Sugar Study Report : Part - 2

Assessment of Consumption of Added Sugar Among Urban Population in Metro Cities in India: NNMB Urban Nutrition Survey (2015-16)

Division of Public Health Nutrition
ICMR-National Institute of Nutrition
Indian Council of Medical Research
Hyderabad
And
Prepared For

International Life Sciences Institute India

2019

Assessment of Consumption of Added Sugar Among Urban Population in Metro Cities in India: NNMB Urban Nutrition Survey (2015-16)

Principal Investigator

Dr. A. Laxmaiah, MBBS, MPH, Ph.D, PGCN, Scientist 'G' & Head,
Division of Public Health Nutrition, NIN

Investigators

Mrs. G. Neeraja, Technical Officer (Nutritionist)

Mr. V. Bhaskar, Technical Officer (Biostatistics)

Mr. K. Sreerama Krishna, Technical Officer (Anthropology)

Mr. SPV. Prasad, Technical Officer (Sociology)

Mrs. G. Madhavi, Technical Officer (Computers)

Division of Public Health Nutrition
ICMR-National Institute of Nutrition
Indian Council of Medical Research
Hyderabad
And

Developed under the Financial Support of ILSI India, New Delhi

International Life Sciences Institute India
2019

ACKNOWLEDGEMENTS

We are grateful to Late Mr. D H Pai Panandiker, Chairman and Ms Rekha Sinha, Executive Director, ILSI-India for their financial support in preparation of this report by using NNMB urban dietary consumption data.

We are thankful to Dr. R Hemalatha, Director ICMR-NIN, and Mr. T Longvah, former Director-In-charge, ICMR-NIN, for their constant support and guidance in the preparation of this report.

We are extremely thankful for all the Officer-in-Charges of all the 16 NNMB state units for their help in execution of the NNMB Urban Nutrition Study.

We thank all the NNMB Project staff for their commitment and sincere efforts in collection of the NNMB dietary consumption data. Our thanks are due to the NIN-NNMB CRL Scientific and Technical staff for their constant efforts in scrutiny, data entry, analysis and preparation of draft tables.

We also thank Dr K Mallikarjuna Rao, Consultant, Mrs Ranjita Bhargavi, RA (Nutrition) and Ms. D. Sarala, Mr. Sriram, Ms. Induja, Ms. Hariprada, Mr Nagesh and Mr Yaqub, Data Entry Operators, for carrying out data entry.

Last but not the least; we are extremely grateful to the community for their unstinting cooperation in data collection, without which the study would not have been completed successfully.

Hyderabad
30 November, 2019

AUTHORS

आई सी एम आर – राष्ट्रीय पोषण संस्थान
स्वास्थ्य अनुसंधान विभाग, स्वास्थ्य और परिवार
कल्याण मंत्रालय, भारत सरकार
ICMR - National Institute of Nutrition
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

डॉ. हेमलता आर, एम बी बी एस, एम डी, एफ ए एम एस, एफ आई यू एन एस, एफ टी ए एस
निदेशक
Dr. Hemalatha R, MBBS, MD, FNAMS, FIUNS, FTAS
Director

PREFACE

I am happy to write the preface for this very important report. While India is marching ahead on many fronts, the nutrition transition is underway. This is dispelling the earlier assumptions that undernutrition is the only major issue confronting our people's health. Yet another facet of malnutrition, overweight/obesity and associated NCDs are now posing equally important if not a more serious threat to the nation's health. More often, both the facets of malnutrition – over and undernutrition along with micronutrient malnutrition co-exist. The Government, especially the regulatory bodies are now stepping up their efforts to discourage consumption of unhealthy foods especially the ones high in Fat, Sugar and Salt (HFSS) in order to promote healthy food choices as an important measure to curb the increasing rates of overweight/obesity and NCDs. However, there is a dearth of information on how India is actually consuming these nutrients of concern. This report, for the first time presents information on added sugar consumption of the city dwellers in seven major metro cities of India. Although the consumption of added sugars has been assessed based on self-reported dietary habits and food labels, the very fact that it drew from the data on dietary intakes of our Institute's recent Urban Survey, which was done with certain methodological rigor renders it a lot of authenticity. Soon reports on Fat and Salt consumption also are to follow. The report points that the overall percent (%) of energy from added sugar is 5% of the total energy intake in general and is within the recommended levels of sugar intake. However, some cities in the western part of the country are consuming little higher than the rest. The data brought out some very interesting facts that the quantity of added sugar consumption was marginally higher among women compared to men, labourers compared to professionals, low educated than the highly educated people. This I am sure will pave way for more concerted efforts in terms of regulatory measures.

I congratulate our Public Health Division and ILSI India for this very important contribution. I am sure this will pave way for many more such reports with authentic data on consumption of the nutrients of concern both in urban and rural contexts.

(R.Hemalatha)

जमई – उस्मानिया, तारनाका, हैदराबाद - 500 007, तेलंगाना, भारत
Jamai – Osmania (P.O.), Tarnaka, Hyderabad - 500 007, Telangana, India
Tel: +91-40-27018083 | Fax: +91-40-27019074
dirnin_hyd@yahoo.co.in | directornin@icmr.gov.in
| www.nin.res.in

CONTENTS

List of Figure

List of Table

1. INTRODUCTION

It was proposed to study individual level consumption of added sugar and its association with socio-economic and demographic status of urban population by utilizing the NNMB database. Findings from the proposed study regarding sugar consumption levels and associations with high consumption levels and its sources are important to help design better targeted policy measures to control or to promote good health.

2. OBJECTIVES

1. To assess the mean consumption levels of added sugar (g/day) among various age, gender, physiological, and physical activity groups among urban population (NNMB 2015-16) in 7 metro cities in India,
2. To assess the mean added sugar consumption levels in different socio-economic population groups, and
3. To assess the mean added sugar consumption levels from different recipes.

3. METHODOLOGY

For the present study, 24 hour dietary recall data pertaining to the urban population of seven metro cities of India, collected by National Nutrition Monitoring Bureau (NNMB) from 16 major states during 2015-16, was obtained. This dietary data was re-coded recipe wise, the data was re-entered into excel sheets and the master dietary consumption database for all the seven metro cities was prepared. Information on socio-economic and demographic particulars of the individuals, food consumption, including fat was also included in the database. The nutritive values of different foods and recipes were computed using form Nutritive Value of Indian Foods (NVIF, 1989) and Indian Food Composition tables (IFCT, 2017).

The city wise and pooled mean consumption of added sugar was analysed. The associations between the mean added sugar and socio-economic and demographic status of the population were presented. The variables included for this analysis were gender, age (0-4, 5-11, 12-17, 18-35, 36-59 and >60 years), community (scheduled caste, scheduled tribes, other backward class and other caste), education (illiterate, read & write, primary school, middle school, high school complete and college and above), occupation (labour including agriculture and other labour, cultivators, housewives, drivers, professional, service, business, dependents and other occupations), type of activity (sedentary and moderate), standard of living (low, medium and high income groups) and type of diet (vegetarians and non-vegetarians).

Also, the recipe wise intake of added sugar from various sources including homemade, packed foods, sweet based preparations, bakery foods, snacks and savouries (namkeen), fast foods etc was computed.

The quantity of added sugar consumption levels

were assessed from the following foods and preparations:

1. Routine home prepared Foods
2. Packaged Foods
3. Sweet based preparations
4. Biscuits and BakeryFoods
5. Milk and Milk Products

Data Analysis: Statistical analysis was carried out using SPSS Windows version 19.0.

4. RESULTS

4.1 Coverage Particulars

The dietary data of 5127 individuals from 1293 HHs of seven metropolitan cities of India was analyzed for intake of added Sugar.

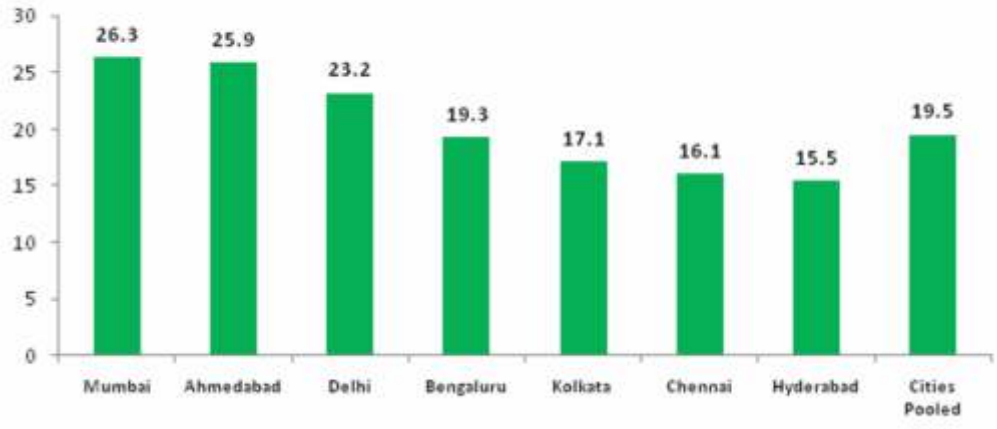
4.2 Mean Intake of Added Sugar by Socio-Economic and Demographic Particulars

The Mean Intake of added sugar (g/day) by Socio-Economic and Demographic particulars is presented in **Table 1**.

In general, the pooled average daily intake of added sugar in all the metro cities was 19.5g/day which was lower than the recommended level of ICMR (30g/ person /day).

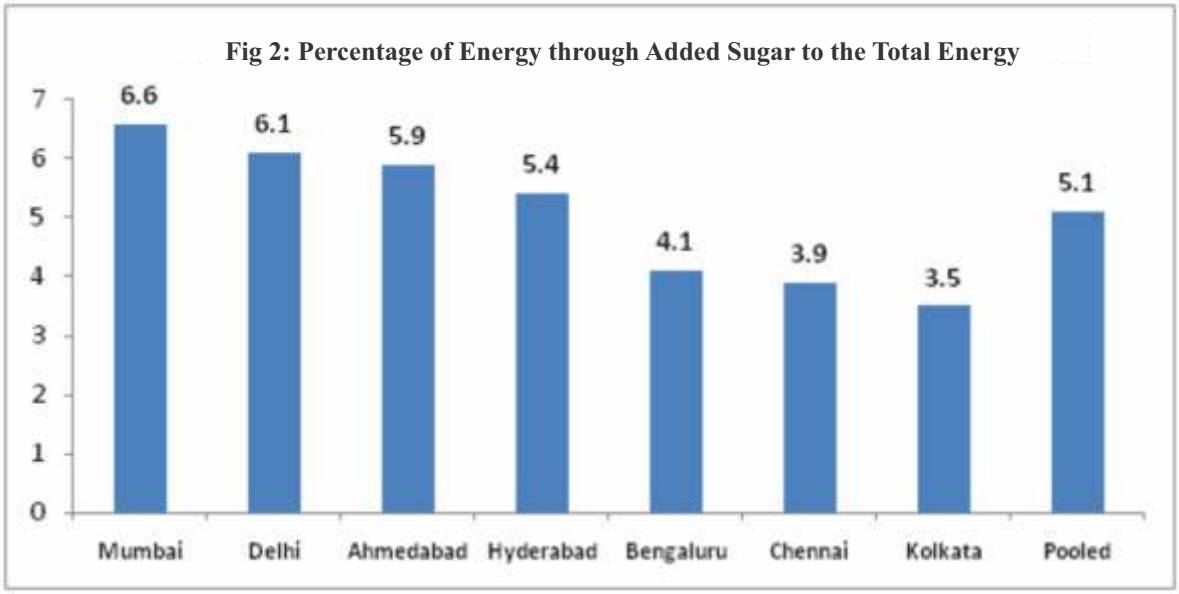
However, the population of Mumbai (26.3g) and Ahmedabad cities (25.9g) were consuming more added sugar than their counterparts in the other cities. The use of added sugar by the population of the other cities was as follows; Delhi (23.2g), Bangalore (19.3g), Kolkata (17.1g) and Chennai (16.1g) **Fig 1**

Fig 1: Average Intake of Added Sugar (g/day) in Metro Cities of India



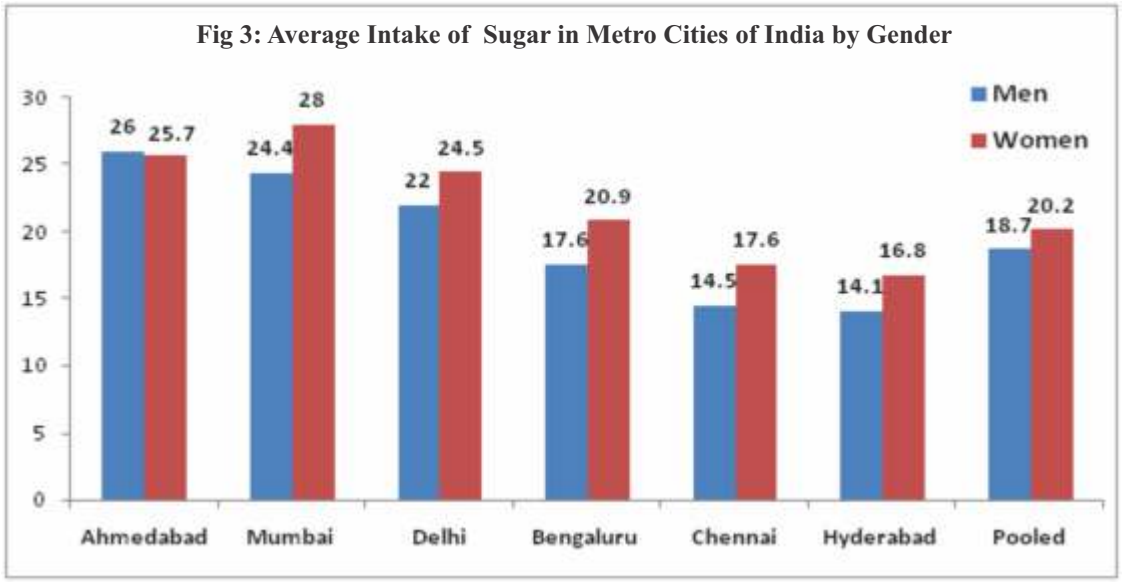
4.1.1 Percent of Energy through Added Sugar

On the whole, the percent (%) of energy through added sugar, to the total energy was 5.1%, which was found to be highest among the population of Mumbai (6.6%) followed by Delhi (6.1%) and Ahmedabad (5.9%). The lowest percent of energy from added sugar to the total energy was observed in the city of Kolkata (3.5%) and Chennai (3.9%) **Fig 2**.



4.2.2 Consumption of Sugar by Gender

In general, the average intake of added sugar was more among women (20.2g) than that in the men (18.7g). The same trend was observed in all the metro cities except for Ahmedabad, in which men and women were consuming more or less the same quantity of sugar (Men: 26g and Women: 25.7g) (**Fig 3**).

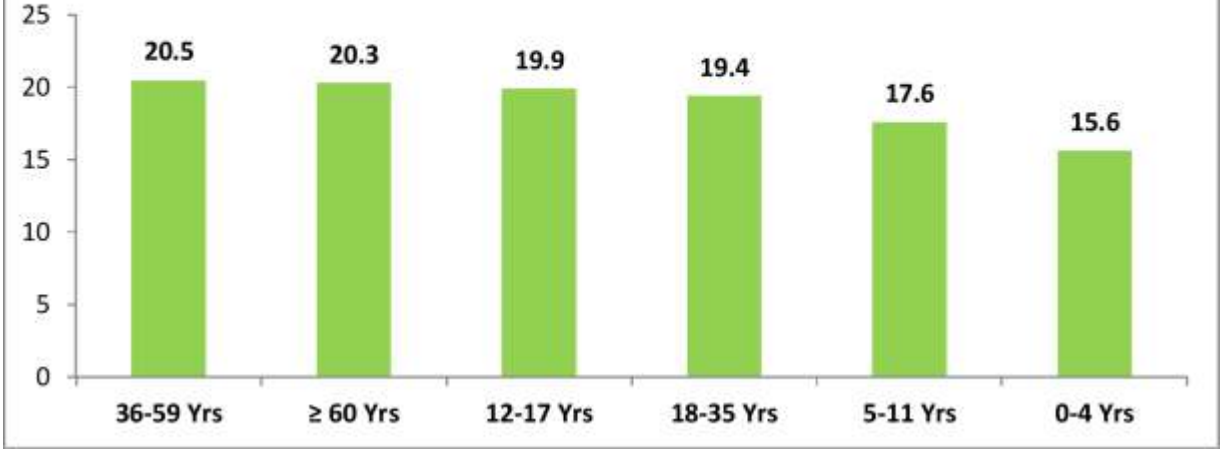


4.2.4 Consumption of Sugar by Age

The intake of added sugar varied considerably among different age groups. In general, adults and elderly people were consuming slightly higher sugar than the younger ones. The highest intake of sugar was observed among older adults, 36-59 years age group (20.5g) followed by the elderly (⩾ 60 years) population (20.3g). The adolescents (19.9g) and the younger adults (18-35 years age group) were consuming (19.4g) almost the same amount of added sugar. The school age children and the preschool children were consuming 17.6g and 15.6g of sugar per day respectively **Fig 4**.

Higher intake of sugar was observed among the elderly population of Mumbai (31.3g) and Ahmedabad (26.5g) when compared with the other cities. Also, the intake of sugar was highest among adolescents of Ahmedabad (28g) and Mumbai (24g).

Fig 4: Average Intake of Added Sugar (g/day) among Urban Population in different Age Group

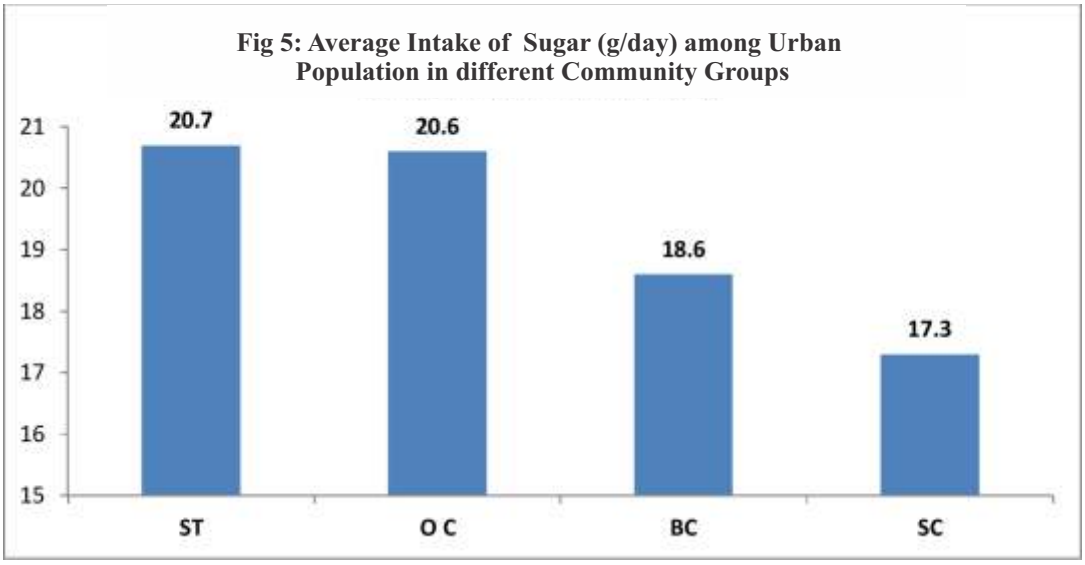


4.2.5 Sugar Consumption by Community

In general, the intake of sugar was highest for the population belonging to other forward caste communities' and 'scheduled tribes' (20.6g) and 'followed by 'backward communities' (18.6g). The lowest intake of sugar was observed among people of the 'scheduled caste' (17.3g) **Fig. 5**.

The same trend was observed in all the cities except in the city of Bengaluru, where the population belonging to 'other forward caste communities' were consuming higher amount of sugar (23.8g) than the population of other communities.

Fig 5: Average Intake of Sugar (g/day) among Urban Population in different Community Groups

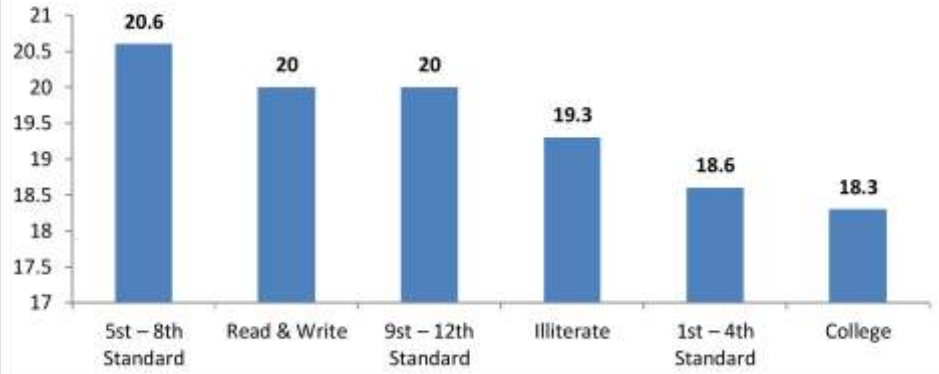


4.2.6 Sugar Consumption by Literacy Status

On the whole, the intake of sugar was high in the population with lower education status than in the higher educated population. The intake of sugar was lowest among those who were educated upto college and above (18.3g). The highest intake of sugar was observed among those who studied upto 5th to 8th standard (20.6g), those who can only read and write and 9th -12th standard (20g) and those who were illiterates (19.3g) **Fig 6.**

Among the highly educated population (college), the consumption of sugar was higher in Ahmedabad (27.6g), Mumbai (24g) and Bengaluru (21.5g) than that of the other cities. Among the illiterate population, the intake of sugar was highest in the cities of Mumbai (33.3g), Ahmedabad (32.3g) and Delhi (27.6g).

Fig 6: Average Intake of Sugar (g/day) among Urban Population by Literacy Status

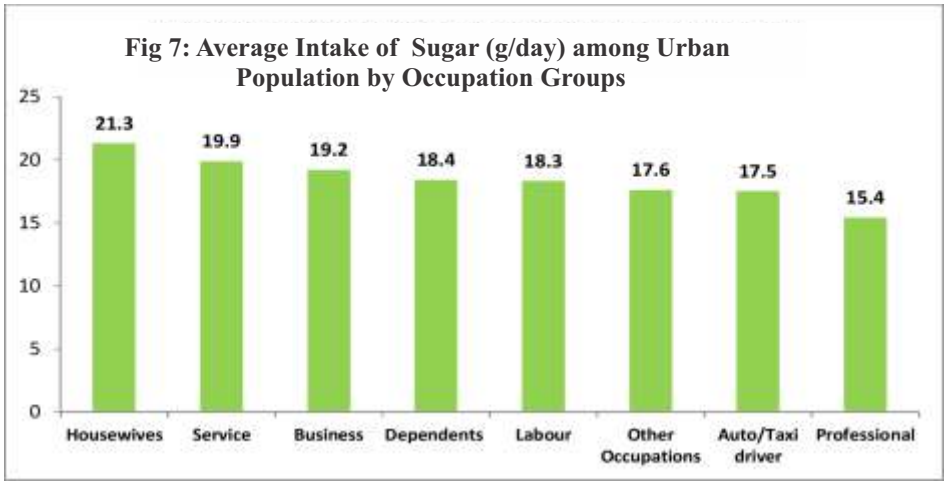


4.2.7 Sugar Consumption by Occupation

The intake of sugar was found to be highest among the housewives (21.3g). Among the others, individuals engaged in service (19.9g), business (19.2g) and dependents (18.4g) were consuming more sugar. The intake of sugar was 18.3g by the labourers. The lowest intake of sugar was observed among professionals (15.4g). **Fig 7.**

Higher intake of sugar was observed among the housewives of Ahmedabad city (30.8g) followed by Mumbai (29.6g) and Delhi (27.2g). Among the population engaged in service, the intake of added sugar was highest in the cities of Ahmedabad (30g), Bengaluru (24.8g) and Mumbai (24.3g). Similarly among those engaged in business the intake of sugar was highest in the cities of Delhi (25.9g) and Mumbai (24.3g).

Fig 7: Average Intake of Sugar (g/day) among Urban Population by Occupation Groups



4.2.8 Sugar consumption by Activity Status

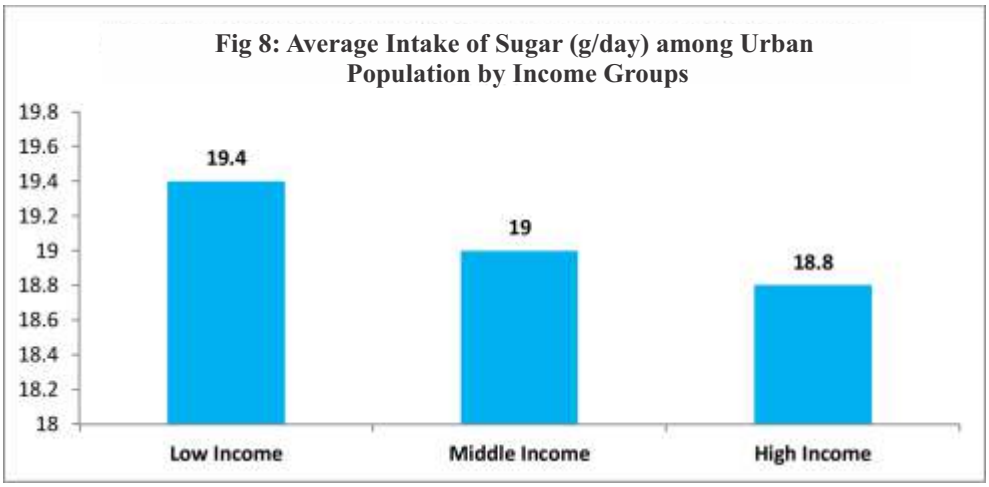
The intake of sugar was lower among those who were engaged in the occupations which involved moderate activity (18.2g) than those who were engaged in sedentary activities (19.4g).

In the cities like Delhi and Hyderabad, the populations engaged in moderate activity were consuming more sugar than those who were engaged in sedentary occupation.

4.2.9 Sugar Consumption by Income Status

Clear income gradation was observed in consumption of the sugar with income quartiles. In general, the people with higher income were found to be using less sugar than those with lower income. The highest intake of sugar was observed among the low income people (19.4g) followed by middle income (19g) and higher income people (18.8g). **Fig 8.**

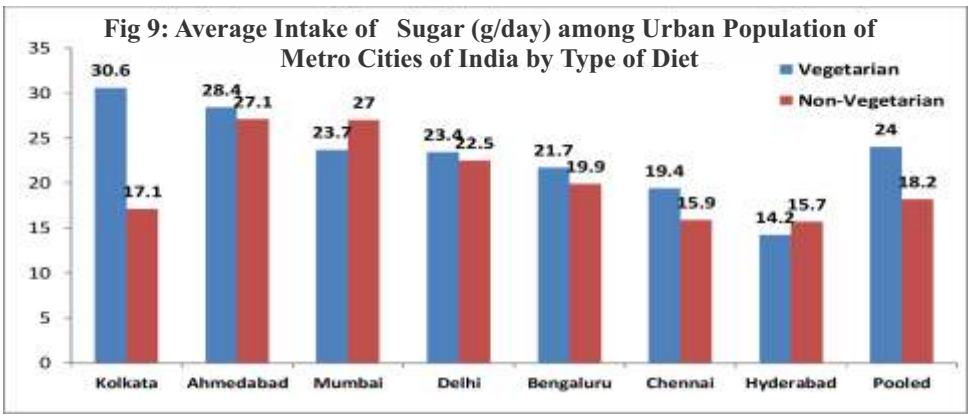
In contrast, in the cities like Ahmedabad, Delhi and Kolkata, the population with higher income were found to be consuming more sugar (29.7g, 23.7g and 19.4g) than those with lower income (27.2g, 23.1g and 16.9g).



4.2.10 Sugar Consumption by Type of Diet

In general, vegetarians were found using more sugar (24g) than the non-vegetarians (18.2g).

The vegetarian population of Kolkata (30.6g) and Ahmedabad (28.4g) were consuming higher amounts of sugar when compared with other cities. It was observed that even the non-vegetarians in Ahmedabad (27.1g) and Mumbai (27g) were consuming more sugar than the non-vegetarian population of the other cities **(Fig 9)**.



4.3 Distribution of Individuals Consuming Different Recipes

The frequency (%) distribution of the individuals consuming different recipes is presented in **Table 2.**

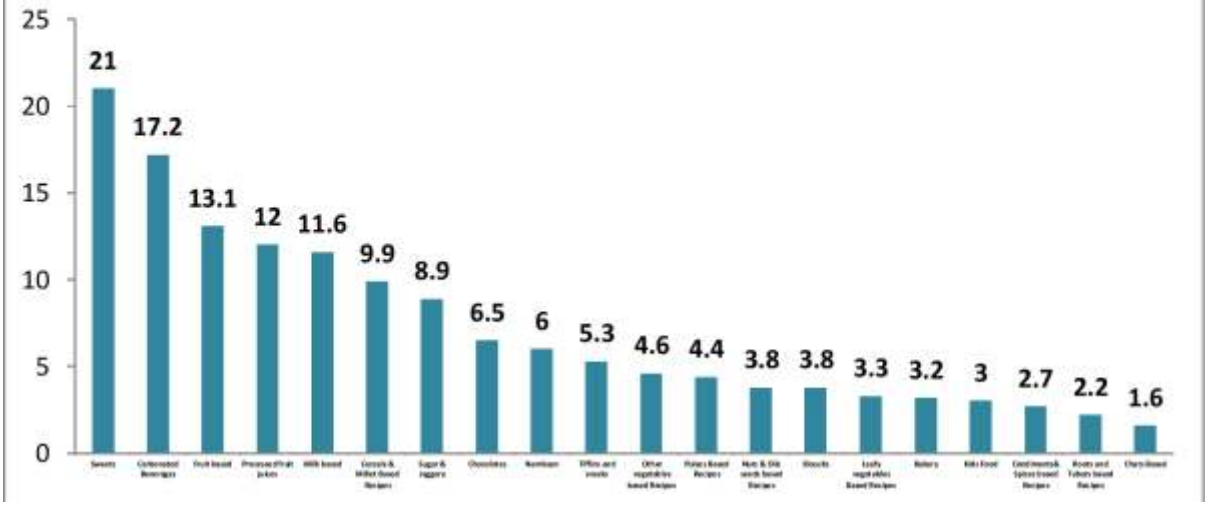
In general, the cereals and millets based recipes were consumed by all the individuals (100%) followed by Milk based recipes (98%), pulses based recipes (62%) and other vegetables (54%). About half of the individuals were consuming recipes like Fruit based (43%), Biscuits (38%) and Non-vegetarian based recipes (36%). Tiffins and Snacks (29%), Bakery foods and Namkeen (22% each) were consumed by a fourth of the individuals. GLV based recipes were consumed by 16% and Chat based items were consumed by 10% of the individuals.

4.4 Average Intake of Sugar through Different Recipe Groups

The average intake of sugar through different recipe groups is presented in **Table 3 and Fig 10**.

The addition of sugar was found to be highest in the Sweets (21g) followed by Carbonated Beverages (17.2g), Fruit based Recipes (13.1g), Processed Fruit Juices (12g) and Milk based Recipes (11.6g). Cereal based recipes were providing around 10 g of sugar a day.

Fig 10: Average Intake of Sugar (g) through Different Recipe Groups



4.5 Recipe Wise Intake of Added Sugar

The Recipe wise intake of sugar is presented in **Table 4 (Tables 4.1 – 4.21).** Among the Cereal, millet based recipes, chapatti with sugar were being consumed by majority of the individuals. The intake of sugar was high for the recipes such as wheat gruel, rice flakes with milk and sugar, oats with milk etc.

Among the vegetable recipes, the preparations with green mango contain more amounts of sugar. Among the fruit based recipes, the juice preparations and mango pickles were found to be made with more sugar. Masala Tea, Tea, Coffee, Milk Shakes, Lassi etc. was consumed with more amount of sugar. All the packed/processed fruit juices were having high amount of sugar. Carbonated beverages were having very high amounts of sugar per serving.

Almost all the sweets in general were prepared with high amount of sugar. Sweets such as payasam/kheer, chkki, rasmalai, laddu, jilebi etc. contained more sugar.

While interpreting the results, caution may be exercised as added sugar consumption levels were reported based on data obtained from sources such as self-reporting and labels. Actual consumption levels may vary. Some of the processed sweet snack foods produced from un-organized sectors were not included in the total quantity of sugar consumed as its consumption could not be obtained.

5. SUMMARY

- In general, the total sugar consumption levels are within the suggested levels of ICMR (30g/CU/day). However, sugar consumption from sources such as sweet snack from unorganized section could not be included.
- The population in Mumbai (26.3g/day) and Ahmedabad cities (25.9g/day) were consuming more added sugar than their other 5 cities.
- Overall, the percent (%) of energy from added sugar, to the total energy was about 5%.
- The quantity of added sugar consumption was marginally higher among women compared to men.
- Older adults (35-59years) and elderly urban population were consuming more added sugars compared to other age groups.
- In general, the intake of added sugar was high in the low educated population than in the higher educated population.
- It was surprising to note that intake of added sugar was higher among laborers (18.3g) compared to professionals which could be because of increasing awareness among educated. And also easy availability of low cost processed food among the urban labour.
- The intake of sugar was high from the recipes such as wheat gruel, rice/corn flakes with milk and oats with milk.
- Masala Tea, Tea, Coffee, Milk Shakes, Lassi etc. were consumed with more amounts of sugar.

The data may be interpreted with caution as it is based on reported data, label and other sources.

Table 1: Average Daily Intake of Added Sugar (g/day) by Socio-Economic and Demographic Particulars in Different Metropolitan Cities of India

		Ahmed-abad	Bangalore	Chennai	Delhi	Hydera-bad	Kolkata	Mumbai	Cities Pooled
Number of Individuals (N)		665	708	654	727	1059	722	592	5127
Average Sugar Intake per day (g/day)		**25.9**	**19.3**	**16.1**	**23.2**	**15.5**	**17.1**	**26.3**	**19.5**
Percent of Energy through Added Sugar to the Total Energy (%)		**5.9**	**4.1**	**3.9**	**6.1**	**5.4**	**3.5**	**6.6**	**5.1**
Gender	Male	26.0	17.6	14.5	22.0	14.1	16.5	24.4	18.7
	Female	25.7	20.9	17.6	24.5	16.8	17.7	28.0	20.2
Age Group	0-4 Yrs	18.2	18.2	17.3	18.2	13.8	10.1	19.0	15.6
	5-11 Yrs	21.9	18.8	18.1	20.6	14.7	12.7	20.7	17.6
	12-17 Yrs	28.0	19.9	17.6	21.5	18.2	16.5	24.0	19.9
	18-35 Yrs	26.8	21.4	14.3	23.6	14.7	16.3	25.4	19.4
	36-59 Yrs	27.0	18.0	15.9	25.4	15.3	19.6	28.5	20.5
	≥ 60 Yrs	26.5	16.5	17.0	25.0	20.4	18.1	31.3	20.3
Community	ST	30.8	18.5	-	24.7	13.0	17.8	23.0	20.7
	SC	21.9	15.5	16.9	22.3	15.6	14.8	23.8	17.3
	BC	29.9	18.7	15.6	23.9	17.2	20.2	28.5	18.6
	Others	28.4	23.8	16.4	23.5	13.3	17.4	25.4	20.6
Type of Activity	Sedentary	27.7	19.8	16.5	23.0	15.5	17.2	26.2	19.4
	Moderate	23.5	17.9	13.6	24.6	16.4	15.0	26.0	18.2
Income	Low Income	27.2	19.4	17.7	23.1	15.4	16.9	26.1	19.4
	Middle Income	24.7	19.9	15.3	20.8	18.2	15.7	30.7	19.0
	High Income	29.7	16.6	13.1	23.7	15.0	19.4	25.1	18.8
Type of Diet	Vegetarian	28.4	21.7	19.4	23.4	14.2	30.6	23.7	24.0
	Non-Vegetarian	27.1	19.9	15.9	22.5	15.7	17.1	27.0	18.2

(Contd.)

Table 1: Average Daily Intake of AddedSugar (g/day) by Socio-Economic and Demographic Particulars in Different Metropolitan Cities of India (Contd…)

		Ahmed-abad	Bangalore	Chennai	Delhi	Hydera-bad	Kolkata	Mumbai	Cities Pooled
Educational Status	Illiterate	32.3	17.1	16.1	27.6	17.3	18.1	33.3	19.3
	Read & Write	20.9	-	24.9	28.4	-	10.3	-	20.0
	1st – 4th Standard	28.3	17.7	16.6	20.6	14.9	13.4	25.1	18.6
	5st – 8th Standard	30.3	18.7	17.5	23.6	16.7	18.7	28.3	20.6
	9st – 12th Standard	26.1	18.6	15.6	24.5	16.3	18.6	26.6	20.0
	College	27.6	21.5	15.1	20.7	14.0	16.6	24.0	18.3
	< 6 Yr Children	21.6	19.0	16.6	17.4	14.4	11.1	17.9	15.2
Occupation	Labour	22.8	12.1	12.6	26.8	14.5	16.0	33.6	18.3
	Cultivators	11.3	10.0	-	22.8	12.4	-	25.8	16.2
	Artisan	61.0	14.4	16.3	23.9	19.4	16.0	-	17.4
	Service	30.0	24.8	13.7	20.6	13.0	17.4	24.3	19.9
	Professional	36.5	-	13.5	29.2	6.6	15.9	23.8	15.4
	Business	23.7	19.9	14.5	25.9	21.1	20.7	24.3	19.2
	Auto/Taxi driver	24.9	19.9	12.6	26.3	14.5	14.5	25.5	17.5
	Housewives	30.8	18.2	18.0	27.2	17.6	19.6	29.6	21.3
	Other Occupations	19.8	16.0	12.6	25.8	21.1	15.7	30.3	17.6
	Dependents (Students, Children, Elderly)	24.7	19.7	17.5	21.1	14.3	15.2	24.5	18.4

Table 2: Frequency (%) Distribution of Individuals Consuming Different Recipe (Groups) in Metro Cities of India

Groups of Recipes	Ahmedabad		Bangalore		Chennai		Delhi		Hyderabad		Kolkata		Mumbai		Pooled	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Cereals & Millet Based Recipes	646	97.1	693	97.9	647	98.6	727	100.0	1059	100.0	726	100.0	590	99.7	5115	99.8
Cereals with Flesh Foods	6	0.9	25	3.5	41	6.3	6	0.8	59	5.6	26	3.6	15	2.5	178	3.5
Pulse Based Recipes	299	45.0	423	59.7	372	56.7	478	65.7	586	55.3	522	71.9	469	79.2	3163	61.7
Leafy Vegetables Based Recipes	121	18.2	86	12.1	109	16.6	32	4.4	181	17.1	159	21.9	147	24.8	836	16.3
Roots and Tubers Based Recipes	179	26.9	83	11.7	191	29.1	208	28.6	244	23.0	500	68.9	77	13.0	1486	29.0
Other Vegetables Based Recipes	349	52.5	270	38.1	357	54.4	394	54.2	662	62.5	436	60.1	328	55.4	2814	54.9
Salads	-	-	14	2.0	-	-	207	28.5	17	1.6	51	7.0	30	5.1	383	7.5
Nuts & Oils Seeds Based Recipes	31	4.7	135	19.1	155	23.6	10	1.4	204	19.3	15	2.1	15	2.5	565	11.0
Condiments & Spices Based Recipes	13	2.0	14	2.0	15	2.3	-	-	26	2.5	5	0.7	-	-	73	1.4
Fruits Based Recipes	154	23.2	193	27.3	454	69.2	327	45.0	486	45.9	251	34.6	337	56.9	2212	43.1
Soups	-	-	5	0.7	18	2.7	-	-	13	1.2	7	1.0	-	-	44	0.9
Flesh Food Based Recipes	82	12.3	198	28.0	337	51.4	73	10.0	404	38.1	520	71.6	220	37.2	1834	35.8
Milk Based Recipes	645	97.0	609	86.0	644	98.2	727	100.0	1042	98.4	720	99.2	592	100.0	5010	97.7
Processed Fruit Juices	-	-	2	0.3	4	0.6	6	0.8	15	1.4	17	2.3	-	-	43	0.8
Carbonated Beverages	-	-	32	4.5	236	36.0	16	2.2	16	1.5	7	1.0	3	0.5	78	1.5
Biscuits	66	9.9	174	24.6	15	2.3	272	37.4	301	28.4	583	80.3	303	51.2	1950	38.0
Infant Foods	-	-	1	0.1	43	6.6	8	1.1	22	2.1	39	5.4	-	-	90	1.8
Chaat Items	45	6.8	40	5.6	-	-	49	6.7	76	7.2	236	32.5	18	3.0	507	9.9
Breakfast and Snacks	115	17.3	221	31.2	540	82.3	18	2.5	402	38.0	161	22.2	42	7.1	1499	29.2
Bakery Foods	84	12.6	77	10.9	70	10.7	338	46.5	163	15.4	183	25.2	187	31.6	1111	21.7
Sweets	93	14.0	69	9.7	37	5.6	29	4.0	52	4.9	176	24.2	21	3.5	477	9.3
Namkeen	131	19.7	117	16.5	170	25.9	141	19.4	265	25.0	180	24.8	109	18.4	1119	21.8
Chocolates	3	0.5	32	4.5	22	3.4	28	3.9	30	2.8	18	2.5	7	1.2	140	2.7
Glucose Powder	-	-	13	1.8	36	5.5	-	-	26	2.5	34	4.7	-	-	111	2.2
Fats and Oils	37	5.6	16	2.3	3	0.5	9	1.2	16	1.5	70	9.6	8	1.4	159	3.1

Table 3 : Average Consumption of Added Sugar from Different Recipe Groups (g/day)

Recipe groups	Ahmeda-bad	Bangalore	Chennai	Delhi	Hyderabad	kolkatta	Mumbai	Pooled
Cereals & Millet Based Recipes	8.4	4.7	10.9	14.2	6.2	12.5	33.8	9.9
Pulses Based Recipes	5.8	3.2	0.6	-	-	1.7	2.9	4.4
Leafy Vegetables Based Recipes	4.6	-	-	-	-	2.1	1.6	3.3
Roots and Tubers Based Recipes	2.7	-	1.9	5.0	-	1.6	1.9	2.2
Other Vegetables Based Recipes	6.9	4.4	2.7	-	6.5	3.3	1.8	4.6
Nuts & Oils Seeds Based Recipes	-	1.2	-	-	1.0	44.7	-	3.8
Condiments& Spices Based Recipes	-	-	-	-	3.4	-	-	2.7
Fruit Based	13.5	11.7	8.9	13.1	10.8	26.9	17.1	13.1
Milk Based	13.9	9.8	8.7	13.9	10.6	8.8	21.7	11.6
Processed Fruit Juices	-	30.6	-	5.9	-	10.8	-	12.0
Carbonated Beverages	-	14.0	-	-	22.0	23.7	11.7	17.2
Biscuits	3.7	5.0	5.2	3.9	6.3	3.2	2.9	3.8
Infant Foods	-	2.9	-	5.8	2.4	3.7	-	3.0
Chaat Items	-	1.5	-	-	-	2.0	-	1.6
Breakfast and Snacks	3.7	4.2	2.4	-	0.4	12.5	-	5.3
Bakery Foods	2.9	3.7	4.5	2.5	5.1	7.4	2.9	3.2
Sweets	25.7	27.2	26.6	15.4	16.2	13.8	26.8	21.0
Namkeen	6.0	-	-	-	-	-	-	6.0
Chocolates	4.6	8.4	6.7	3.1	2.8	10.6	10.5	6.5
Sugar & Jaggery	6.5	12.1	11.0	-	6.5	6.5	-	8.9

(Cities Pooled)

Table 4: Average Intake of Sugar from Different Recipes (g/day)*

	Name of the Recipe	No. of Individuals who Consumed the Recipe	Per Capita Consumption of the Recipe (g)	Average Quantity of Sugar Consumed from the Recipe(g)
4.1 Cereals Based Recipes				
	Kichidi/Pongal/Pulagam	519	108.0	4.6
	Mango Rice (pulihora)	13	129.2	1.8
	Masala Rice	50	145.3	4.1
	Rice Porridge/Gruel	27	20.2	5.0
	Tamarind Pulihora Rice	89	140.3	4.5
	Vegetable Biryani/Rice	140	219.5	3.2
	Rice Fakes Poha/Upma	86	132.7	3.1
	Rice Flakes with Milk and Sugar	22	96.0	21.3
	Rice Flakes-Chudva	42	55.1	8.4
	Puffed Rice- Chudva	26	49.8	7.7
	Other Preparations of Puffed Rice	365	42.7	10.5
	Broken Wheat Upma	42	51.6	15.2
	Wheat Chapati with Sugar	2393	131.4	12.5
	Wheat Dhal Bati	8	120.7	9.9
	Parota	458	112.2	5.4
	Stuffed Parota - Sweet	64	155.9	19.3
	Wheat Porridge/Gruel	17	158.4	26.0
	Wheat Flakes	3	68.3	2.5
	Semolina Porridge/Gruel	8	36.2	2.7
	Vermicelli Upma	18	118.4	9.6
	Ragi Chapathi	49	121.5	5.0
	Ragi Java/Porridge/Sari/Kodu	32	48.3	9.5
	Ragi Kali (Mudda)	104	136.3	4.6
	Oats with Milk	10	39.9	15.0
	Other Preparations with Oats	20	15.4	8.0
	Corn Flakes	18	76.2	2.8
	Corn Soup	2	55.5	5.0
	Other Preparations with Bajra	1	55.0	5.0
	Other Preparations with Cereals	10	70.8	5.0
4.2 Pulse Based Recipes				
	Bengal Gram Whole, Curry (gravy)	110	113.8	1.6
	Green Gram Dhal, Curry (gravy)	256	59.5	2.4
	Green Gram Dhal, Sambar type	43	83.5	14.0
	Lentil, Curry (gravy)	407	51.1	0.7

(Contd.)

	Peas Green, Curry (gravy)	56	73.2	0.7
	Red Gram dhal, Curry (gravy)	730	53.9	5.5
	Red Ggram Dhal,Deep fry	42	55.4	2.4
	Red Gram Dhal,Sambar type	795	102.7	2.9
	Red Gram Dhal ,With Vegetables	94	70.2	5.5
	Soya Bean, Curry (gravy)	67	74.3	0.9
	Other Pulses, Curry (gravy)	143	68.6	0.7
	Bengal Gram Dhal, Curry (gravy)	140	92.8	3.0
	Bengal Gram Dhal, Sambar type	10	20.5	3.8
	Bengal Gram Dhal, Chutney Powder dry	14	11	0.1
4.3 Leafy Vegetables Based Recipes				
	Cabbage, Curry/Fry	210	124.9	1.3
	Colocasia Leaves, Curry/Fry	12	108.8	2.4
	Coriander Leaves, Chutney	46	26.1	2.5
	Drum stick Leaves, Chutney	5	117.7	8.5
	Spinach,Curry/Fry	93	170.1	2.1
4.4 Roots and Tubers Based Recipes				
	Potato Curry	842	110.1	0.8
	Radish, Curry	18	101.7	3.8
	Sweet Potato, (Boiled & Seasoned)	9	109.8	7.8
	Sweet Potato, Fry	3	77.2	1.9
4.5 Other Vegetables Based Recipes				
	Bitter gourd, Curry	122	104.5	2.2
	Bottle gourd, Curry	193	133.0	3.3
	Bottle gourd, Masala Curry	2	281.0	1.5
	Brinjal, Curry	259	110.6	1.8
	Brinjal, Boiled & Seasoned	78	77.8	0.3
	Broad Beans, Curry	42	102.0	6.5
	Broad Beans, Fry	6	61.3	1.7
	Cauliflower,Curry	155	160.9	0.8
	Cluster Beans, Chutney	1	5.1	1.0
	Green Chillies, Curry	9	33.8	8.0
	Green Chillies, Chutney	24	17.5	8.4
	Ladies Finger, Curry	221	116.2	2.8
	Mango Green, Curry	13	84.8	37.4
	Mango Green, Chutney/Pickle	279	5.1	6.1
	Papaya Green, Curry	14	104.4	3.6
	Pumpkin, Curry	41	149.5	2.7
	Pumpkin, Boiled & Seasoned	3	44.3	0.9
	Ridge Gourd, Curry	156	120.9	1.8
	Tomato Green, Curry	127	76.5	7.5

(Contd.)

	Tomato Green, Boiled & Seasoned	16	31.9	0.3
	Tomato Green, Chutney	251	68.8	6.6
	Mixed Vegetables, Curry	642	153.2	2.5
	Others Vegetable, Curry	16	117.3	1.6
	Vegetable Marrow, Curry	25	247.8	3.2
4.6 Nuts and oil Seed Based Recipes				
	Coconut Chutney	284	35.9	1.1
	Ground nut Chutney	185	33.7	15.6
4.7 Condiments & Spices based Recipes				
	Ginger, Chutney	20	4.7	2.7
4.8 Fruit Based Recipes				
	Banana Juice	623	64.9	2.6
	Apple Juice	18	104.1	8.0
	Dates Juice	5	54.0	1.3
	Grapes Green Juice	4	73.5	15.0
	Guava Juice	3	104.6	23.7
	Lemon Juice	32	121.9	11.0
	Lemon Chutney/Pickle	30	4.8	0.7
	Lemon Sweet,Juice	4	117.0	21.1
	Lime Sweet Juice	47	159.9	12.9
	Litchi Juice	2	200.0	12.6
	Mango Ripe Juice	21	128.6	20.0
	Mango Ripe Chutney/Pickle	75	4.9	2.0
	Mask Melon Juice	7	59.2	16.7
	Orange Juice	4	12.5	7.5
	Pome Granate Juice	8	121.5	11.5
	Sapota Juice	3	223.8	6.6
	Straw Berry Juice	4	39.1	6.7
	Tomato Ripe Juice	106	163.4	63.2
	Tomato Ripe, Rasam	174	40.3	0.2
	Tamarind, Chutney/Pickle	16	12.2	5.1
	Tamarind, Rasam	285	26.8	1.7
	Wood Apple, Chutney/Pickle	2	17.1	6.3
	Mixed Fruits, Juice	12	60.6	5.5
	Peach, Chutney/Pickle	29	15.6	5.4
	Peach, Juice	12	60.8	8.6
	Phalsa, Chutney/Pickle	4	4.5	9.0
	Fruit Juice with Other Fruits	3	116.3	45.0
4.9 Soups				
	Soups Veg	19	112.2	5.8
	Soups Non-Veg	25	145.6	10.0

(Contd.)

4.10	**Milk Based Recipes**			
	Butter milk with Sugar	304	108.1	12.4
	Milk shake -Fruit	18	206.4	12.3
	Tonned Milk	109	115.6	12.4
	Badam Milk	5	115.3	6.0
	Choco-bar	11	0.8	0.1
	Ice cream-Cone	12	68.3	11.5
	Ice cream-Bar	5	8.0	4.6
	Ice cream-Cup	62	54.8	6.7
	Curd with Sugar (Buffalo)	509	65.6	4.9
	Curd with Sugar (Cow)	242	154.0	9.0
	Khadi	136	125.4	4.2
	Pudding	2	171.5	3.0
	Raita	122	91.0	1.5
	Khulfi	1	15.0	1.7
	Lassi /Faluda	35	110.2	10.4
	Black Tea	338	97.2	8.2
	Green Tea	44	115.0	7.3
	Masala Tea	85	106.4	16.3
	Lemon Tea	10	116.9	8.0
	Black Coffee	16	137.5	16.4
	Flavored Coffee	4	151.7	11.6
	Tea	4049	124.0	14.4
	Coffee	708	101.0	9.8
	Milk with Health Drink	889	118.4	5.6
	Milk with Sugar	1234	106.9	9.7
4.11	**Processed Fruit Juices**			
	Processed Fruit Juice	47	76.8	13.8
4.12	**Carbonated Beverages ***			
	Carbonated Beverages (make 1)	12	188.3	20.5
	Carbonated Beverages (make 2)	8	217.5	21.5
	Carbonated Beverages (make 3)	7	97.1	9.7
	Carbonated Beverages (make 4)	13	146.5	18.9
4.13	**Biscuits ***			
	Biscuit -1	82	12.5	6.1
	Biscuit -2	6	20.0	6.0
	Biscuit -3	3	9.0	3.2
	Biscuit -4	89	12.9	5.5
	Biscuit -5	76	14.2	3.6
	Biscuit -6	319	16.0	4.8
	Biscuit -7	174	12.0	3.2

(Contd.)

	Biscuit -8	428	13.0	4.1
	Biscuit -9	26	9.1	1.2
	Biscuit -10	9	8.0	3.2
	Biscuit -11	11	15.0	3.6
	Biscuit -12	650	12.8	2.7
	Biscuit -13	40	20.8	7.6
	Biscuit -14	18	9.4	3.2
	Biscuit -15	84	14.3	3.9
	Other biscuits	156	13.5	3.9
4.14	**Infant foods**			
	Infant Formula Food	69	9.8	1.0
4.15	**Chat based Recipes**			
	Beel Puri	3	50.0	1.5
	Veg Noodles	178	80.1	2.0
4.16	**Breakfast based**			
	Chocolate Flakes	7	104.6	10.0
	Macaroni/Pasta	16	198.4	0.5
	Puri	302	70.4	1.1
	Upma with Sugar	117	84.0	3.7
	Other Snack Preparations	33	37.6	2.0
4.17	**Bakery Foods**			
	Black Forest Cake/Pastry	9	5.9	0.9
	Brown/Wheat Bread	234	25.0	4.2
	Burger- Non-Veg	10	40.1	2.9
	Burger-Veg	4	25.0	1.8
	Butter Biscuits	16	19.0	6.9
	Cake with Fruits	5	54.4	10.2
	Chocalate Cake/Pastry	8	50.0	11.4
	Cream Doughnuts	2	40.0	8.0
	Cup Cake	24	20.6	5.8
	Dilkhush	2	10.0	5.8
	Dilpasand	4	35.0	5.8
	Fruit Cake /Pastry	3	5.0	0.7
	Jeera Khari	1	130.0	2.0
	Ketchup	8	23.0	1.7
	Masala khari	2	30.0	0.3
	Milk Bread	106	29.3	3.9
	Osmania Cookies	15	28.3	4.4

(Contd.)

	Pizza-Non Veg	5	211.4	2.5
	Pizza-Veg	9	117.3	1.0
	Plain Khari	4	49.0	0.3
	Plum Cake	4	25.0	8.4
	Sandwich Bread	24	50.3	8.0
	Toast/Rusk	514	11.6	2.6
	Veg. Hot Dog	2	118.0	1.4
	Veg. Sandwich	12	120.0	2.6
	Sauce All Varieties	12	5.8	0.8
4.18	**Sweets**			
	Badhusha	9	36.1	8.7
	Besan Laddu	11	36.1	17.2
	Boondhi Laddu	15	27.9	11.0
	Carrot Halwa	9	172.7	41.1
	Coconut Laddu	9	50.2	9.9
	Groundnut Chikki/Barfi	6	50.0	34.8
	Gullab Jamun	7	176.0	45.9
	Pooran Poli/Holigae (Bobattu)	15	95.8	31.3
	Jalabi/Jelabi	7	74.3	20.7
	Kaju Barfee	3	36.7	11.3
	Kheer (Dhal)	6	159.4	28.5
	Kheer/Payasam (Dago, Vermicelli, Rice, Semolina)	70	140.5	28.0
	Mysore Pak	8	34.8	8.0
	Payasam -Poppy Seed	5	249.8	91.3
	Peda	9	2.9	0.5
	Puffed Rice Laddu	2	19.0	6.0
	Rasgulla-Big	44	97.6	19.9
	Rasgulla-Small	15	93.1	21.1
	Rasmalai	4	87.5	30.9
	Sheermall-Wheat Based Sweet	7	76.2	14.9
	Sonpapidi	5	38.6	11.7
	Suji, Vermicelli-Halwa/Kesari	25	78.9	21.7
	Til Laddu	2	188.0	27.0
	Mixed Fruit Jam	48	25.3	9.7
	Other Sweets	168	34.6	18.0

(Contd.)

4.19	**Namkeen**			
	Papad/Vadiyalu/Appadam (Sev/Bujia/Mixture/Poha)	348	48.1	6.0
4.20	**Chocolates**			
	Chocolates of all Varieties	143	10.9	7.0
4.21	**Sugar and Honey (Directly added to the meal)**			
	Sugar	107	9.3	9.3
	Honey	4	4.0	4.0

* The quantity of sugar was computed based on the label data, and also collected from other sources, but not on the basis of exact chemical analysis. The exact quantity of sugars content may vary to some extent.

GLOSSARY

NNMB	:	National Nutrition Monitoring Bureau
ICMR	:	Indian Council of Medical Research
ILSI	:	International Life Sciences Institute
NIN	:	National Institute of Nutrition
Visible Fat	:	Added Fat
Visible Fat	:	Fat/Oil used during the process of cooking/preparation/eating.
HH	:	House Hold
SC	:	Scheduled Caste
ST	:	Scheduled Tribe
BC	:	Backward Classes
OC	:	Other Caste (Forward Caste)
Artisan	:	Skilled Workers
Other Occupations	:	Priest, Pensioners, Beedi Workers, etc.
Dependants	:	Students, Children, Elderly (non earning people)
Sedentary Activity	:	A sedentary activity is defined as one which involves sitting, a certain amount of walking and standing is often necessary in carrying out job duties (White Collar duties involving less physical activity).
Moderate Activity	:	A moderate activity is defined as one which involves reasonable or limited activity without extreme or excessive, or intense moments.
Infant Foods	:	Commercial Baby Foods
Chaat Items	:	Chaat items/foods are defined as savoury snacks, typically served at road-side outlets or from food stalls or food carts.
Breakfast/Tiffin Items	:	The breakfast/Tiffin foods are eaten primarily as the first meal of the day. (Examples: Idli, Dosa, Pongal, Kichidi, Vada, Bajji, Upma, Puri, Parata, Chapati etc…)
Namkeen	:	Namkeen is the food which will give the savory flavor. Namkeen is used as a generic term to describe savory snack foods. (Chkodi, Boondi, Chakli/Muruku, Mixture, Sev, Pakodi)
Appadam	:	Papad
Dilkush	:	Bread with Sweet Stuffing
Dilpasand	:	Bread with Dry Fruits and Sweet Stuffing

International Life Sciences Institute India

Email: info@ilsi-india.org Website: htpp//www. ilsi-india.org