eating habits affect mental and physical health	2.02	0.71
	Overall nutritional awareness	2.59	0.64
Nutrition Behavior	Check food labels before buying packaged foods	2.12	0.65

Nutritional Awareness Item	Mean	SD
I choose food carefully to ensure good health	2.08	0.85

table 5 presents representative nutritional awareness items among later adolescents across four domains: basic nutrition knowledge, healthy dietary practices, nutrition attitudes, and nutrition behavior. Participants demonstrated relatively higher awareness regarding sources of vitamin C (Mean = 3.39, SD = 1.06) and recommended daily water intake (Mean = 2.92, SD = 0.77). Moderate awareness was observed for healthy snack choices, breakfast, and food label reading. Overall, the findings suggest that adolescents possess a moderate level of nutritional awareness, although certain aspects of nutrition knowledge and healthy food choices require further improvement.

Table 6 Association between Place of Residence and Selected Dietary Patterns Variables
Test of
(Chi-square)

Dietary Pattern Variable	χ^2	df	p-value	Cramer's V	Interpretation
Fixed meal timings	5.46	2	0.065	0.327	Not significant
Leave a gap between meals	2.77	2	0.251	0.233	Not significant
Breakfast before starting the day	3.41	2	0.181	0.259	Not significant
Eat 3 or more meals per day	16.80	2	<0.001	0.573	Significant
Eat late at night (after 10 PM)	1.61	2	0.446	0.178	Not significant
Skip meals every day	2.60	2	0.273	0.226	Not significant
Eat Vegetables Daily	11.30	2	0.004	0.471	Significant
Consume Fruits Daily	1.65	2	0.438	0.180	Not significant

A Chi-square test was conducted to examine the association between place of residence selected dietary pattern variables among adolescents. Among the eight dietary variables examined, two showed statistically significant associations with place of residence. The frequency of consuming three or more meals per day was significantly associated with place of residence ($\chi^2 = 16.80$, df = 2, $p < .001$, Cramer's V = 0.573), indicating a strong association. Similarly, daily vegetable consumption was significantly associated with place of residence ($\chi^2 = 11.30$, df = 2, $p = .004$, Cramer's V = 0.471), indicating a moderate-to-strong association. However, no statistically significant associations were found for fixed meal timings, leaving a gap between meals, breakfast consumption, late-night eating, skipping meals, or daily fruit consumption ($p > .05$).

Notes: χ^2 = Pearson Chi-square statistic; df = degrees of freedom; $p < 0.05$ indicates statistical significance; Cramer's V represents the strength of association.

Correlation between Dietary Pattern Score and Nutritional Awareness Score

Nutritional Awareness Variable	χ^2	df	p-value	Interpretation
Knowledge of Vitamin C sources	22.20	3	<0.001	Significant
Knowledge of disease related to excess salt intake	3.72	2	0.155	Not Significant
Knowledge of nutrient essential for muscle building	10.90	2	0.004	Significant
Knowledge of a balanced Indian meal	4.20	2	0.122	Not Significant
Knowledge of the main source of energy	1.46	3	0.692	Not Significant
Knowledge of calcium-rich foods	4.27	3	0.234	Not Significant
Knowledge of health problems caused by excess sugar	9.49	3	0.023	Significant
Knowledge of the function of protein	4.85	3	0.183	Not Significant

presents the association between place of residence and selected nutritional awareness variables among later adolescents. Chi-square analysis indicated that knowledge regarding Vitamin C sources was significantly associated with place of residence ($\chi^2 = 22.20$, $df = 3$, $p < 0.001$). Similarly, knowledge about the nutrient essential for muscle building showed a significant association with place of residence ($\chi^2 = 10.90$, $df = 2$, $p = 0.004$). In addition, knowledge regarding the health problems caused by excessive sugar consumption was significantly associated with place of residence ($\chi^2 = 9.49$, $df = 3$, $p = 0.023$). However, no statistically significant associations were observed for knowledge related to diseases associated with salt intake, balanced Indian meals, the main source of energy, calcium-rich foods, or the function of protein ($p > 0.05$).

Discussion:

The current pilot investigation looked at food habits and knowledge of nutrition among older adolescents in rural and urban locations of Chennai. The present pilot study gives initial proof with regard to the eating habits, food habits, and nutritional awareness among the adolescents, also comparing the difference in adolescent behaviours as per whether they are from urban or rural locations. The results of the present study show that in spite of several adolescents claiming to have adopted healthier eating habits, unhealthy eating practices and lack of nutrition knowledge do exist among them. Also, as it is a pilot study, it shows that the method of study can be used in larger studies. The results were that a good number of adolescents had good eating habits with regular breakfast, regularity in meals, and eating 3 or more meals per day. Eating breakfast regularly is encouraging because breakfast is one meal that helps in improving concentration power, cognitive abilities, and nutritional condition of adolescents. In the same way, the responses of many individuals concerning the fact that they also ate fruits and vegetables regularly show the awareness of healthy eating. But unhealthy eating is also visible with many respondents saying they eat late at night, skip meals, snack frequently, eat outside food, and occasionally eat too much. Such lifestyle choices have been found to lead to bad nutrition status, obesity and a heightened risk of non-communicable diseases among young people. This confirms previous studies that established that several factors including quick transformation of societies, evolution of lifestyles as well as access to great variety of processed foods contributed to shaping the dietary patterns of teenagers in India. The evaluation of nutrition awareness indicated that the respondents had enough information about different aspects of nutrition; however, they still lacked knowledge in certain areas. For instance, most adolescents could easily name the sources of vitamin C; they knew what the function of protein in building muscles was and how harmful excessive consumption of sugar

could be, while they were less aware of healthy nutrition, sources of calcium and diseases related to the excessive consumption of salt. This indicates that even though teenagers are exposed to various nutrition-related information in schools, families, and via media, education concerning nutrition lacks its comprehensiveness. The above-mentioned findings were corroborated by previous studies that also indicated that adolescents have some understanding of nutrition and nutrition-related issues, but they often lack proper understanding of the balanced eating habits and disease prevention. The most interesting aspect of the study was that several significant differences were demonstrated in health awareness indicators between rural and urban teenagers. The Chi-square analysis revealed statistically significant correlations between knowledge of vitamin C sources, nutrients necessary for muscle growth, and health issues linked to excessive sugar intake and place of residence. Variations in educational possibilities, health information access, socioeconomic situations, internet availability, and exposure to nutrition awareness programs between rural and urban communities may account for these disparities. On the other hand, knowledge about balanced meals, foods high in calcium, the roles of proteins, and illnesses linked to salt consumption did not differ significantly between the two groups. These results imply that nutrition education programs should concentrate on enhancing particular areas of knowledge while guaranteeing adolescents, regardless of where they live, equal access to nutrition information. In conclusion, the current research has many important implications as may be evidenced in the pilot study. First of all, reliability analysis showed the acceptable internal consistency of dietary pattern scale (Cronbach's $\alpha = 0.739$) which indicates that the questionnaire is more than appropriate for large-scale research in the future with minor adjustments. Secondly, the successful data collection and data analysis process was completed successfully proving the possibility of conducting further comparative research amongst late adolescents in Chennai. Finally, the results of the study are the first evidence which can help educators, health professionals, nutritionists, and policy-makers in the field of planning nutrition education courses directed towards promoting healthy eating among adolescents. It is important to note that the research has certain limitations, though. Therefore, the research findings should be regarded as preliminary evidence rather than final.

Implications:

This preliminary research tends to increase young people's understanding of health, especially with regard to nutrition. Many young individuals attempt to eat healthily; however, they consume unhealthy products and lack knowledge about nutrition. Therefore, nutrition education programs for the youth are necessary.

This research will make it possible for the educational institutions to develop nutrition education programs. By various events and seminars, the youth will be provided with the knowledge of healthy diets and ways of preventing health problems.

In order to create the healthy environment and adore the healthy diets and nutritional awareness between rural and urban communities, many sociological speaking the adolescent age improves their awareness and requirement with the collaboration of families, educational institutions, medical assistance and based on their community requirement.

Limitations of the Study:

- The participants selected from a different part of Chennai
- The data was collected using self-reported questionnaires and is prone to recall and social desirability bias.
- Food consumption patterns can change over time but the study gathered food consumption data at just one point in time.
- The pilot study used no specific measures of food intake or biochemical tests.
- There were no advanced statistical analyses performed because of the limited sample size.

Conclusion:

This initial research project investigated dietary pattern and nutrition knowledge among young people from city and countryside of Chennai. The results indicate that while the majority of participants practiced good dietary habits like eating breakfast regularly, the frequency of meals, and high intake of fruits and vegetables, there were some negative aspects like missing meals, eating snacks frequently, eating out, and eating at night. The study shows that there some good eating habits amongst young people, but there are still many areas in which improvement can be made.

The evaluation of nutrition knowledge showed that participants had good knowledge about such important nutrition concepts as the role of vitamin C, protein, and dangers of consuming too much sugar. It has been noted that there were still areas where participants lacked knowledge, for instance, choice of healthy products and nutrition-related diseases. The pilot study shows an acceptable level of internal consistency (Cronbach's $\alpha = 0.739$) and validates the feasibility of the research instrument used, indicating its appropriateness for the planned larger study. The findings yield useful insight into the dietary habits and nutrition awareness of adolescents, despite the limited sample size being studied. The findings stress the importance of improving nutrition education within the family, schools, health facilities, and communities. Young people with proper eating patterns may be more successful in school, healthier, and less likely to experience nutrition-related illnesses in adulthood. Further research with a larger and more representative sample of adolescents is needed in order to develop effective interventions and public health initiatives to improve nutrition among the youth in India.

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