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Meal Pattern of Urban Adolescents of Different Socio-economic Status Groups in Delhi

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Abstract

Introduction and Methods: A community-based cross-sectional, descriptive study was carried out on urban adolescents (*n* = 545, 11–18 years, 62.0% girls) residing in Delhi. Information pertaining to their detailed meal pattern was collected. **Results:** Approximately 75% adolescents from urban slums (US), low income group (LIG), and middle income group (MIG) were non-vegetarian. Highest percentage of vegetarians (27.4%) and ovo-vegetarians (19.9%) belonged to high income group (HIG). Adolescents from HIG reported the highest mean number of meals (weekdays - 5.16 ± 0.887 and weekends - 4.85 ± 1.026) and adolescents from LIG reported the lowest mean number of meals (weekdays - 4.31 ± 0.777 and weekends - 4.26 ± 0.846). Dinner was the main meal consumed by ≥99% adolescents from all four SES both on weekdays and weekends. Highest proportions of adolescents from LIG were consuming other main meals such as breakfast (97.8%) and lunch (97.0%) on weekdays and weekends. Adolescents from HIG reported the lowest daily breakfast consumption (68.5%) in comparison to other groups. Fixed times for main meals were reported by 62.6% and 54.5% adolescents on weekdays and weekends, respectively. Majority of adolescents having fixed times for main meals on weekdays and weekends belonged to HIG (74.0%) and MIG (61.5%), respectively. Majority of adolescents commonly skipping main meals on weekdays and weekends belonged to MIG (53.1%) and US (37.3%), respectively. It is found that the adolescents from LIG, who reported consuming the lowest mean total number of meals on weekends, also reported the lowest percentage of skipping main meals on weekends (21.5%).

Keywords: Adolescents, Breakfast, Meal pattern, Socio-economic status, Urban
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Introduction

India is home to 253 million adolescents (10–19 years).[1] According to Census 2011, adolescents constitute 236.5 million or 19.6% of the total population of India.[2] The period of adolescence pertains to rapid changes in body weight and height, hormonal changes, sexual maturity, and mood swings.[3] This period provides a window of opportunity for improving nutritional deficiencies occurred in childhood, for catching-up on growth, and for establishing recommended dietary behaviors.[1] Dietary guidelines for Indians formulated by ICMR-National Institute of Nutrition, Hyderabad suggest intake of a balanced diet during adolescence for optimum growth and boosting immunity.[3] Adolescents who do not confirm to healthy eating habits are prone to diet-related non-communicable diseases.[4] Faulty dietary habits make adolescents susceptible to obesity which, in turn, increases the risk for non-communicable diseases such as diabetes mellitus, hypertension, cardiovascular disorders, and hormonal imbalances in future.[5] The report on "Adolescent, Diets and Nutrition" by Comprehensive National Nutrition Survey revealed that malnutrition peaks during early adolescence. The report also highlights the rising problem of micronutrient deficiencies, unhealthy diets, overweight, and anemia among Indian adolescents aged 10–19 years.[6] Awareness among adolescents to cut down fat, salt, and sugar consumption can have a major impact at the population level.[4] Thus, it is important to study the meal pattern of adolescents.

Meal pattern is described as an individual's eating pattern at the "meal" level, namely, main meal (breakfast, lunch, and dinner) or a snack. Meal pattern also includes assessment of frequency, regularity, timing, and skipping of meals.[7] Every stage of childhood is characterized with distinctive nutritional needs, risks, and eating behaviors. During adolescence, habits such as snacking and skipping/missing meals become more common.[8] Out of all meals, skipping breakfast, in particular, has been associated with diet quality inversely.[7]

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Not much data are available on detailed meal pattern of urban Indian adolescents. This paper is an attempt to throw some light on the meal pattern of urban adolescents of Delhi belonging to different SES groups.

Methodology

The study was conducted among urban adolescent girls and boys aged 11–18 years (*n* = 545) residing in Delhi. West and Southwest Delhi were purposively selected out of 11 districts of Delhi. This was a community-based cross-sectional and descriptive study. Households in selected urban areas were classified into different SES, namely, high income group (HIG), middle income group (MIG), low income group (LIG), and urban slums (US) based on class and type of houses.[9] Figure 1 gives the criterion for classification of households into HIG, MIG, LIG, and US. Data for US, LIG, and MIG were collected from the community. But response from HIG

community was poor. Therefore, data for HIG were collected from a school catering to this income group.

Information on socio-economic and demographic profile and meal pattern was collected using a pre-tested, interviewer-administered interview-schedule from purposively selected adolescents. Information collected on meal pattern of adolescents included:

- Food habits (vegetarian, ovo-vegetarian, or non-vegetarian)
- Type of meals consumed usually, namely, main meals (breakfast, dinner, and lunch) and snacks (mid-morning/school-lunch, tea-time, and bed-time)
- Total number of meals consumed
- Adherence to fixed meal times and reasons for not having fixed meal times
- Skipping meals and reasons for doing the same; and
- Breakfast consumption.

Information was collected separately for weekdays and weekends, where applicable. Reference period was 1 month before data collection. Data were analyzed using IBM Statistical Package for the Social Sciences version 21. Results are presented as frequencies. Column percentages have been reported in the tables. Association between different SES groups was assessed using Pearson Chi-square test. $P < 0.05$ was considered as significant. Strength of association between significant variables was assessed using Cramer's V. The results presented in this paper are a sub-section of a larger study assessing the consumption pattern of high fat, salt, and sugar food items among Delhi adolescents. The study protocol has been approved by the Institutional Ethics Committee, Lady Irwin College, University of Delhi. Data were collected between November 2018 and February 2020.

Results

This section provides details of the study population with respect to their socio-economic and demographic profile and their meal pattern. Socio-economic and demographic profile: The classification of adolescents into different SES is provided in Table 1.

The study sample comprised 62.0% girls and 38.0% boys overall. LIG had the highest percentage of girls (89.6%) and HIG had the highest percentage of boys (54.1%) among all SES groups. The mean age of the study population was 13.6 ± 2.0 years. Adolescents belonging to LIG had the highest mean age as compared to other SES groups.

Approximately 82% adolescents were enrolled in school [Table 2]. The SES group having maximum number of adolescents not enrolled in school/college at the time of data collection was LIG (44.4%). The area from where data for LIG were collected was predominantly inhabited by Gujarati community. The occupation of majority of people of this community was selling utensils on foot (bartano ki ferry). Children from this community started working either along with their parents (both girls and boys) or in factories (mostly boys) from a very early age. This is the reason why majority of adolescents from this group did not go to school/dropped out of school. All adolescents from HIG were enrolled in school as data for this income group were collected from a school.

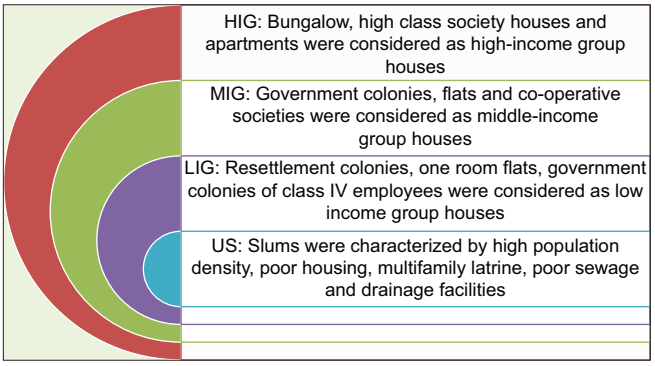

Figure 1: Criterion for defining households into HIG, MIG, LIG and US

Food Habits of Adolescents

Almost three-fourth of the study population (75.2%) was non-vegetarian, 14.1% was vegetarian, and 10.6% was ovo-vegetarian [Table 3]. Comparison among SES showed that more than 75% adolescents from US, LIG, and MIG were non-vegetarian. Moreover, the highest percentage of vegetarians (27.4%) and ovo-vegetarians (19.9%) belonged to HIG. A highly significant association ($P < 0.001$) was reported between adolescents belonging to different categories of SES and their food habits ($\chi^2(6) = 66.935$; Cramer's V = 0.248).

Total Number of Meals Consumed on Weekdays and Weekends

The mean total number of meals (main meals + snacks) consumed by adolescents on weekdays and weekends was 4.77 ± 0.854 (range: 2–7) and 4.53 ± 0.880 (range: 1–7), respectively [Table 4]. Adolescents from HIG reported the highest mean number of meals consumed out of all SES groups both on weekdays (5.16 ± 0.887) and weekends (4.85 ± 1.026). Adolescents from LIG reported the lowest mean number of meals consumed out of all SES groups both on weekdays (4.31 ± 0.777) and weekends (4.26 ± 0.846). Furthermore, adolescents from all four SES groups reported higher mean number of meals consumed on weekdays in comparison to weekends.

Meals Consumed Usually on Weekdays and Weekends

On weekdays, dinner was the main meal consumed by almost all adolescents from all four SES [Figure 2]. Comparison among SES groups showed that the highest proportions of adolescents consuming main meals such as breakfast (97.8%) and lunch (97.0%) belonged to LIG. Further comparison showed that the higher percentages of adolescents from HIG consumed snacks such as early morning (26.0%), mid-morning/school-lunch (95.2%), and bed-time (34.2%), while the highest percentage of adolescents consuming tea-time snacks belonged to MIG (94.6%).

On weekends, a similar pattern was observed for the three main meals. Dinner was again the main meal consumed by almost all adolescents from all SES [Figure 3]. Highest percentages of

Table 1: Categorization of adolescents into different SES groups

SES groups	*n (%)*
US	134 (24.6)
LIG	135 (28.5)
MIG	130 (23.9)
HIG	146 (26.8)
Total	545

HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

Table 2: School-going status of adolescents

School-going status	*US (n=134) n (%)*	*LIG (n=135) n (%)*	*MIG (n=130) n (%)*	*HIG (n=146) n (%)*	*Total (n=545) n (%)*
Enrolled in school	109 (81.4)	75 (55.6)	119 (91.5)	146 (100)	449 (82.4)
Doesn't go to school/School dropout/Have completed school but did not enroll for higher studies	25 (18.7)	60 (44.4)	11 (8.5)	0 (0.0)	96 (17.6)

HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

Table 3: Food habits of adolescents

Food habits	*US (n=134) n (%)*	*LIG (n=135) n (%)*	*MIG (n=130) n (%)*	*HIG (n=146) n (%)*	*Total (n=545) n (%)*	*P-value*[a]
Vegetarian	15 (11.2)	4 (3.0)	18 (13.8)	40 (27.4)	77 (14.1)	<0.001
Ovo-vegetarian	13 (9.7)	4 (3.0)	12 (9.2)	29 (19.9)	58 (10.6)	
Non-vegetarian	106 (79.1)	127 (94.1)	100 (76.9)	77 (52.7)	410 (75.2)	

[a]*P*-value reported for Pearson Chi-square Test, HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

Table 4: Mean total number of meals consumed by adolescents of different SES on weekdays and weekends

Days of the week	*Mean±SD*				
	US (n=134)	*LIG (n=135)*	*MIG (n=130)*	*HIG (n=146)*	*Total (n=545)*
Weekdays	4.72±0.642	4.31±0.777	4.85±0.855	5.16±0.887	4.77±0.854
Weekends	4.49±0.680	4.26±0.846	4.50±0.819	4.85±1.026	4.53±0.880

HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

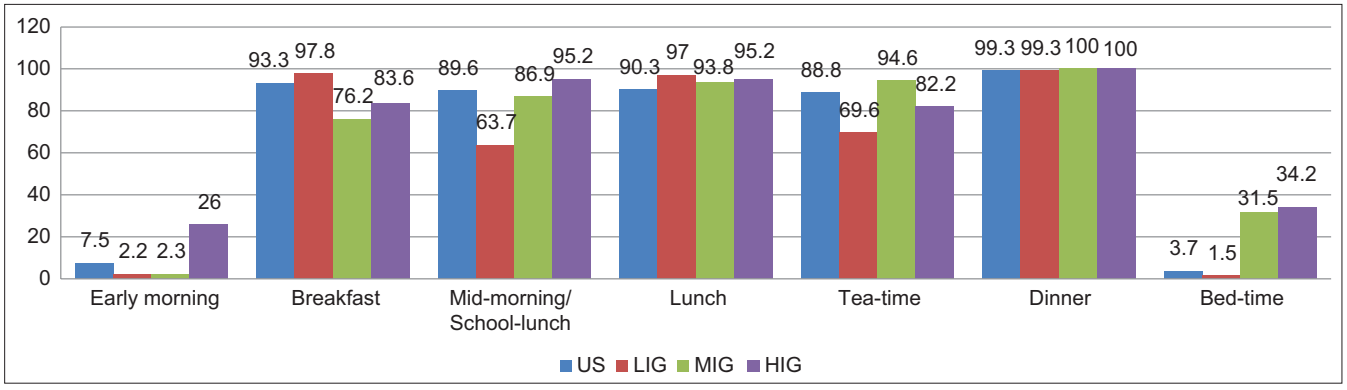

Figure 2: Meals usually consumed by adolescents on weekdays

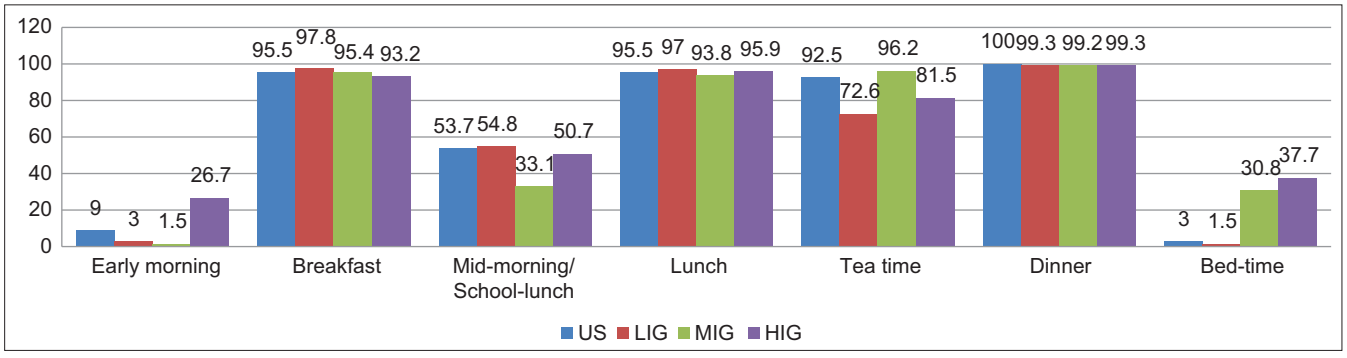

Figure 3: Meals usually consumed by adolescents on weekends

adolescents consuming main meals such as breakfast (97.8%) and lunch (97.0%) belonged to LIG. Highest consumption of early-morning (26.7%) and bed-time (37.7%) snack was reported by adolescents from HIG. While, highest percentages of adolescents consuming mid-morning/school-lunch and tea-time snacks belonged to LIG (54.8%) and MIG (96.2%), respectively.

Frequency of Breakfast Consumption

Majority of adolescents reported consuming breakfast daily (78.7%) in the month before data collection [Table 5]. Daily breakfast consumption by adolescents from all four SES was reported to be 90.4% (LIG), 84.3% (US), 72.3% (MIG), and 68.5% (HIG). This was followed by 9% adolescents who reported consuming breakfast 1–2 days/week. Comparison among SES showed that under this frequency category, 18.5% adolescents from MIG, and 13.7% adolescents from HIG consumed breakfast 1–2 days/week. Breakfast consumption 5–6 days/week was reported by 7.5% adolescents. Under this frequency category, approximately 10% adolescents both from US and HIG reported consuming breakfast. Finally, adolescents who did not consume breakfast in the month before data collection constituted 2.2% of the target population.

Fixed Meal Times on Weekdays and Weekends

A total of 62.6% and 54.7% adolescents reported having fixed times for main meals on weekdays and weekends, respectively [Table 6]. Majority of adolescents having fixed times for main meals on weekdays and weekends belonged to HIG (74.0%) and MIG (61.5%), respectively. In contrast, majority of adolescents not adhering to fixed meal times on weekdays and weekends belonged to LIG (54.1%) and HIG (47.3%), respectively. A significant association (P = 0.003) was reported between adolescents belonging to different categories of SES and having fixed time for main meals on weekdays ($\chi^2(3) = 13.849$, Cramer's V = 0.159).

Reasons for not Having Fixed Meal Times on Weekdays and Weekends

On weekdays, the main reasons reported for not having fixed meal times were eating only when hungry (56.4%), followed by loss of appetite because of eating snacks in between main meals (28.4%), getting occupied with academic work (11.3%), and variation in tuition time (10.3%) [Table 7]. On comparing between SES groups, it was observed that majority of adolescents belonging to HIG (81.5%) cited the reason "eating only when hungry," while, approximately half of the adolescents belonging to US lost their appetite because of intake of snacks in between main meals. Further, getting busy with studies (47.4%) and variation in tuition time (47.4%) were quoted by maximum adolescents belonging to HIG.

On weekends, the main reasons reported for not having fixed meal times included eating only when hungry (58.3%), loss of appetite because of eating snacks in between main meals (28.7%), getting up late (25.1%), and being occupied with screens (12.6%) [Table 8]. Comparison among SES showed that majority of adolescents belonging to HIG listed eating only when hungry (79.2%), whereas, majority of adolescents belonging to US (43.5%) listed losing their appetite because of intake of snacks in between main meals (43.5%). Getting up late (68.8%) and being occupied with screens (39.0%) were listed by majority of adolescents belonging to HIG.

Skipping Meals on Weekdays and Weekends

As discussed earlier, even though a high proportion of adolescents reported consuming main meals usually, a total of 42.6% and 30.3% adolescents reported skipping main meals on weekdays and weekends, respectively [Table 9]. Main meals were commonly skipped by adolescents belonging to MIG (53.1%) and US (37.3%) on weekdays and weekends, respectively. A highly significant association ($P < 0.001$) was reported between adolescents belonging to different categories of SES and skipping main meals on weekdays ($\chi^2(3) = 24.436$, Cramer's V = 0.212). A significant association (P = 0.042) was reported between adolescents belonging to different categories of SES and skipping main meals on weekends ($\chi^2(3) = 8.210$, Cramer's V = 0.123).

Reasons for Skipping meals on Weekdays and Weekends

On weekdays, majority of adolescents reported loss of appetite because of eating snacks in between main meals (26.7%), followed by getting up late (15.5%), food not being appealing (10.8%), getting busy with academic work (8.6%), variation in tuition time (7.8%), and getting busy with screens (7.3%) as key reasons for

Table 5: Frequency of breakfast consumption in the month before data collection

Frequency	*US (n=134) n (%)*	*LIG (n=135) n (%)*	*MIG (n=130) n (%)*	*HIG (n=146) n (%)*	*Total (n=545) n (%)*
Every day	113 (84.3)	122 (90.4)	94 (72.3)	100 (68.5)	429 (78.7)
5–6 times/week	13 (9.7)	6 (4.4)	7 (5.4)	15 (10.3)	41 (7.5)
3–4 times/week	3 (2.2)	1 (0.7)	0 (0.0)	7 (4.8)	11 (2.0)
1–2 times/week	2 (1.5)	3 (2.2)	24 (18.5)	20 (13.7)	49 (9.0)
Once in 2 weeks	0 (0.0)	0 (0.0)	0 (0.0)	2 (1.4)	2 (0.4)
Once a month	0 (0.0)	1 (0.7)	0 (0.0)	0 (0.0)	1 (0.2)
Did not consume	3 (2.2)	2 (1.5)	5 (3.8)	2 (1.4)	12 (2.2)

HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

Table 6: Adolescents having fixed times for main meals on weekdays and weekends

Days of the week	*US (n=134) n (%)*	*LIG (n=135) n (%)*	*MIG (n=130) n (%)*	*HIG (n=146) n (%)*	*Total (n=545) n (%)*	*P-value*[a]
Weekdays	77 (57.5)	73 (54.1)	83 (63.8)	108 (74.0)	341 (62.6)	0.003
Weekends	72 (53.7)	77 (57.0)	80 (61.5)	69 (47.3)	298 (54.7)	0.109

[a]*P*-value reported for Pearson Chi-square Test, HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

Table 7: Reasons for not having fixed times for main meals on weekdays (*n*=204)

Reasons	*US* *(n=57)* *n (%)*	*LIG* *(n=62)* *n (%)*	*MIG* *(n=47)* *n (%)*	*HIG* *(n=38)* *n (%)*	*Total* *(n=204)* *n (%)*
Eat only when hungry	32 (56.1)	26 (41.9)	26 (55.3)	31 (81.6)	115 (56.4)
Loss of appetite because of eating snacks in between main meals	28 (49.1)	5 (8.1)	10 (21.3)	15 (39.5)	58 (28.4)
Get busy with homework/academic work	3 (5.3)	1 (1.6)	1 (2.1)	18 (47.4)	23 (11.3)
Tuition time varies	1 (1.8)	1 (1.6)	1 (2.1)	18 (47.4)	21 (10.3)
Get up late	1 (1.8)	1 (1.6)	1 (2.1)	9 (23.7)	12 (5.9)
Get busy on phone/laptop/computer/television	0 (0.0)	0 (0.0)	1 (2.1)	11 (28.9)	12 (5.9)
Mother returns home at different times from work	0 (0.0)	3 (4.8)	3 (6.4)	6 (15.8)	12 (5.9)

HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

Table 8: Reasons for not having fixed times for main meals on weekends (*n*=247)

Reasons	*US* *(n=62)* *n (%)*	*LIG* *(n=58)* *n (%)*	*MIG* *(n=50)* *n (%)*	*HIG* *(n=77)* *n (%)*	*Total* *(n=247)* *n (%)*
Eat only when hungry	34 (54.8)	24 (41.4)	25 (50.0)	61 (79.2)	144 (58.3)
Loss of appetite because of eating snacks in between main meals	27 (43.5)	5 (8.6)	9 (18.0)	30 (39.0)	71 (28.7)
Get up late	2 (3.2)	1 (1.7)	6 (12.0)	53 (68.8)	62 (25.1)
Get busy on phone/laptop/computer/T.V.	0 (0.0)	0 (0.0)	1 (2.0)	30 (39.0)	31 (12.6)
Get busy with homework/academic work	4 (6.5)	1 (1.7)	1 (2.0)	22 (28.6)	28 (11.3)
Tuition time varies	0 (0.0)	2 (3.4)	0 (0.0)	24 (31.2)	26 (10.5)
Mother returns home at different times from work	0 (0.0)	2 (3.4)	2 (4.0)	8 (10.4)	12 (4.9)

HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

Table 9: Adolescents skipping main meals on weekdays and weekends

Days of the week	*US* *(n=134)* *n (%)*	*LIG* *(n=135)* *n (%)*	*MIG* *(n=130)* *n (%)*	*HIG* *(n=146)* *n (%)*	*Total* *(n=545)* *n (%)*	*P-value*[a]
Weekdays	70 (52.2)	52 (38.5)	69 (53.1)	41 (28.1)	232 (42.6)	<0.001
Weekends	50 (37.3)	29 (21.5)	40 (30.8)	46 (31.5)	165 (30.3)	0.042

[a]*P*-value reported for Pearson Chi-square test, HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

Table 10: Reasons for skipping main meals on weekdays (*n*=232)

Reasons	*US* *(n=70)* *n (%)*	*LIG* *(n=52)* *n (%)*	*MIG* *(n=69)* *n (%)*	*HIG* *(n=41)* *n (%)*	*Total* *(n=232)* *n (%)*
Loss of appetite because of eating snacks in between main meals	23 (32.9)	4 (7.7)	13 (18.8)	22 (53.7)	62 (26.7)
Get up late	6 (8.6)	2 (3.8)	17 (24.6)	11 (26.8)	36 (15.5)
Food is not appealing	5 (7.1)	10 (19.2)	5 (7.2)	5 (12.2)	25 (10.8)
Get busy with homework/academic work/office work	1 (1.4)	1 (1.9)	2 (2.9)	16 (39.0)	20 (8.6)
Tuition time varies	0 (0.0)	0 (0.0)	0 (0.0)	18 (43.9)	18 (7.8)
Get busy on phone/laptop/computer/T.V.	0 (0.0)	1 (1.9)	0 (0.0)	16 (39.0)	17 (7.3)
Trying to lose weight	0 (0.0)	0 (0.0)	3 (4.3)	12 (29.3)	15 (6.5)
Mother returns home at different times from work	0 (0.0)	0 (0.0)	0 (0.0)	2 (4.9)	2 (0.9)

HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

skipping main meals on weekdays [Table 10]. Among different SES groups, majority of adolescents citing loss of appetite because of eating snacks in between main meals as the reason for skipping main meals on weekdays belonged to HIG (53.7%). Further, getting up late was also listed by majority of adolescents belonging to HIG (26.8%) closely followed by MIG (24.6%). Majority of adolescents from LIG (19.2%) reported food not being appealing as the reason for skipping main meals. Variation in tuition time (43.9%) and getting busy with screens (39.0%) were reported by majority of adolescents belonging to HIG.

On weekends, majority of adolescents reported loss of appetite because of eating snacks in between main meals (26.7%), followed by getting up late (15.5%), food not being appealing (10.8%), getting busy with academic work (8.6%), variation in tuition time (7.8%), and getting busy with screens (7.3%) as key reasons for skipping main meals on weekdays [Table 11]. Comparison among SES showed that maximum proportion of adolescents listing loss of appetite because of eating snacks in between main meals (60.9%), getting up late (54.3%), being occupied with screens (41.3%), variation in tuition time (39.1%), and getting busy with

Table 11: Reasons for skipping main meals on weekends (*n*=165)

Reasons	*US (n=50) n (%)*	*LIG (n=29) n (%)*	*MIG (n=40) n (%)*	*HIG (n=46) n (%)*	*Total (n=165) n (%)*
Loss of appetite because of eating snacks in between main meals	21 (42.0)	3 (10.3)	17 (42.5)	28 (60.9)	69 (41.8)
Get up late	3 (6.0)	1 (3.4)	3 (7.5)	25 (54.3)	32 (19.4)
Food is not appealing	5 (10.0)	6 (20.7)	5 (12.5)	10 (21.7)	26 (15.8)
Get busy with homework/academic work/office work	0 (0.0)	0 (0.0)	0 (0.0)	17 (37.0)	17 (10.3)
Tuition time varies	0 (0.0)	0 (0.0)	0 (0.0)	18 (39.1)	18 (10.9)
Get busy on phone/laptop/computer/T.V.	0 (0.0)	0 (0.0)	0 (0.0)	19 (41.3)	19 (11.5)
Trying to lose weight	0 (0.0)	0 (0.0)	1 (2.5)	12 (26.1)	13 (7.9)
Mother returns home at different times from work	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.2)	1 (0.6)

HIG: High income group, MIG: Middle income group, LIG: Low income group, US: Urban slums

homework, etc., (37.0%), trying to lose weight (26.1%) and food not being appealing (21.7%) as reasons for skipping main meals on weekends belonged to HIG.

Discussion

The mean total number of meals (main meals + snacks) consumed by adolescents on weekdays and weekends was 4.77 ± 0.854 and 4.53 ± 0.880, respectively. A study conducted on adolescents enrolled in peri-urban government school students of Delhi (*n*: 491; age: 12–14 years) reported that the total number of meals consumed in a day ranged from 2 to 4.[10] Our study reports a higher mean for the total number of meals consumed daily. Dinner was the main meal consumed by almost all adolescents from all four SES both on weekdays and weekends. Unlike our study, lunch (94.6%) was the most consumed meal by adolescents (*n*: 1095, age: 14–16 years) attending secondary school in Kolkata.[11] On weekdays and weekends, the highest proportions of adolescents consuming other main meals such as breakfast and lunch belonged to LIG. On weekdays, higher percentages of adolescents from HIG reported consumption of snacks such as early morning (26.0%), mid-morning/school-lunch (95.2%), and bed-time (34.2%), while majority of adolescents from MIG reported consuming tea-time snacks (94.6%). On weekends, the highest consumption of early-morning (26.7%) and bed-time (37.7%) snack was reported by adolescents from HIG; and mid-morning/school-lunch and tea-time snacks were consumed the most by LIG (54.8%) and MIG (96.2%), respectively.

In our study, 78.7% adolescents reported daily breakfast consumption; while, 2.2% did not consume breakfast. However, in recent times, skipping breakfast has been commonly reported.[12] Skipping of breakfast by school-going children and adolescents has been reported to have negative consequences for accomplishment of good health and educational objectives.[13] Among adolescents, daily breakfast consumption has been associated with the lower overweight/obesity and with healthier dietary and physical activity behavior.[14] It should be noted that even though only 2.2% of the study population reported missing breakfast, the proportion of adolescents consuming breakfast daily was reportedly low. Comparison among SES showed that adolescents belonging to HIG reported the lowest percentage of daily breakfast consumption, that is, 68.5% in comparison to the other three SES groups, namely, LIG (90.4%), US (84.3%), and MIG (72.3%).

Fixed times for main meals on weekdays and weekends were reported only by 62.6% and 54.7% adolescents, respectively. Majority of adolescents belonging to HIG (74.0%) and MIG (61.5%) reported having fixed times for main meals on weekdays and weekends, respectively. In contrast, majority of adolescents belonging to LIG (54.1%) and HIG (47.3%) reported not adhering to fixed meal times on weekdays and weekends, respectively. Eating only when hungry (56.4%), loss of appetite because of eating snacks in between main meals (28.4%), getting occupied with academic work (11.3%) and variation in tuition time (10.3%) were reported as the main reasons for not having fixed meal times on weekdays. In addition to these factors, getting up late (25.1%) and being occupied with screens (12.6%) were reported as other main reasons for not having fixed meal times on weekends.

Even though, higher proportion of adolescents in the present study reported consuming all three main meals, skipping main meals were reported by 42.6% and 30.3% on weekdays and weekends, respectively. Income groups from which majority of adolescents reported skipping main meals were MIG (53.1%) on weekdays and US (37.3%) on weekends. In a study conducted on 1027 urban participants aged ≥8 years from Mumbai, not being hungry and lack of time were reported as major reasons for skipping breakfast.[12] In contrast, our study reported reasons such as loss of appetite because of eating snacks in between main meals getting up late, food not being appealing, and being occupied with screens as main reasons for skipping meals. Loss of appetite because of snacking in between main meals emerged as the most common reason for skipping main meals in our study. This reason was reiterated by a study conducted on Australian adolescents (*n* = 3250, aged 12–15 years). This study reported that adolescents snacking during specific contexts (e.g., on the run, travelling to and from school, during the day, or middle of the night) were more likely to skip meals in comparison to adolescents who did not snack during these times.[15] Further, snacking on energy-dense foods has been reported to be associated with overweight among US adolescents.[16]

Conclusion

Meal pattern of children and adolescents in developing countries are inappropriate in terms of distribution of nutrients throughout the day. In contrast, consumption of energy-dense food leads to excess intake of calories. Interventions focusing on mitigating such a pattern should be prioritized.[13] Snacking is reported as a common eating behavior during adolescence and should be utilized as a strategy to promote consumption of nutritious food items.[15] Regular breakfast consumption should be emphasized as an intervention to treat childhood obesity.[14] Further, adoption of effective public health initiatives, namely, implementation of

healthy school food policies and inculcation of food literacy in curriculum can enable healthy eating habits among adolescents.[17] In addition to enhancement of knowledge at the individual level, educating adolescents with good nutrition strategies can also help in bringing about a change at the household and community levels.[18]

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References

1. UNICEF. Adolescent Nutrition, UNICEF India; 2018. Available from: https://www.unicef.org/india/what-we-do/adolescent-nutrition. [Last accessed on 2021 Aug 04].
2. Chandramouli C. Adolescents and Youth in India. India: Highlights from Census; 2011.
3. Indian Council of Medical Research. Dietary Guidelines for Indians-a Manual. 2nd ed. Hyderabad, India: National Institute of Nutrition, Indian Council of Medical Research, National Institute of Nutrition; 2011. p. 139.
4. Dasgupta R, Pillai R, Kumar R, Arora NK. Sugar, salt, fat, and chronic disease epidemic in India: Is there need for policy interventions? Indian J Community Med 2015;40:71-4.
5. Meher S, Nimonkar R. Assessment of dietary pattern of school going adolescents in a metro city: A cross sectional study. Int J Community Med Public Health 2018;5:4043.
6. Sethi V, Lahiri A, Bhanot A, Kumar A, Chopra M, Mishra R, *et al*. Adolescents, Diets and Nutrition Growing Well in a Changing World Birth to Adolescence. United States: UNICEF; 2019.
7. Leech RM, Worsley A, Timperio A, McNaughton SA. Understanding meal patterns: Definitions, methodology and impact on nutrient intake and diet quality. Nutr Res Rev 2015;28:1-21.
8. UNICEF. State of the World's Children 2019: Children, Food and Nutrition. United States: UNICEF; 2019. p. 4.
9. Indian Council of Medical Research. ICMR Task Force Study on Consumption Pattern of Carbonated Water among Indian Population. New Delhi: Indian Council of Medical Research; 2011.
10. Eating Behavior and Nutritional Status of Adolescents in Peri-Urban Delhi. Available from: https://www.opensciencepublications.com/fulltextarticles/IJN-2395-2326-8-222.html [Last accessed on 2021 Aug 04].
11. Rathi N, Riddell L, Worsley A. Urban Indian adolescents practise unhealthy dietary behaviours. Br Food J 2018;120:1657-65.
12. Sivaramakrishnan M, Kamath V. A typical working-day breakfast among children, adolescents and adults belonging to the middle and upper socio-economic classes in Mumbai, India-challenges and implications for dietary change. Public Health Nutr 2012;11:2040-6.
13. Ochola S, Masibo PK. Dietary intake of schoolchildren and adolescents in developing countries. Ann Nutr Metab 2014;64:24-40.
14. Arora M, Nazar GP, Gupta VK, Perry CL, Reddy S, Stigler MH. Association of breakfast intake with obesity, dietary and physical activity behavior among urban school-aged adolescents in Delhi, India: results of a cross-sectional study. BMC Public Health 2012;12:881.
15. Savige G, MacFarlane A, Ball K, Worsley A, Crawford D. Snacking behaviours of adolescents and their association with skipping meals. Int J Behav Nutr Phys Activity 2007;4:1-9.
16. Larson NI, Miller JM, Watts AW, Story MT, Neumark-Sztainer DR. Adolescent snacking behaviors are associated with dietary intake and weight status. J Nutr 2016;146:1348-55.
17. Rathi N, Riddell L, Worsley A. Food consumption patterns of adolescents aged 14-16 years in Kolkata, India. Nutr J 2017;16:1-12.
18. UNICEF. Scaling Up Action on Adolescent Nutrition, Diets, Services, and Practices in India. United States: UNICEF; 2020.