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Socio-Economic Status and Frequency of Consumption of Processed Foods Among Rural and Urban Adolescents of Kamrup-Metropolitan District of Assam

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ABSTRACT

Adolescence is a crucial phase characterized by significant physical and psychological changes, and adequate nutrition plays a central role in influencing the overall health and welfare of individuals in this age group. An adolescent who possesses good physical and mental health, as well as a strong educational background, is likely to develop into a productive and knowledgeable member of society in the future. With this background, the present study was carried out to study the nutritional status of rural and urban adolescents of the Kamrup-metropolitan district of Assam. Based on the purposive sampling technique, a total of 200 adolescents were selected. A standardized pre-tested questionnaire was developed to collect information on the socio-economic status and frequency of consumption of processed foods in both rural and urban regions with 100 adolescents. A cross-sectional comparative study was undertaken in a sample of schools, with the participation of 200 teenagers aged 13-18 years. The sample was divided equally between rural and urban locations. Findings revealed that the majority of individuals in rural areas belonged to the low-family income group (54.0%), whereas the majority of urban adolescents belonged to the high-income group (63.0%). A higher number of adolescents ate outside food in urban areas (83.0%) compared to rural areas (65.0%).

Keywords: Health, Well-being, Processed foods, Adolescents, Diet, Snacking

INTRODUCTION:

According to the World Health Organization (WHO), adolescence is delineated as the phase of human maturation and advancement that transpires after childhood and precedes adulthood, encompassing the age range of 10 to 19 years (WHO., 2016). Globally, adolescents constitute one-fifth of the total global population (UNICEF., 2018 and WHO., 2022). Approximately 87% of adolescents are in developing nations, with India hosting the biggest adolescent population, accounting for 21% of the total Indian population (Population Projection Report., 2020). Therefore, the concern for adolescent health is particularly significant due to the considerable population of young individuals, particularly in India.

The phase of adolescence, which encompasses the transition from childhood to adulthood, is characterized by a quick and profound development in physiological, psychological, and sexual aspects (WHO., 2020). Additionally, this period is characterized by growth spurts and heightened levels of physical activity

(Soliman *et al.*, 2022). Consequently, teenagers require a greater quantity of essential nutrients in comparison to adults. Insufficient dietary intake can result in delayed onset of sexual maturation and decelerated linear growth (UNICEF., 2018). The monitoring of nutritional indicators has played a crucial role in both the Millennium Development Goals and the Sustainable Development Goals. However, their primary concentration has been on children under the age of five (UN Millennium Development Goals 1 and 2., 2015). Despite the undeniable significance of nutrition to the growth and development of adolescents (10-19 years old), they are often overlooked in nutrition surveys (Aiga et al., 2019).

Ensuring an adequate and accurate supply of nourishing food is crucial for the optimal growth and development of children of school age. Issues often arise, particularly when there is inaccurate and misleading information being circulated. These defects adversely affect the biological systems and organs of many children. (Rokhmah *et al.*, 2020). Recognizing the prevalence of snacking and its impact on health, it is evident that individuals require more energy in the intervals between meals (McKeown and Nelson, 2018). Teenagers today commonly opt for snacks as their preferred choice. Adolescents typically prioritize taste above nutrition when selecting snacks, resulting in a tendency to opt for snacks that are heavy in salt, sugar, or fat instead of healthier alternatives such as fruits and vegetables (Cross *et al.*, 2016). Despite a general enthusiasm for consuming healthier foods and snacks, there is an increasing availability and consumption of highly processed, ready-to-eat snacks (Ridder et al., 2019). Most adolescents do not comply with the suggested dietary guidelines, potentially affecting their overall health (Ridder *et al.*, 2019). Nevertheless, Bassett *et al.* (2020) showed that increased teenage dietary autonomy does not necessarily result in healthier food selections. Adolescence is a period when snacking tends to increase (Dunford and Popkin, 2018). Moreover, it is common for teenagers to opt for unhealthy snacks (Larson *et al.*, 2013).

Although there is a potential connection between consuming snacks and obesity, and it has been reported that snacking is common among teenagers, there has not been a thorough investigation of the eating habits of adolescents. Limited information is available regarding the circumstances surrounding snacking in adolescents or the potential impact of snacking on other dietary behaviours, such as meal skipping. The current investigation was carried out among adolescents to evaluate the frequency of consumption of processed foods.

MATERIALS AND METHODS:

Study design and selection of locale: A cross-sectional comparative study was carried out in schools purposively selected in rural and urban areas of the Kamrup metropolitan district of Assam. The two rural schools selected for the study were 1) Swahid Kushal Konwar High School, Panikhaiti and 2) Chandrapur High School, Chandrapur. The two Urban schools selected for the study were 1) Pub Guwahati High School, Bamunimaidan and 2) St.Vivekananda English Academy, Maligaon. A total of 200 adolescents (100 from rural and 100 from urban) in the age group of 13- 18 years studying in 7^{th} - 12th standard were randomly selected. Out of 200 adolescents, 87 were males, and 113 were females.

Data collection tool: The quantitative data were collected using a pre-tested semi- structured questionnaire. The questionnaire was developed to collect the information on Family status, such as religion, type of family, family size, family members, socio economic status, which include the occupation, education and family income of the parents. The frequency of consumption of processed foods was assessed using the questionnaire including.

The respondents parents education of Parents classified as a) Illiterate, b) Primary, c) High School d) PUC,

e) Degree/Post graduate. The total income of the respondent's family from all the available resources in a month was taken into consideration. The data was classified into three distinct categories: Rs 10,000-20,000 (Low income), Rs 21,000-30,000 (Moderate income), and over Rs 31,000 (High income). Food frequency of processed foods was classified as daily, weekly (once, twice and thrice), fortnightly, once in month, rare and never. The types of processed foods are categorized into 14 different groups according to the popularity of processed foods among adolescents. The groups are chips, cake, bread, biscuits, packaged foods, fast food, chocolate, processed juice, chats, pizza, noodles, burger, french fries, and others.

Analysis : Data was analyzed using suitable statistical tests.

RESULTS AND DISCUSSIONS:

Table 1

Classification of respondents by Family related characteristics and socio-economic status

Characteristics	Group	Urban (n=100)		Rural (n=100)		Total (n=200)		$\chi 2$ Test
		N	%	N	%	N	%	
Religion	Hindu	93	93.0	88	88.0	181	90.5	1.45 ^{NS}
	Muslim	7	7.0	12	12.0	19	9.5	
Type of Family	Nuclear	84	84.0	98	98.0	182	91.0	11.96 *
	Joint	16	16.0	2	2.0	18	9.0	
Family Size (members)	2-3	22	22.0	20	20.0	42	21.0	1.87 ^{NS}
	4-5	66	66.0	61	61.0	127	63.5	
	6+	12	12.0	19	19.0	31	15.5	
Family Income /month (000's)	Rs. 10-20 (Low)	16	16.0	54	54.0	70	35.0	89.41 *
	Rs. 21-30 (Moderate)	21	21.0	45	45.0	66	33.0	
	Rs. 31+ (High)	63	63.0	1	1.0	64	32.0	

Classification of respondents by Family related characteristics and socio-economic status:

In Table 1: The data indicate that the majority of respondents in both urban and rural areas were found to be Hindu faith,within urban (93.0%) and in rural areas (88.0%). On the contrary, it was observed that only a small percentage of respondents, in the urban area (7.0%) and rural area (12.0%) were Muslims. Rural areas had a higher percentage of nuclear families (98.0%) compared to urban areas (84.0%). In contrast, urban areas have a higher percentage of joint families (16.0%) compared to rural areas (2.0%). The results showed more number of nuclear families as compared to joint families both in urban and rural areas depicting the present pattern of families in Assam. Kansagara *et al.* (2018) found similar results in a study on nutritional intake among school-aged girls in rural and urban Jamnagar district, where the majority of respondents were from nuclear families. Similarly, Onyiriuka *et al.* (2013) and Konwar *et al.* (2019) found that the majority of the respondents belonged to nuclear families in both rural and urban.

The distribution of family size between urban and rural respondents depicted that a higher percentage

belonged to the 4-5 group of family size from urban (66.0%) and rural areas(61.0%). Whereas only a small percentage belonged to the 6+ group of family size from urban (12.0%) and rural (19.0%) respondents. There is a slightly higher prevalence of larger family sizes (6 or more members) in rural areas, as indicated by a higher number of siblings reported by respondents residing in rural regions from the previous results.

A Maximum number of respondents were in the Rs. 10,000-20,000 income group from rural areas (54.0%) compared to urban areas (16%). Followed by, the Rs. 21,000 – 30,000 income group, the majority were from rural (45.0%) in comparison to urban areas (21.0%). A majority (63.0%) of urban area respondents were categorized in the Rs. 31,000+ group. The observed income inequalities between urban and rural areas in Assam can be ascribed to a range of socioeconomic and structural reasons. These factors have led to a concentration of high-income parents in urban areas and low-income parents in rural areas. The findings indicated that a greater proportion of respondents residing in rural areas fell within the income bracket of Rs. 10,000- 20,000 primarily due to the fact that a majority of their parents were engaged in self-employment smaller level occupations such as farming, house-keeping, masonry, weaving, and carpentry. Conversely, a majority of respondents from urban areas belonged to the income group of Rs. 31,000 largely because their parents were government employers. Cities like Guwahati, the largest urban center in Assam, attract businesses and industries, potentially leading to higher income levels. (Anonymous, 2019). A similar finding was reported by Hassan et al. (2017), and Goyal and Talwar (2020), with the majority of respondents belonging to low Rs. 4,000- 12,000 income from a rural area.

Table 2
Classification of Respondents by Occupation and Education of Parents

Characteristics	Group	Urban (n=100)		Rural (n=100)		Total (n=200)		χ^2 Test
		N	%	N	%	N	%	
Occupation (Father)	Govt.	27	27.0	2	2.0	29	14.5	39.45 *
	Private	27	27.0	32	32.0	59	29.5	
	Business	24	24.0	12	12.0	36	18.0	
	Self-employed	22	22.0	54	54.0	71	35.5	
Occupation (Mother)	Others	13	13.0	39	39.0	52	26.0	17.56 *
	Housewife	87	87.0	61	61.0	148	74.0	
Education (Father)	Upto Middle	10	10.0	23	23.0	33	16.5	70.29 *
	High School	24	24.0	39	39.0	63	31.5	
	PUC	13	13.0	37	37.0	45	22.5	
	Degree/ PG	53	53.0	1	1.0	39	19.5	
Education (Mother)	Upto Middle	16	16.0	48	48.0	64	32.0	66.63 *
	High School	28	28.0	48	48.0	76	38.0	
	PUC	26	26.0	3	3.0	29	14.5	
	Degree/ PG	30	30.0	1	1.0	31	15.5	

Classification of Respondents by Occupation and Education of Parents:

The distribution of occupation of fathers between urban and rural respondents depicted that 27.0 per cent and 29.0 per cent were in government sectors from urban and rural respondents respectively. Further, 27.0 per cent and 32.0 per cent were in the Private sectors from urban and rural respondents respectively. Interestingly, 24.0 per cent and 19.0 per cent did Business and were self-employed respectively in urban areas, whereas 12.0 per cent and 52 per cent did business and were self-employed in rural areas respectively. Equal numbers of fathers of urban adolescents were observed to be in government and private sectors. Whereas in the rural majority were self-employed followed by private. Very few (2.0 %) were in government service. As the state of Assam possesses a notable agricultural sector, with a substantial number of rural inhabitants actively involved in farming and its associated endeavors. Self-employment within the agricultural sector is a prevalent means of sustenance in rural regions. Apart from agriculture, other common occupations and activities in rural Assam include tea plantations, livestock farming, handicrafts and handlooms, fishing, and forestry. The distribution of occupation of mothers between urban and rural respondents depicted that 13.0 per cent from urban areas and 39.0 per cent from rural areas were in different sectors like government, private and self-employed. It was very interesting to note that 87.0 per cent of urban respondents were housewives, which was slightly higher than (61.0%) in rural areas. The results showed that majority of women in rural area were engaged in different sectors as compared to urban women where majority of them were housewives. This maybe because women in rural areas may work as daily wage laborers, participating in construction projects, agricultural labor, manual labor-intensive tasks, or were engaged in traditional crafts such as weaving, pottery, basket making, and embroidery to meet the daily needs but in case of urban women only a small per cent of women were engaged in different sectors maybe as their husbands were earning well. The findings of the study was similar to that reported by Biswas and Banu (2023) where the proportion of women engaged in the workforce was double in rural India than the urban.

Maximum (53.0%) fathers of urban areas were graduates contrary to rural areas (1.0%). Further, a maximum number of fathers in rural areas (39.0%) completed their education till high school level compared to urban areas (24.0%). The data subjected to statistical tests revealed the difference in education of fathers found to be significant ($\chi 2 = 70.29$ *). Urban locations generally exhibit superior accessibility to educational institutions, encompassing universities and colleges, hence providing an extensive array of graduate and postgraduate programs. On the other hand, it is worth noting that rural regions often have constraints in terms of educational infrastructure, hence presenting more difficulties for inhabitants in their pursuit of higher education. Similar studies were reported by Konwar *et al*. (2019) where only 1.0 per cent of the respondents' fathers were graduates in tea garden estates of Assam. Education of mothers showed that 16.0 per cent and 48.0 per cent of urban and rural residents, respectively, had their education up to middle.

Majority of the mothers in urban areas were graduated compared to only 1 per cent in rural areas. As in some rural areas, traditional gender roles and cultural norms may prioritize early marriage and household responsibilities over women's education. In urban areas, there may be greater acceptance of women pursuing higher education. Poverty can also lead to early marriages in some rural areas, as families may see marrying off their daughters as a way to reduce the financial burden. Similar findings were reported by Omobuwa *et al.* (2014), and Ali *et al.* (2016) that majority of the respondents came from families whose mother's were illiterate or had their education up to middle class.

Table 3:
Frequency of processed food consumption

Sl No.	Foods	Place	Frequency of Processed Food Consumption (%)							
			D	W3	W2	W1	FN	M	R	N
1	Chips	Urban	25	19	27	14	6	0	8	1
		Rural	30	25	17	21	1	2	2	2
2	Cake	Urban	5	25	15	34	8	5	5	2
		Rural	18	17	12	27	3	12	7	4
3	Bread	Urban	9	25	22	29	9	1	4	1
		Rural	19	20	23	17	0	11	4	6
4	Biscuits	Urban	45	17	8	15	9	3	1	2
		Rural	58	12	10	6	4	1	1	8
5	Packaged foods	Urban	12	11	18	15	20	9	8	7
		Rural	13	11	8	21	11	13	11	12
6	Fast foods	Urban	7	19	14	22	22	12	4	0
		Rural	13	15	19	17	11	13	7	5
7	Chocolate	Urban	21	19	20	22	11	5	2	0
		Rural	30	30	14	10	1	7	5	3
8	Processed juice	Urban	8	12	23	22	20	6	6	3
		Rural	6	10	16	18	13	14	7	16
9	Chats	Urban	1	11	16	29	14	12	15	2
		Rural	3	9	17	14	5	19	18	15
10	Pizza	Urban	0	6	6	14	23	22	15	14
		Rural	0	1	9	5	8	15	13	49
11	Noodles	Urban	2	7	22	18	15	22	10	4
		Rural	3	15	14	18	17	13	13	7
12	Burger	Urban	0	9	4	16	15	16	20	20
		Rural	0	3	3	3	8	13	16	54
13	French fries	Urban	0	1	0	8	9	17	42	23
		Rural	0	1	1	0	1	8	11	78

Frequency of processed food consumption:

It was evident from the findings that processed food consumption like chips, cake, bread, biscuits, packaged foods, fast foods, chocolates, and chats were consumed at higher frequency, especially by the rural respondents. Other processed foods like juice, pizza, burgers, french fries, and noodles were consumed in high frequency by the urban respondents as compared to the rural respondents. A greater proportion of respondents residing in rural areas reported consuming chips, biscuits, and chocolates compared to those residing in urban areas. This disparity may be attributed to the limited availability of pizza, burgers, and french fries in rural regions, as well as the relatively lower cost of chips, bread, and chocolates in comparison to pizzas and burgers. According to a survey conducted in Philadelphia, teens most frequently purchase beverages and chips from corner businesses (Kerr et al., 2022). Fast food items like pizza, noodles, burgers, and french fries showed relatively lower consumption percentages compared

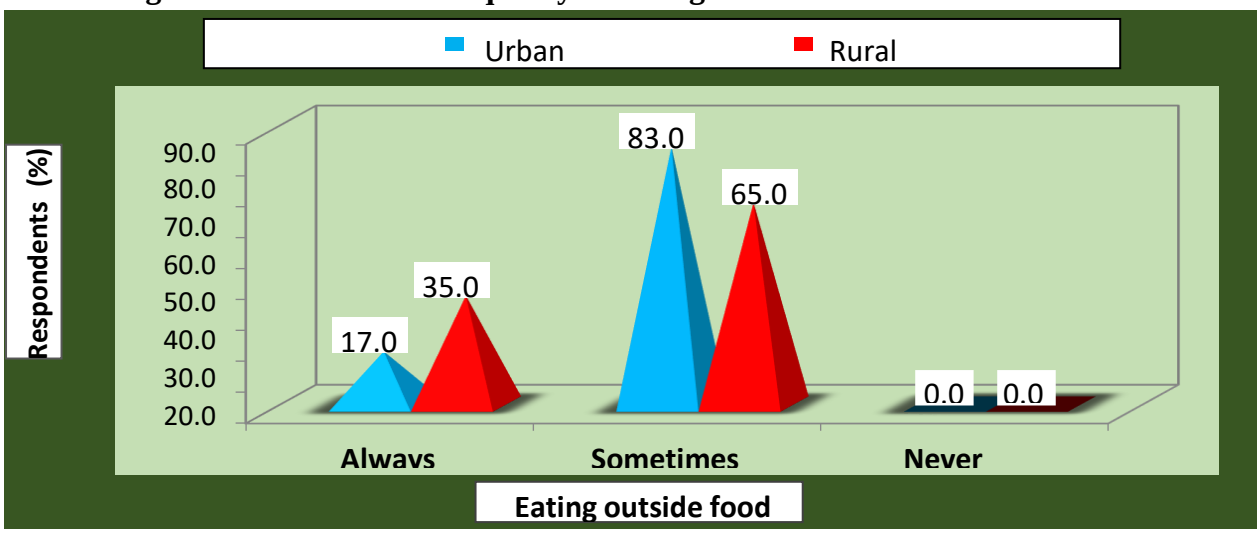
to other processed foods. However, their consumption is generally higher in urban areas, which is consistent with the trend of urbanization and the availability of fast-food outlets in cities. Similar study conducted by Dhobale et al. (2016) reported that the frequency of eating processed food items was considered on the basis of daily or occasional eating among adolescents in Assam. These food items are like dry snacks, bakery products, non-vegetarian food, samosa, pizza and carbonated drink.

A study conducted on snack consumption patterns by Jensen et al. (2019) reported that snacks consumed daily, 95.2 per cent of children and 89.9 per cent of adolescents reported at least one snacking event. Ali et al. (2016) observed that 86.90% of adolescent girls consumed junk foods almost every day, and the association between junk food intake and the BMI of the adolescent girls was not found to be statistically significant ($p = 0.663$). Similarly, Abiola (2017) found that snack eating patterns among in-school teenage adolescents were significant since they were linked to energy and nutritional intakes, as well as BMI. The majority of respondents (43.8 per cent) said they ate snacks once a day. More than half of them (91 percent) said they ate snacks in the afternoon. Fresh fruits, doughnuts, egg rolls, plantain chips, buns, sausage rolls, and soft drinks are also popular snacks. The majority of the student's meal and snack patterns (25 percent) consisted of three main meals plus three snacks per day. There was a considerable disparity in meal and snacking patterns, with the majority (25 per cent) eating three main meals plus two snacks per day.

In an alternate study by Kucharczuk et al. (2022), it was reported that dairy beverages and ready-to-eat breakfast cereals ranked top ten among children, whereas empty sugars and carbonated beverages ranked top ten among adolescents. Fruits and vegetables were the most commonly consumed snack food category in children (40.0 %), but grain-based desserts ranked first in adolescents (46.0 %).

Also, social media plays a role in adolescents' food choices. The present study revealed two major findings: adolescents were more likely to recall unhealthy food, and celebrity influence was a common component of the advertisements, especially among urban respondents. Adolescents recognize the significance of maintaining a nutritious diet, however Stevenson et al., (2020) discovered that they struggle to give it high priority. The study conducted by Bissonnette and Contento (2015) revealed that adolescents possess a conceptual understanding of the nutritional value of foods, but they demonstrate minimal care for their long-term health, resulting in a lack of significance placed on healthiness. McKeown and Nelson (2018) found that adolescents commonly opted for an unhealthy diet characterized by a scarcity of fruits and vegetables, and an abundance of fat and carbohydrates.

Fig. 1: Classification of frequency of Eating outside food based on Residence

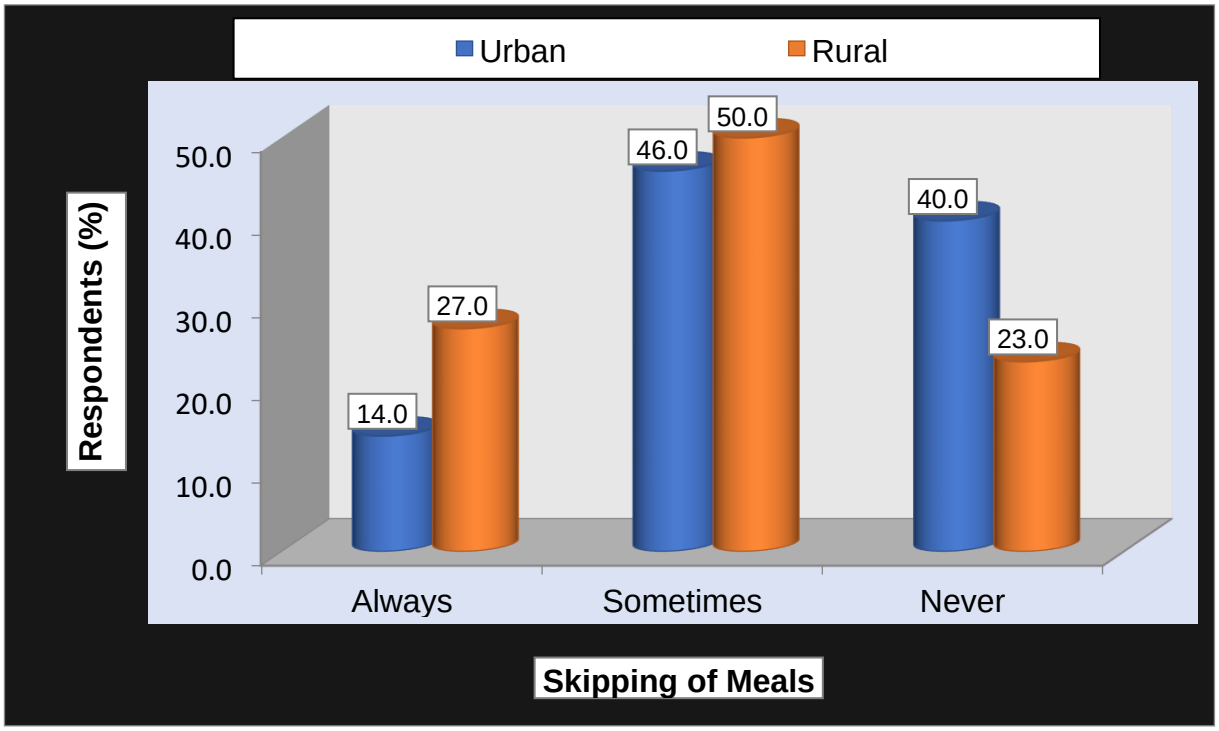


Outside eating:

Practice like eating outside by the respondents is given in Table 14. The results showedthat the majority of the respondents eat outside food sometimes, which consists of both urban (83.0%) and rural (65.0%) respondents. On the contrary, only 17.0 per cent of urban respondents and 35.0 per cent of rural respondents eat outside food always.

Majority of the urban respondents were found to eat outside when compared to rural. As, urban areas generally have a greater density of dining establishments, including restaurants, cafes, fast-food establishments, and street food vendors. The wide array of dining choices available in urban areas enhances the convenience of dining out for inhabitants. Urban areas typically have well-established food delivery services and apps that offer a wide selection of restaurant dishes. This makes it even more convenient for urban residents to order food from their favourite eateries. In rural areas shops and food outlets are not easily accessible to the respondents which may be attributed to various factors, including economic constraints. Evidence indicated that adolescents residing in urban settings have unhealthy snacking patterns and commonly consume snacks high in energy but low in nutrients. Based on a survey carried out in Philadelphia, adolescents predominantly buy beverages and chips from corner establishments (Kerr et al., 2022). In a similar study by Ogungbayi et al. (2020) who conducted a study on the snacking behaviors of students at Olabisi Onabanjo University in Ogun, Nigeria. The study specifically examined the students' frequency of consuming snacks, assessed the factors that influenced their snack consumption, and explored their beliefs of the health impacts of snack consumption. A total of 394 university students were selected through a multistage random sampling method, and information was gathered using a standardized questionnaire. The findings indicated that students sporadically consumed snacks throughout breakfast and dinner.

Fig. 2: Classification of Skipping of meals based on Residence



Skipping of meals:

From the above results, it was found that the majority of rural respondents skipped breakfast compared to urban areas. This may be because in some rural areas, adolescents may have to travel long distances to attend school. Long commutes can result in disrupted meal schedules, particularly breakfast. A significantly greater proportion of participants in urban regions reported skipping lunch compared to those in rural areas. This disparity can be attributed to the fact that in rural areas, mid-day meal is provided on a daily basis, following a proper food menu. It was also found from the results that urban respondents skipped dinner more comparedto rural respondents as urban areas typically have a higher density of restaurants and food delivery services. Adolescents in urban settings may have easier access to dining out or ordering takeout, which can lead to the perception that a proper dinner at home is less necessary. Consequently, individuals in rural areas tend to skip breakfast and have a proper lunch at school.

Similar study was reported by, Otuneye *et al.* (2017), noted a variety of unhealthy eatingpractices among the study's adolescent participants. About 9.5 per cent of people skipped meals frequently, with breakfast being the meal that was skipped the most frequently by 4.6 per cent of adolescents. However, the report by Onyiriuka *et al.* (2013) lists several justifications for skipping breakfast, including lack of morning appetite, lack of time, lack of readily available food, self-perceived overweightness, and religious considerations. In their study of 2097 urban adolescents school girls weight status and eating habits, they found that 48.1 per cent of them acknowledged skipping at least one meal per week. Renjini *et al.* (2014) stated in the study that most of the subjects had the habit of skipping meals especially breakfast (89%).

Conclusion:

The study done in the Kamrup Metropolitan District of Assam demonstrates notable disparities in the socio-economic position and dietary habits, specifically in the intake of processed food, among rural and urban adolescents. Urban adolescents, who mostly originate from higher-income families with parents who have higher levels of education, are more likely to consume a wide variety of processed foods and dine out more frequently. This is because they have easier access to food outlets. Rural adolescents, especially those from lower-income households, tend to primarily consume cheap processed foods such as chips and biscuits. Additionally, they are more prone to skipping breakfast due to logistical difficulties. These eating patterns emphasize the necessity of specific nutritional interventions designed to address the distinct difficulties faced by each demographic. The study emphasizes the need of encouraging healthier dietary practices among adolescents and proposes additional investigation to examine the lasting health consequences linked to these behaviors.

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